

**STATE OF MINNESOTA  
OFFICE OF ADMINISTRATIVE HEARINGS  
FOR THE MINNESOTA ENVIRONMENTAL QUALITY BOARD**

In the Matter of the Exemption Application  
by Minnesota Power for a 345/230 kV High  
Voltage Transmission Line Known as the  
Arrowhead Project

**FINDINGS OF FACT,  
CONCLUSIONS AND  
RECOMMENDATION**

This matter was heard by Administrative Law Judge Kenneth A. Nickolai beginning at 9:00 a.m. on August 28, 2000, continuing for technical hearings on August 29 through September 1, and September 5-9, 2000. Public hearings were held on August 28 and August 29, 2000, from 7:00 p.m. to approximately 10:30 p.m. Hearings were held at the Black Woods Conference Center 195 Highway 2, Proctor, Minnesota. [1] Following the close of the hearing, with agreement of all parties, the Administrative Law Judge toured the proposed route with guidance of EQB staff member, Bob Cupit. The record remained open for the submission of public comments until September 13, 2000. Initial briefs were filed on November 15, 2000 and reply briefs on December 5, 2000. The record in this matter closed for all purposes on December 5, 2000.

Appearances: Michael C. Krikava, Briggs & Morgan, 2400 IDS Center, 80 South 8<sup>th</sup> Street, Minneapolis, MN 55402, and Deborah Amberg, Senior Attorney for Minnesota Power, 30 West Superior Street, Duluth, MN 55802-2093 appeared on behalf of Minnesota Power ("Applicant", "Company" or "MP"). Dwight Wagenius, Assistant Attorney General, 900 NCL Tower, 445 Minnesota Street, St. Paul, MN 55101-2127, appeared on behalf of the Minnesota Environmental Quality Board ("MEQB"). Bob Cupit, MEQB Staff Project Manager, 300 Centennial Building, 658 Cedar Street, St. Paul, Minnesota 55155, represented the MEQB staff. Suzanne Steinhauer, Public Advisor, 300 Centennial Building, 658 Cedar Street, St. Paul, Minnesota 55155, appeared to assist members of the public participating in this proceeding. Ginny Zeller, Assistant Attorney General, 525 Park Street, Suite 200, St. Paul, MN 55103-2106, appeared on behalf of the Minnesota Department of Commerce ("Commerce"). George Crocker, PO Box 174, Lake Elmo, MN 55042, appeared on behalf of the North American Water Office ("NAWO"). Pam McGillivray, Garvey & Stoddard, 634 West Main Street, Suite 201, Madison, WI 53703, appeared on behalf of Save Our Unique Lands ("SOUL"). Carol A. Overland, Attorney at Law, 402 Washington Street So., Northfield, MN 55057, appeared on behalf of World Organization for Landowner Freedom ("WOLF").

Notice is hereby given that pursuant to Minnesota Statutes § 14.61 and Minn. Rule 4405.0900, exceptions to this report, if any, by any party adversely affected must be filed within fourteen (14) days of the mailing date of this document. Exceptions must be filed with the Director of the Minnesota Environmental Quality Board, 658 Cedar Street, St. Paul, Minnesota 55155. Exceptions must be specific and stated and numbered separately. Proposed Findings of Fact, Conclusions and Order should be included, and copies thereof shall be served upon all parties.

The MEQB will make the final determination of the matter after the expiration of the period for filing exceptions as set forth above or after oral argument if such is requested and granted in this matter.

Further notice is hereby given that the MEQB may accept or reject the Administrative Law Judge's Recommendation.

### **STATEMENT OF ISSUE**

May the Minnesota Environmental Quality Board exempt the proposed Arrowhead Project from the requirements of the Minnesota Power Plant Siting Act (Minn. Stat. §§ 116C.51-.69) and, if so, should the requested exemption be granted?

Based upon all the proceedings herein, the Administrative Law Judge makes the following:

### **FINDINGS OF FACT**

#### **A. Procedural History**

1. The Applicant, MP, is an investor-owned corporation engaged in the production, distribution, and sale of electricity. MP seeks an exemption from the requirements of the Power Plant Siting Act (Minn. Stat. Chap. 116C or PPSA) allowing it to upgrade an existing power line from the Arrowhead substation connecting to a facility at Oliver, Wisconsin. The line upgrade will only be completed if the State of Wisconsin approves construction of a 345 kV HVTL from Oliver, Wisconsin to the Weston substation.<sup>[2]</sup> Before filing this request for exemption, MP held public information meetings in Midway Township, Minnesota on May 26 and 27, 1999 on their proposal to upgrade the power line. These meetings were held at 2:00 p.m. and 7:00 p.m. in the Midway Town Hall. Notices of the meetings were published in local newspapers and mailed to landowners within 1,000 feet of the proposed right-of-way; local, state, and federal agencies; and elected governmental representatives.<sup>[3]</sup>

2. On September 16, 1999, MP submitted an application for exemption from the PPSA to the MEQB for the proposed 345/115-kV Transmission Line addition and rebuild.<sup>[4]</sup>

3. Notice of the exemption application was published in the *Duluth News-Tribune* newspaper on September 19, 1999, the *Duluth Budgeteer* on September 26, 1999, and the *Proctor Journal* on September 23, 1999. (MEQB Exhibit 2.) The notice

described the proposed project and provided that interested persons had the opportunity to comment and to request a public hearing. Similar information was included in the letters mailed to affected landowners and government officials. (MEQB Exhibit 2.) Those letters were mailed on September 21, 1999. *Id.*

4. The MEQB received nine objections to the application for exemption. On November 18, 1999, the MEQB met and ordered that a public hearing be held on the application. (MEQB Exhibit 4.) The MEQB also received over one thousand public comments responding to the public notice of MP's application.<sup>[5]</sup>

5. Notice of the public hearing in this matter scheduled for January 31, 2000 was given by publication in the *Duluth News-Tribune* on December 17, 1999 and January 23, 2000. (MEQB Exhibits 5a and 5b.) Because a motion to clarify the scope of this proceeding was certified by the Administrative Law Judge to the MEQB, that scheduled public hearing was postponed. (MEQB Exhibit 5c.)

6. The MEQB issued an Order Clarifying Scope of Hearing Record on May 3, 2000 "that the hearing be limited to impacts from the construction or operation of the project facility on human health and the environment experienced in Minnesota." (MEQB Exhibit 7, at 8.) The matter was then remanded to the Administrative Law Judge for hearing.

7. The Notice of Public Hearing was published in the *Duluth News-Tribune* on August 11, 2000. (MEQB Exhibit 5e.) The hearing schedule was also published in the *EQB Monitor* on August 21, 2000. (MEQB Exhibit 5g.) Both of these notices indicated that updated information about the hearing process would be posted on the Internet at the site maintained for this proceeding, located on the OAH website at <http://www.oah.state.mn.us/cases/arrowhead/arrowhead.html>. The Notice of Public Hearing was mailed to each of the persons on the MEQB's list of persons who had requested notice and to three officials of affected units of local government. (MEQB Exhibit 6b.)

## **B. Existing Facilities and Route**

8. MP owns and operates an electric power substation, known as the Arrowhead substation, covering 22 acres<sup>[6]</sup> in Hermantown, MN.<sup>[7]</sup> The substation was first developed in 1962, was expanded in 1971 and 1977, and is now MP's second largest substation.<sup>[8]</sup> The substation has twelve power lines running from it connecting to other facilities.<sup>[9]</sup> One of those power lines is a 115 kV line, which leaves the substation in a southerly direction crossing the St. Louis River at Gary-New Duluth, Minnesota and Oliver, Wisconsin and connecting to another utility's facility in Oliver, Wisconsin.<sup>[10]</sup>

9. Three of the five 115 kV power lines exiting the substation to the south run in a common right of way corridor for 3.2 miles. These three lines are known as Lines 22, 70 and 131. Line 22 is the line located farthest west of the three lines in the 3.2 mile corridor.<sup>[11]</sup> Only Line 131 continues south and east for six miles to the substation at Gary, Minnesota. Line 131 currently travels along the western edge of the

DM&IR railroad tracks, adjacent to homes in Gary<sup>[12]</sup>. From the Gary substation, a line designated as Line 132 provides the existing 115 kV connection to facilities at Oliver, Wisconsin. The route now occupied by Lines 22, 131 and 132 (except for 0.8 miles along the DM&IR rail yard) is the route proposed for the line rebuild and addition.

### C. The Proposed Power Line and Route

10. MP proposes a 345/115 kV double circuit HVTL running from the Arrowhead substation for a distance of approximately 12.5 miles to the Wisconsin border at Oliver, Wisconsin.<sup>[13]</sup> The proposed transmission line (hereinafter "the Arrowhead Project") will follow existing power line right-of-way, except for eight-tenths of a mile. The width of the right-of-way will be increased by twenty feet along approximately 3.2 miles of the route. MP proposes to use double circuit, single pole structures set upon concrete foundations to support the lines. A 48-strand fiber-optic cable is proposed along the top of the new structure. The fiber-optic cable would be used for communications, including information transfer needed in transmitting electricity.<sup>[14]</sup> The initial 3.2 miles of 115 kV power line will be constructed for operation as a 230 kV HVTL (but only operated at 115 kV).<sup>[15]</sup> Six additional facility changes would need to be undertaken prior to operating that line at 230 kV.<sup>[16]</sup>

11. The Arrowhead Project, including the 345 kV HVTL connection from the Arrowhead substation to a line at Oliver, Wisconsin, includes the major following facility changes to the Arrowhead substation:

- Increase the area covered by substation equipment by 10 acres, increasing it from 22 to 32 acres.<sup>[17]</sup>
- Adding four single-phase 345/230 kilovolt transformers to interface with the 345 kV line. These transformers step up the voltage from 230 kV to 345kV.<sup>[18]</sup>
- Adding one 230 kV to 230 kV phase-shifting transformer to adjust the phase angle of electricity being transmitted on the 345 kV HVTL.<sup>[19]</sup>
- Adding control equipment, switched capacitors, 230 kV circuit breakers, and 345 kV circuit breakers.<sup>[20]</sup>

Major changes to the transmission line facilities and route from the proposed project will be described by line segment:

12. The first segment ("Midway segment") is the 3.2 mile corridor from the Arrowhead substation to Midway Township.<sup>[21]</sup> The geography of segment 1 is flat, with areas of wetlands and woods. The existing right of way currently holds three 115 kV lines. The changes proposed for this segment include:

- Dismantling the existing 115 kV line<sup>[22]</sup> on the western side of the corridor, and the H frame structures supporting it.
- Replacing that line with a double circuit, single pole, steel structure designed for 345/230 kV operation for the first 3.2 miles. The single pole, steel structures would be placed in a concrete foundation.
- Placing a 345 kV high voltage transmission line on those structures, extending from the Arrowhead substation to Oliver, Wisconsin, as part of a circuit intended to terminate at the Weston substation near Wausau, Wisconsin.
- Also placing on those structures, for 3.2 miles, a 230 kV circuit. This 230 circuit would initially be operated at 115 kV replacing the 115 kV line currently connecting to Hibbard in this segment of the corridor.
- Reconfigure the power line arrangement in the initial 3.2 mile corridor to substitute the new 230 kV circuit for the existing 115 kV line now running to Hibbard. The existing 115kV line now serving Hibbard would be used to provide service from the Arrowhead substation to the Cloquet substation.
- Widening the initial 3.2 miles of right of way by 20 feet on the westerly side of the corridor.<sup>[23]</sup>

13. Segment 2 ("Beck's Road segment") runs six miles through Midway Township, along the west end of the City of Duluth, and terminating at the City of Gary.<sup>[24]</sup> This segment begins with geography similar to the Midway segment until the right of way crosses Interstate Highway 35. At that point, the Beck's Road segment crosses a ridge and follows the base of that elevation, closely paralleling railroad tracks traveling to the southeast. The area around the right of way is wooded. Several gravel pits and a bituminous asphalt plant are located near the right of way. Major facility changes in this segment include:

- Dismantling the present Arrowhead-Gary 115 kV line identified as Line 131 and the H frame structures supporting the line.
- Replacing the structures with single pole structures with two circuits: a 345 kV line as described in segment one and a 115kV line.
- No changes are anticipated to the right of way in this six-mile segment.

14. Segment 3 ("Gary segment") travels east, beginning near Commonwealth Avenue in Gary, Minnesota, then turns south at the DM&IR Railroad tracks and follows those tracks south to the Wisconsin border. This existing line is identified as Line 132. The transmission line parallels the existing crossing of the St. Louis River into Wisconsin (the Highway 39 railroad/vehicle bridge).<sup>[25]</sup> The area along the right of way

has some residences, but is predominantly occupied by industrial uses. The Gary segment is 2.8 miles long. Major changes in this portion of the corridor include:

- Dismantling the existing 115kV identified as Line 132.
- Abandoning 0.8 mile of existing right of way.
- Establishing a new right of way for that piece of the route approximately 900 feet east of 96<sup>th</sup> Avenue West in Gary. This new portion of the right of way will be a 100-foot-wide right of way east of the DM&IR railroad tracks.
- Replacing the dismantled structures and establishing two circuits, a 345 kV circuit as described above and a 115kV circuit replacing the existing Line 132.

15. In all the segments, the 345 kV circuit will consist of two-wire bundled 1272 kcmil ACSR conductor for each of the three segments for a total of twelve. The 115 kV circuit will consist of a single 954 kcmil ACSR conductor.<sup>[26]</sup> The 230 kV segment will use a single 954 kcmil ACSR conductor, the same as that used on the 115 kV portion of the line.<sup>[27]</sup> Shield wire and optical ground wire will be utilized for lighting protection and communication.<sup>[28]</sup> The 345 kV HVTL will include new steel structures, hardware, insulators and wire. The proposed 345 kV HVTL will have a minimum clearance of 30 feet from the conductor to ground.<sup>[29]</sup> The line has a maximum achievable operating temperature of 100 degrees Centigrade (212 degrees Fahrenheit).<sup>[30]</sup>

16. The transmission lines will be supported by double-circuit single pole structures for straight, inline, and slightly-angled locations. Single poles will be composed of self-weathering steel. MP originally proposed that lines could be supported by steel lattice structures at medium-angled, heavy-angled, and dead-end locations. Lattice structures will be composed of hot-dipped galvanized steel. Both lattice and pole structures will be supported by concrete structures extending approximately twenty feet below grade. The maximum below grade depth of the footing will be forty feet, in situations where the ground provides little shear strength and fifty feet for heavily-angled structures.<sup>[31]</sup> The average height of the structure is 135 feet.<sup>[32]</sup> The tallest structure could extend to approximately 185 feet above grade.<sup>[33]</sup> Connection of the conductors to the supporting structures will be accomplished using dampers to control vibration.<sup>[34]</sup>

17. Power for the lines will be drawn from existing power flowing into the Arrowhead substation from generating facilities in North Dakota and Manitoba, Canada.<sup>[35]</sup> The existing flows enter at 230 kV, 115 kV, and 250 kV (from a DC line originating at the Square Butte substation in North Dakota).<sup>[36]</sup> These flows will be stepped up to 345 kV for transmission on the 345 kV line.

## **D. Exemption Standards**

18. MP has applied for an exemption from the siting process under Minn. Stat. § 116C.57, subd. 5. In determining whether to grant the exemption, the MEQB must apply the following standard:

If the board determines that the proposed high voltage transmission line will not create significant human or environmental impact, it may exempt the proposed transmission line with any appropriate conditions, but the utility shall comply with any applicable state rule and any applicable zoning, building and land use rules, regulations and ordinances of any regional, county, local and special purpose government in which the route is proposed.<sup>[37]</sup>

19. The MEQB Rule 4400.3900 governs the exemption application process. Minn. Rule 4400.3900, subp.1a requires the applicant to provide a "description of the potential human and natural environmental effects..." as identified in Minn. Rule 4400.1310.<sup>[38]</sup> The following findings address the categories of impacts listed in Minn. Rule 4400.1310, subp. 1.

## **E. Assessment of Impacts**

### ***Effects on Human Settlement***

#### *Displacement*

20. No residential dwellings would be displaced by the proposal and there are no homes or garages located within the proposed right-of-way. The existing transmission line route has been used for approximately 20 years. In the Midway and Beck's Road segments, the route passes through sparsely populated areas. A railroad yard separates the proposed route from the residential development in Gary-New Duluth.<sup>[39]</sup> MP identified nine homes located within three hundred feet of the centerline of the right-of-way.<sup>[40]</sup> The nearest distance between a home and the centerline of the HVTL is between 160 to 180 feet.<sup>[41]</sup> The distance between several homes and the western edge of the right of way will be reduced by twenty feet in the segment running south from the Arrowhead substation for 3.2 miles (Midway segment).<sup>[42]</sup> The distance between the edge of the right of way and homes on the east side will not change. No specific distance is recommended as needed between HVTL and homes.<sup>[43]</sup> The relocation of the right of way in segment 3 will result in the power line being removed from a residential area.<sup>[44]</sup> This will result in a number of homes being farther from the line than previously.

#### *Noise*

21. Two sources of additional noise from the proposed project were identified. These sources are noise from changes to the Arrowhead substation and noise from the additional 345 kV line. MP measured existing noise levels from operation of the Arrowhead substation at several locations. Those measurements show

that noise levels at the substation property lines are currently within the MPCA noise standards.<sup>[45]</sup> Short term measurements taken show constant sound levels (L90) ranging from 35 dba to 43 dba<sup>[46]</sup> The middle level of sounds (L50) experienced at those locations ranged from 37 dba to 45 dba.<sup>[47]</sup> The high-end sounds (L10) experienced at those locations ranged from 40 dba to 48 dba.<sup>[48]</sup> The MPCA noise standards for residences are 60 dba (L50) and 65 dba (L10) in the daytime, and 50 dba (L50) and 55 dba (L10) at night.<sup>[49]</sup>

22. The phase shifting transformer to be added at the substation will emit 89 dba<sup>[50]</sup> measured at a distance of one meter. Each of the other three transformers will emit 84 dba at that distance.<sup>[51]</sup> After these additions, the calculated noise levels are 47 dba at 2000 feet from the substation and 50 dba at 1,400 feet.<sup>[52]</sup> Due to the nature of the noise generated, these noise levels are expected to be constant, that is, the noise levels will be the same at all hours of the day and night.<sup>[53]</sup> There are at least two residences within 1,200 feet of the substation.<sup>[54]</sup> The increase in noise levels is likely to exceed 10 dba at the location of the residences.<sup>[55]</sup> Unless noise is reduced by some other mechanism, the noise levels at the nearest residences are likely to exceed 50 dba at night.<sup>[56]</sup>

23. An increase of 10 db in a sound level is perceived by the human ear as being twice as loud.<sup>[57]</sup>

24. The increased levels of sound produced by the addition of the transformers for the Arrowhead project can be reduced to below 50 dba at the nearest residences through noise mitigation. Effective noise mitigation can be achieved through the use of lower noise level transformers, the installation of sound barriers, or the use of a combination of both methods.<sup>[58]</sup> Using noise mitigation technology will prevent nearby residents from perceiving a significant increase in the noise emitted from the Arrowhead substation.

25. The second source of noise is from operation of the lines. Directly under the line in periods of high humidity when the 345 kV HVTL is operated in corona, the noise level will be approximately 50-55 dba.<sup>[59]</sup> That sound becomes attenuated within approximately 100 feet and is no longer audible at that distance.<sup>[60]</sup>

### *Cultural Values*

26. The Minnesota Historical Society State Historic Preservation Office identified no properties listed on the National or State Registers of Historical Places, nor any known or suspected archaeological properties.<sup>[61]</sup> No properties were identified as eligible for inclusion on those Registers. There are no significant cultural resources associated with the proposed route.

### *Aesthetics*

27. The existing transmission line is supported by H frame poles<sup>[62]</sup> of approximately 65 to 75 feet in height, with an above ground height of 56.5 to 66.5 feet.<sup>[63]</sup> For this project, MP intends to replace those poles with approximately 104

self-weathering steel structures.<sup>[64]</sup> The tallest structure would be not higher than 185 feet with a predominate structure height approximately 130 feet above ground.<sup>[65]</sup> Taller structures are required because of the proposed design of three conductors for each circuit stacked vertically.<sup>[66]</sup> The total number of poles will be reduced by replacing an H frame structure with a single pole structure.<sup>[67]</sup> At some angle locations, up to three poles may be replaced with a single, taller pole. The footprint of the single-pole structure is smaller than the footprint of the combined perimeter of the two or three-pole structures.<sup>[68]</sup>

### *Recreation*

28. Two of the three segments of the route, the Beck's Road segment and the Gary segment, contain recreational areas near the right of way. Magney Park, Short Line Park, Merritt Park, and portions of the Willard Munger Trail are within relatively short distances of the Beck's Road segment and portions of the Gary segment. The Buffalo House Campground is within a half-mile south of the Beck's Road segment. Fond du Lac State Park is located within one mile of the Beck's Road segment at the nearest point to the park boundary.<sup>[69]</sup> Both the Willard Munger Trail and the Western Waterfront Trail intersect the existing power line right of way.<sup>[70]</sup> The proposed HVTL runs along the existing power line right of way.

29. Short Line Park lies between two sets of railroad tracks along a sloping elevation below Elys Peak.<sup>[71]</sup> There is no direct road access, provision for automobile parking, or facilities in Short Line Park for recreation.<sup>[72]</sup> Short Line Park is occasionally used by rock climbers.<sup>[73]</sup> The existing 115 kV power line abuts the western end of Short Line Park.

30. Merritt Park lies directly south of Short Line Park, south of Beck's Road and the existing 115 kV power line right of way.<sup>[74]</sup> At its nearest point, the power line right of way is within 1,000 feet of Merritt Park.<sup>[75]</sup> There is road access to Merritt Park, from Beck's Road, but no facilities are located there for recreation activities. A demolition landfill is located adjacent to Merritt Park.<sup>[76]</sup>

31. Magney Park is located atop the ridge overlooking the Gary segment and much of the Beck's Road segment.<sup>[77]</sup> A portion of the Willard Munger Trail runs through Magney Park. Direct road access is provided to Magney Park by Skyline Parkway. There are no facilities in Magney Park for recreation.<sup>[78]</sup>

32. The Willard Munger Trail and Western Waterfront Trail are recreational trails. The Willard Munger Trail is constructed along an abandoned railroad right of way.<sup>[79]</sup> It runs parallel to the power line right of way for approximately 1,000 feet with a distance of 300 to 400 feet separating the two.<sup>[80]</sup> The two intersect at one point. The Willard Munger Trail is a popular recreational resource. The 345 kV HVTL will not be significantly more visible to users of the Willard Munger Trail than the existing 115 kV power line that currently occupies the right of way.

33. The Western Waterfront Trail runs along a railroad right of way located along the St. Louis River.<sup>[81]</sup> The City of Gary, radio towers, extensive railroad facilities, and a steel casting plant are all visible to the landward side of the Western Waterfront Trail.<sup>[82]</sup> The existing 115 kV power line is visible from all points of the Western Waterfront Trail.<sup>[83]</sup>

34. The Buffalo House Campground is south of the Beck's Road segment of the proposed right of way. The Campground is located within a half-mile of the right of way, where the right of way crosses Interstate 35.<sup>[84]</sup> A restaurant is located at the entrance to the Campground.

35. The Fond du Lac State Park is located approximately one mile south of the 115 kV power line right of way at its nearest point.<sup>[85]</sup> The topography between the right of way and the State Park precludes park visitors from seeing the Arrowhead HVTL.<sup>[86]</sup>

36. There are no long-term impacts on public recreation arising out of the Arrowhead Project. There may be temporary interruptions to some recreational uses during the construction period.<sup>[87]</sup>

#### *Public Services*

37. MP will notify the DM&IR railroad when installation of the 345 kV HVTL and 115 kV power line will be affecting the railroad's trackage. Similar notification to the Minnesota Department of Transportation will occur when the construction crosses Interstate 35. MP will schedule its construction activities to minimize the affect on vehicular traffic.<sup>[88]</sup> There are no impacts on public services arising out of the Arrowhead Project.

#### **Public Health and Safety**

38. Electric and magnetic fields (EMF) arise from the flow of electricity and the voltage of a line. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors.<sup>[89]</sup> There are no state or federal standards for transmission line electric fields. The MEQB has included permit conditions for other transmission lines specifying that maximum electric fields must not exceed 8 kV/meter.<sup>[90]</sup> The maximum anticipated electric field exposure, measured directly under the HVTL is approximately 6.5 kV/meter.<sup>[91]</sup> Within 100 feet of the centerline of the HVTL, the electric field strength nears zero.<sup>[92]</sup>

39. EMF is also measured in milligauss (mG). Common electrical appliances produce EMF fields while in operation, as do HVTLs. The Arrowhead Project will increase EMF exposures for persons living along the right of way above current EMF levels.<sup>[93]</sup> The amount of the increase is small, ranging from approximately 50 mG at the edge of the right of way to approximately 10 mG at the distance of the nearest home to the Arrowhead HVTL.<sup>[94]</sup> These increased levels occur at the periods of peak flow and are present approximately 5% of the time.<sup>[95]</sup>

40. The record of this matter contains an evaluation of research and investigations conducted into the effects of HVTL, including "electric fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values."<sup>[96]</sup> Research into human health impacts from electric fields, issued by the National Institute of Environmental Health Sciences shows "weak scientific evidence that exposure may cause a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern."<sup>[97]</sup>

41. The "Henshaw Hypothesis" asserts that aerosols are affected by the electromagnetic fields surrounding HVTL, resulting in the deposition of particulate matter under and around power lines, resulting in adverse health effects.<sup>[98]</sup> The research conducted into the Henshaw Hypothesis does not support a conclusion that adverse environmental effects or health effects arise from the presence of aerosols or deposition of particulate matter in the area of HVTLs.<sup>[99]</sup>

42. Electric currents in the earth can be caused by transmission of electricity where grounding is used to complete the electric circuit.<sup>[100]</sup> In one of the two design options under consideration, the Arrowhead HVTL will use grounding only in one location for every distinct segment of HVTL (approximately one to two miles apart).<sup>[101]</sup> The other design option uses grounding at only one end of the line. Both arrangements prevent completion of an electric circuit in the earth between the segments.<sup>[102]</sup> There is no evidence of adverse health effects arising from such currents.<sup>[103]</sup>

### ***Land-Based Economies***

43. An aggregate quarry (gravel pit) operates adjacent to the Beck's Road segment. There is no indication that current or future operations of the quarry will be affected by the Arrowhead HVTL. Since the Arrowhead HVTL will be using existing right of way currently occupied by a 115 kV power line, the impact on land values from the proposed 345 kV HVTL will not be significant. With the increase of the width of the Midway segment of the right of way some additional agricultural land will be affected, but the effect is not significant. No significant effects on land-based economies have been identified arising out of the Arrowhead Project.

### ***Archaeological and Historic Resources***

44. No archaeological or historic resources have been identified along the route of the Arrowhead Project HVTL. No significant effects on archaeological or historic resources have been identified arising out of the Arrowhead Project.

### ***Natural Environment***

45. Ten acres of cleared, undeveloped ground will be occupied by equipment when the Arrowhead project is constructed. A twenty-foot-wide area, 3.2 miles in length will be cleared in order to widen the existing right of way. No environmental resources have been identified that would be affected by this clearing. Use of the existing right of way reduces the potential long-term impact to a minimum. MP has indicated that, where the line crosses wetlands, construction will occur in winter, when the ground is

frozen. Where wetlands are not sufficiently frozen, mats will be used to minimize damage to plant life present.<sup>[104]</sup> No significant adverse effects on the natural environment have been identified from the operation of the Arrowhead HVTL.

### ***Rare and Unique Natural Resources***

46. The Natural Heritage and Non-game Research Program of the Minnesota Department of Natural Resources (DNR-NHNRP) conducted a review of its records to assess the potential impact of the Arrowhead Project on rare or unique plant or animal species. DNR-NHNRP indicated that seven known instances of such plants and animals exist in the area, but not within 1,000 feet of the HVTL right of way.<sup>[105]</sup> These instances are four observations of lake sturgeon, two observations of moschatel (a flowering plant) and one observation of Carolina spring-beauty (a flowering plant).<sup>[106]</sup> The distance between the instances of these species and the HVTL right of way is sufficient to prevent adverse impact on those species. The Arrowhead Project is not expected to adversely impact any rare or unique plant or animal species.

### ***Application of Design Options***

47. MP has opted for single-pole construction for the Arrowhead HVTL to minimize the right of way required. A portion of the existing Arrowhead-Cloquet 115 kV power line (Line 22) will be reconstructed to enable it to carry a 230 kV load. This reconstruction precludes the need to undertake an additional approval proceeding in the event that this load is needed to meet anticipated future demand for electricity. MP has examined design options to optimize the efficiency and minimize the impact of the Arrowhead HVTL.

### ***Existing Rights-of-way***

48. The siting considerations for transmission lines favor the use of existing rights-of-way to minimize the impact of those lines on the areas they traverse. The Arrowhead Project uses the existing corridor for right of way. In the Midway segment, that right of way must be widened by twenty feet over a 3.2 mile distance. The land affected is primarily agricultural. The expansion of the existing right of way for that segment has no significant impact.

49. The other alteration to the right of way for the Arrowhead Project moves the 0.8 miles of the existing route to the eastern side of the DM&IR rail yard. The change is proposed at the request of the landowner, the DM&IR railroad. The movement of the 0.8 mile length of right of way does not result in significant human or environmental impact. Removing the existing 0.8 mile segment of 115 kV power line from its existing location is a benefit to persons living in the eastern portion of Gary. The Arrowhead Project uses existing rights-of-way to minimize the impact of upgrading the existing 115 kV power line to a 345 kV HVTL.

### ***Electrical System Reliability***

50. The Arrowhead Project will improve the electrical system reliability for consumers in both Minnesota and Wisconsin. The existing system of distribution has only one major source of electricity for western Wisconsin from Minnesota, the 345 kV King-Eau Claire-Arpin HVTL (K-EC-A HVTL). The K-EC-A HVTL experienced a significant failure on June 25, 1998 that adversely affected electricity consumers in both Wisconsin and Minnesota. Other situations have arisen over past few years that could have resulted in failures similar to that on June 25, 1998. Adding a second 345 kV connection to the Wisconsin transmission and distribution systems will reduce the likelihood of such failures and improve the reliability of the electrical system for both Minnesota and Wisconsin consumers.

### ***Design and Route Dependent HVTL Costs***

51. There have been no costs identified for constructing, operating, and maintaining the Arrowhead Project HVTL which are dependent on design and route.

### ***Unavoidable Adverse Human and Natural Environmental Effects***

52. There have been no significant adverse human, natural and environmental effects from the Arrowhead Project identified either at the Arrowhead substation or along the HVTL route that are unavoidable consequences of the construction of the Arrowhead project or operation of the 345 kV HVTL that will be installed.

### ***Mitigation of Adverse Environmental Effects***

53. The proposed construction of the Arrowhead HVTL incorporates several features to minimize potential adverse environmental effects<sup>[107]</sup> associated with the construction and operation of the Project.

- Right of way clearing will be limited to vegetation actually affecting the safe operation of the HVTL. MEQB Ex. 1, at 11. The only new right of way clearing would occur along the 3.2 mile length of the Midway segment and the 0.8 mile length of the Gary segment with relocated right of way.
- All construction debris will be removed from the right of way. Grass and low-growing vegetation will be "encouraged" to provide revegetation of construction areas. MEQB Ex. 1, at 11. Silt will be prevented from entering surface waters by installation of barriers and use of set back zones, where appropriate.
- Special consideration will be given where the right of way crosses stream banks to ensure that erosion will be minimized and existing shade retained to prevent changes in water temperature. MEQB Ex. 1, at 17. No in-stream work will be performed between September 15

and April 30 to protect the four designated trout streams being crossed by the right of way. *Id.*

- The potential for damaging vegetation during installation will be minimized by constructing the structures for carrying the HVTL during the winter months, when the wetlands areas are frozen. When weather conditions have resulted in insufficiently frozen ground, mats will be used to prevent damage.
- Structures crossing open fields will be placed so as to minimize maneuvering for farmers during haying.<sup>[108]</sup>

#### *Cumulative Present and Future Demands of the Project on Air and Water Resources*

54. The Arrowhead Project will not impose demands on air or water resources.

Based on the foregoing Findings of Fact, the Administrative Law Judge makes the following:

#### **CONCLUSIONS**

1. Any of the foregoing Findings more properly designated as Conclusions are hereby adopted as such.

2. The Administrative Law Judge and the Minnesota Environmental Quality Board have jurisdiction over the subject matter of the hearing pursuant to Minn. Stat. §§ 14.50 and 116C.06.

3. All relevant substantive and procedural requirements of law and rule have been fulfilled prerequisite to an application for exemption from the Power Plant Siting Act.

4. The proposed project "will not create significant human or environmental impact" in any of the categories of impact examined under the terms of Minn. Rule 4400.3310, except the noise impact noted at Finding 22. This impact can be eliminated by utilizing the mitigation methods noted at Finding 24.

5. The Applicant has demonstrated that the Arrowhead Project meets the standards for exemption from the Minnesota Power Plant Siting Act process in Minn. Stat. § 116.57, subd. 5.

Based upon the foregoing Conclusions, of Law, the Administrative Law Judge makes the following:

#### **RECOMMENDATION**

That the MEQB grant the Applicant's Application for exemption from the requirements of the Minnesota Power Plant Siting Act (Minn. Stat. §§ 116C.51-.69) for

the construction of the 345 kV/115 kV and 345/230 kV High Voltage Transmission Line (for one segment operated at 115 kV), and modifications to the Arrowhead substation, known as the Arrowhead Project, subject to the condition that noise impacts be reduced at the Arrowhead substation, and necessary permits be obtained from the federal and state agencies and local units of government with appropriate jurisdiction.

Dated this 29th day of January, 2001

/s/ Kenneth A. Nickolai  
KENNETH A. NICKOLAI  
Administrative Law Judge

Reported: Karen J. Macaulay, Citran, Duluth, Minnesota  
Transcript prepared, Twelve Volumes.

#### NOTICE

Under Minn. Stat. § 14.62, subd. 1, the agency is required to serve its final decision upon each party and the Administrative Law Judge by first class mail or as otherwise provided by law.

#### MEMORANDUM

##### **Burden of Proof**

The parties dispute the burden of proof. By applying for an application for exemption from the PPSA, MP has the burden to demonstrate that the exemption should be granted. MP's burden is to present credible evidence that the proposal will not "have a significant impact....." MP argues that the burden is on the opponents to the application to demonstrate that a significant impact exists. In advancing this argument, MP relies on decisions made in cases arising under the Minnesota Environmental Rights Act<sup>[109]</sup>. In *PEER* the Supreme Court explained that under *that* act, "in order to make "a prima facie showing" the plaintiff must prove the existence of a "(1) protectible natural resource, and (2) pollution, impairment or destruction of that resource."<sup>[110]</sup> However, this case is not a citizen-initiated action under MERA, but a utility initiated request that a project be exempted from the Power Plant Siting Act.

The Administrative Law Judge concludes that MP met its burden of presenting credible evidence that the proposal would not have a "significant human or environmental impact..." The ALJ also concludes that the opponents did not counter MP's evidence and establish the likelihood of significant human or environmental impact. As will be discussed later in this memo, there is evidence that this project will or may have an impact on humans or the environment. However, the ALJ was not convinced that the potential impacts met the legal test for significance.

NAWO maintains that the applicant for an exemption must prove there are no significant impacts "beyond a reasonable doubt." NAWO Brief, at 2. The law does not impose that high an evidentiary standard to this administrative proceeding.<sup>[111]</sup> Minn. Rules 1405.1700, Subp. 7 provides, "Any route or site proposer must prove the facts at issue by a preponderance of the evidence...".

Regardless of the burden of proof, NAWO correctly points out that Minn. Stat. § 116C.57, subd. 5, states that the MEQB "may" exempt a proposed transmission line from the certificate of need process. The statute then gives the MEQB discretion to grant or deny an exemption. The final agency decision will be made by the MEQB using the following standard:

If the board determines that the proposed HVTL will not have a significant human or environmental impact, the board may exempt from the act with any appropriate conditions the construction of the proposed facility within the proposed route.<sup>[112]</sup>

### **Significant Human or Environmental Impact**

Almost every action has some impact on humans or on the environment. The issue in this case is whether the identified impacts rise to the level of being "significant" under the law. NAWO, WOLF, and SOUL assert that MP failed to demonstrate that no significant human or environmental impact will occur based on the application of the "precautionary principle." SOUL described the precautionary principle as follows:

When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.<sup>[113]</sup>

MP objected to using the precautionary principle as requiring proof of "negative facts."<sup>[114]</sup> To use the precautionary principle would, in MP's opinion, replace the existing standard with "unsubstantiated or speculative impacts."<sup>[115]</sup>

Minnesota law does not recognize the precautionary principle as the standard for determining a "significant impact."<sup>[116]</sup> The term "significant" is an important limitation in law. The ALJ concludes that it requires a showing that a potential impact is serious and material. It further is not merely incidental and cannot be readily mitigated.<sup>[117]</sup> In this case, which is to determine whether or not the MEQB should allow the exemption sought by MP, the determination of significance must be made by looking to the difference between the operation of the existing power line and the upgraded line proposed.<sup>[118]</sup>

### **Health Effects**

WOLF, SOUL, and NAWO assert that MP failed to demonstrate that the Arrowhead Project will not create significant human or environmental impact because MP has not proven that 345 kV HVTL has no effect on human health. WOLF noted the conclusion of NIEHS that:

The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may cause a leukemia hazard. <sup>[119]</sup>

WOLF also relied upon the NIEHS conclusion that "[ELF-EMF is a] possible human carcinogen." <sup>[120]</sup>

WOLF asserts that MP has failed to account for the higher exposure to magnetic fields that persons living along the Arrowhead Project route will experience due to the increase in voltage from the existing 115 kV power line to the 345 kV HVTL. Based on measurements made at a 345 kV HVTL between northern Wisconsin and Michigan's Upper Peninsula, <sup>[121]</sup> the ambient EMF levels are 30 mG within one hundred feet of the right of way centerline to one side and 80 mG within one hundred feet of the centerline on the other side. <sup>[122]</sup> The difference is due to the 345 kV HVTL being located off-center in the right of way. There are higher estimates of increased EMF levels of 60 mG and 100 mG at 100 feet from each side of the right of way centerline when the 345 kV HVTL is operated at peak capacity.

In the case of the Arrowhead HVTL, the nearest homes are within 300 feet of the route. <sup>[123]</sup> But the intensity of a magnetic field drops exponentially with distance. <sup>[124]</sup> MP calculates that, during peak periods, the maximum exposure of persons in the closest residence is 10 mG. <sup>[125]</sup> WOLF, SOUL, and NAWO have not shown that persons in the homes nearest to the Arrowhead HVTL will be experiencing EMF levels in excess the average exposure that is normally experienced by any user of electricity and common household appliances. From the distances between the nearest homes and the Arrowhead HVTL, those residents will not experience significantly higher (and perhaps not even measurably higher) EMF levels. The average daily exposures of persons studied in EMF-RAPID ranged from 28% of persons exceeding 10 mG (milligauss), 11% exceeding 20 mG, and 2% exceeding 50 mG. <sup>[126]</sup> The in-home averages were 8 mG while awake and 5 mG while sleeping. <sup>[127]</sup>

The EMF-RAPID study arrived at a conclusion regarding the risks posed by EMF and what precautionary action should be taken. That conclusion states:

The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern. <sup>[128]</sup>

The EMF-RAPID description of ELF-EMF as a "possible human carcinogen" does not demonstrate that HVTL constitutes a substantial human impact. <sup>[129]</sup>

NAWO, SOUL, and WOLF also asserted that MP failed to account for the impact of ground current on human health. The transmission of electricity along HVTLs can

create a return current through the ground. This phenomenon, known as ground current, passes electricity back along the ground under the line to complete the electric circuit.<sup>[130]</sup> MP responded that there has never been any showing of adverse health impacts from ground currents arising from HVTLs and that no studies have been performed to show any such impact.<sup>[131]</sup>

Evidence of the impact caused by "stray voltage" on humans and livestock was introduced to support a claim of substantial impact caused by the Arrowhead Project.<sup>[132]</sup> Stray voltage is caused by the grounding of the distribution system to individual consumers. The Arrowhead substation and Arrowhead HVTL are designed without the sort of grounding that can result in stray voltage.

There is no evidence in the record from which to draw a conclusion that ground currents have general impacts on human health or the environment. Stray voltage will not be caused by the Arrowhead Project. There has been no showing in this matter of an adverse human health impact that would trigger a full-scale routing review under the PPSA.

## **Noise**

MP asserted that no significant increase in noise will arise from the proposed line or modifications to the Arrowhead substation. The mitigation originally proposed in MP's application for exemption was withdrawn, due to the asserted lack of additional noise. MP cites the measurements conducted of the noise levels around the Arrowhead Substation and conclusions drawn from a study conducted to support this assertion and modification of the application.<sup>[133]</sup>

The study relied upon by MP was designed and assessed by Dr. Hooshang Khosrovani of Veneklasen Associates. An employee of MP performed the measurements using equipment calibrated and provided by Veneklasen Associates. Dr. Khosrovani "performed noise calculations and analysis for estimating the expected noise levels around the Arrowhead substation due to the operation of transformers and impact of proposed additions."<sup>[134]</sup> MP asserts that "the results of the noise tests showed that in all instances, applicable Minnesota noise standards will not be exceeded."<sup>[135]</sup> MP maintains that any increase in noise caused by the upgrade will be "below the human ear's ability to perceive any meaningful difference."<sup>[136]</sup> MP also relies upon the presence of roadways and truck traffic near the substation in concluding there will be no substantial impact on nearby residents due to noise.<sup>[137]</sup> MP also cites the MPCA noise standards as support for its proposal to modify the Arrowhead substation without conducting any mitigation.

The MPCA has set out "rules of thumb" to assess the impact of sound.<sup>[138]</sup> An increase of 3 dB reaches the level of human perception.<sup>[139]</sup> An increase of 5 dB is described as "quite noticeable."<sup>[140]</sup> When sound increases by 10 dB, the sound is perceived as "twice as loud."<sup>[141]</sup> The Veneklasen study assessed sound levels as perceived by persons at existing homes near the Arrowhead substation operating with existing equipment. The study used instruments to quantitatively measure the sounds near the Arrowhead substation. In addition to the quantitative measurements, subjective assessment of impact by ear of existing facilities was noted by the person conducting the testing and shows audible noise as "slightly," "noticeable," "somewhat

loud," "very noticeable," and "loud, but not obvious."<sup>[142]</sup> The measurements for some of the noise impacts at adjacent homes were conducted when the DC converter station was out of service.<sup>[143]</sup>

MP is adding four transformers, using one as a back-up to the three that will be in operation. The calculated noise level that would occur with the addition of the transformers was based upon the measurement of existing equipment. The single transformers would emit 84 dBA at a distance of one meter. The phase shifting transformer emits 89 dBA at that distance.<sup>[144]</sup> The EEI Electric Power Plant Environmental Noise Guide methodology was used to determine the potential impact of the new equipment on adjacent residents. Using the EEI methodology, the conclusion derived in MP's study stated:

The results of these calculations indicate a noise level of approximately 47 dBA, due only to transformer contributions, may be expected at a distance of 2000 feet away. Any location at a distance of less than 2000 feet will have a higher level of transformer noise impact.<sup>[145]</sup>

Due to the anticipated contribution to the noise impact by the new equipment, the report commissioned by MP recommended that noise reduction be accomplished by requiring that the three 300 MVA transformers being added as a result of the Arrowhead Project be specified at "noise levels of 12 dBA below NEMA ratings for these transformers (NEMA-12) in the procurement specifications."<sup>[146]</sup>

The evidence is that noise from this equipment will be both perceptible and annoying.<sup>[147]</sup> MP pointed out that the existing noise was within the MPCA standards for residential areas. MP asserted that the resulting noise from the Arrowhead Project upgrade would fall within that limit and therefore no mitigation of noise impacts is required. MP claimed that there would be no perceptible increase in sound at the property line of the Arrowhead substation caused by the new equipment.<sup>[148]</sup> That assertion is contradicted by the report and is not supported by facts in the record. The author of the study was unaware of the distance between the Arrowhead substation and the location of either the monitoring equipment or the adjacent homes.<sup>[149]</sup> The nearest houses to the Arrowhead substation are well within 2000 feet.<sup>[150]</sup> MP cannot rely upon a calculation of a noise impact on a location beyond the actual person hearing the sound to establish that there will be no substantial impact on that person.

MP also relies upon the MPCA standards as establishing the standard to be met in obtaining the exemption in this proceeding without conducting mitigation. The appropriate test for obtaining an exemption is not whether the MPCA noise limit is met. Rather, the test is whether a substantial impact will be caused by the new equipment. MP has failed to meet its burden to demonstrate that there will be no substantial impact on nearby residents without the inclusion of some noise mitigation at the Arrowhead substation. This noise mitigation can be accomplished by purchasing transformers that emit less noise. Noise mitigation may be accomplished by installing sound barriers that will reduce the overall noise impact of the Arrowhead substation. The reduction methods will reduce the noise created by the project to eliminate any substantial impact.

## **Land Valuation**

WOLF asserts that MP's failure to prepare appraisals results in a failure of proof that the Arrowhead Project will not have significant impact on land values. WOLF, however, relies on the eminent domain provision of the PPSA as the basis for this claim. This proceeding is to determine if the Arrowhead Project is to be exempted from the requirements of the PPSA. The standards to be met in applying for an exemption are clearly set out. Impact on land valuation is not, by itself, a consideration in determining whether an exemption is appropriate. Land valuation can be included to the extent that it affects other listed considerations. In this matter, there is no evidence that market values will be measurably affected by replacing a 115 kV power line with a 345 kV HVTL. The homes that were part of the market survey conducted by MP were on the market for an average of 110 days, which is above the market average. There is no evidence that size of the power line will further increase that average. There is no evidence that market values for land, even if altered, will affect human settlement or land economies.

### **Mining Operations**

An aggregate quarry and an asphalt facility are located on the Beck's Road segment.<sup>[151]</sup> MP maintains that the Arrowhead HVTL will not impair the functioning of either operation.<sup>[152]</sup> WOLF maintains that MP used the wrong standard in assessing the impact on mining operations. According to WOLF, the potential impact of particulate matter interacting with the corona of the HVTL is key. That potential impact was addressed as a consideration regarding health affects and it was determined to not have the potential for significant impact.<sup>[153]</sup> There is no evidence of substantial impact on land-based economies arising from the location of the Arrowhead HVTL.

### **Eminent Domain**

MP intends to seek additional easements to widen the right of way in the initial 3.2 miles of the corridor. MP has indicated that it will seek to negotiate with landowners for easements. But MP will use eminent domain to obtain those easements if mutually agreeable terms cannot be reached. WOLF asserts that only if the full routing provisions of the PPSA are applied will landowners have their property interests protected. Further, WOLF asserts that eminent domain is only available to MP if the Arrowhead Project has been subjected to the Certificate of Need process and the demonstration of need made. In this matter, only the impacts on human settlement that result in significant human impact are to be considered. There has been no showing that the potential application of eminent domain will result in such impact. WOLF's assertion that eminent domain is not available without a finding of need cannot be addressed in this proceeding. That dispute is properly brought before the District Court in the event that such a proceeding arises.

### **Historic Resources**

A bridge (Historic Bridge No. L-6007, hereinafter "Stewart Creek Bridge") on Skyline Parkway is identified by WOLF as a historic resource affected by the Arrowhead HVTL.<sup>[154]</sup> The Oliver Bridge over the St. Louis River is also identified as a "unique bridge." These resources are cited as being substantially affected by the Arrowhead HVTL. The automobile traffic over the Oliver Bridge passes on the deck beneath railroad tracks. Visibility is significantly impaired from the automobile level of the Oliver

Bridge.<sup>[155]</sup> The current power line at the Oliver Bridge crossing is visible from the approaches. REL-8. No one has described any meaningful aesthetic difference affecting these resources between seeing the proposed single pole structures and seeing the existing H-pole structures.

WOLF maintains that the Arrowhead HVTL affects the Stewart Creek Bridge on Skyline Parkway. There is no testimony in the record of where that bridge is in relation to the proposed Arrowhead HVTL. There is no testimony to support a finding that the proposed HVTL will be visible from that bridge. Based on a topological map of the area, the Stewart Creek Bridge is located approximately 1.5 miles from the nearest point along the Arrowhead HVTL route.<sup>[156]</sup> The topography surrounding that location strongly suggests that the Arrowhead HVTL will not be visible from the Stewart Creek Bridge.<sup>[157]</sup> The record is insufficient to demonstrate that the Arrowhead Project will have a significant impact on historic resources.

### **Recreational Resources**

The impact on recreational resources caused by the Arrowhead HVTL is limited to the change in visibility of the power line. In some areas, the switch to a single pole design will reduce the intrusiveness of the power line because of its smaller footprint. The much taller poles will, however, be more visible from viewpoints at several recreational areas. The parties differed on how much impact this additional visibility would have on people using the recreational resources in the vicinity of the Arrowhead HVTL.

One example of an affected viewshed is the overlook portion of Skyline Drive. From this vantage point, one can observe much of the Beck's Road segment and the entirety of the Gary segment.<sup>[158]</sup> The Skyline Drive area overlooking the Arrowhead route is both passable by automobile and frequently used.<sup>[159]</sup> The views from Short Line Park and the western end of Magney Park are substantially similar to that of the Skyline Drive overlook. The viewshed of the easternmost end of Magney Park contains all of the Gary segment and St. Louis River running north to the waterfront area of the City of Duluth.

WOLF demonstrated that the Arrowhead HVTL will be visible from the road access point to the Willard Munger Trail.<sup>[160]</sup> No evidence was introduced to support a finding of substantial impact from the Willard Munger Trail itself since the difference is the height and footprint of the pole, not its existence. Similar problems exist with the claims of substantial impact from the scenic views overlooking the Beck's Road and Gary segments. The views afforded to individuals from these points are not just of a power line, but also of an area dedicated to industrial uses. Railway lines, rail yards, a 115 kV power line, an electrical substation, quarries, factories, and docks are all visible from the vantage points above the proposed Arrowhead HVTL. The ALJ concludes that the overall visual impact of the proposed Arrowhead HVTL will be indistinguishable from the existing uses along the route.

### **Electrical System Reliability**

Reliability is defined by NERC as adequacy and security.<sup>[161]</sup> Adequacy is the ability of the electrical system to supply the demands of customers, including during

periods of outages. Security refers to the ability of the system to withstand disturbances through short circuits (tripping) or unanticipated loss of generation or transmission capacity. There is no meaningful difference between system loading that occurs due to consumer demand and system loading occurring due to environmental disruption. A failure on one portion of the electrical transmission grid can cause power disruptions in other areas. A primary reason cited by MP for upgrading the existing 115 kV power line to a 345 kV HVTL is to improve the reliability of the existing electrical transmission system. The Department of Commerce indicated that the existing connection between the Mid-Continent Area Power Pool (MAPP) and the Mid-American Interconnected Network (MAIN) is supported only by the K-EC-A 345 kV HVTL and this sole connection has resulted in reliability problems.

A disturbance in the regular transmission of electricity between MAPP and MAIN occurred on June 10-11, 1997 (hereinafter "the 1997 disturbance").<sup>[162]</sup> On June 10, 1997 the K-EC-A line was operating at 945 MW (which would ordinarily result in action being taken), but the load dropped to 850 MW, so no relief was requested. Shortly thereafter, the southern interconnection (known as "SPP") with MAIN showed signs of overloading. Shortly after midnight, the K-EC-A line tripped and the resulting power flows were far over the SPP's operating limits for its lines. The overload condition existed until approximately 1:30 a.m. on June 11, 1997.<sup>[163]</sup> The conclusion reached after the 1997 disturbance was that a significant risk of a regional blackout existed and such a blackout had been narrowly averted.<sup>[164]</sup>

The K-EC-A HVTL failed on June 25, 1998 ("1998 service interruption"). The 1998 service interruption occurred during a thunderstorm that tripped both the Prairie Island-Byron 345 kV HVTL and the K-EC-A HVTL. "Cascade tripping" then ensued, causing more than 60 transmission lines (ranging from 345 kV to 69 kV) to fail. The resulting disruption of power delivery adversely affected electricity consumers in both Wisconsin and Minnesota. A significant risk of electrical blackout throughout Minnesota was avoided only when some of the lower voltage lines automatically reclosed and held.

Another disturbance in the regular transmission of electricity between MAPP and MAIN occurred on June 10, 1999 (hereinafter "the 1999 disturbance").<sup>[165]</sup> The 1999 disturbance was the result of system loading on the K-EC-A line. The system was considered to be "insecure" for several hours. An additional element of risk to the delivery of electricity was posed at that time due to the presence of thunderstorms in the area.

The 1998 service interruption and the system disturbances in 1997 and 1999 were cited by both MP and Commerce as demonstrating the need for an additional 345 kV connection between MAPP and MAIN. MP maintains that the proposed Arrowhead project will improve the performance of the electrical grid between Minnesota and Wisconsin. On the other hand, WOLF asserted that:

The transmission crisis is a crisis of the utilities' making through their "increased market transactions" in their desire to move all the power they can sell, overloading lines for bulk transfer and putting local loads and the grid in jeopardy.<sup>[166]</sup>

With these arguments, NAWO, SOUL, and WOLF argue that the purchase and sale of bulk power should be examined separately from the existing transmission system. Under this approach, increases in market demand would not be included in the assessment of system security. Thus, a project proposed to meet market demands on a system would not qualify as being needed to improve system security. The ALJ concludes this is not the correct standard since either demand or an incident can affect system reliability and security.

NAWO also asserts that the Arrowhead project is dependent upon all of the associated projects being completed <sup>[167]</sup> and it is no longer necessary. NAWO quotes the WRAO <sup>[168]</sup> Executive Summary:

In order to achieve the benefits which construction of plan 3j would provide, it must be constructed in its entirety. For all the plans presented, several significant additions of upgrades to the underlying transmission system are required. Notably, the Chisago-Apple River 230 kV project presently under regulatory review in Wisconsin and Minnesota is considered a critical requirement for all of the plans (except plan 5a, Chisago-Weston 345 kV). The Chisago-Apple River project is an integral system reinforcement and is also critical for local load serving. If transmission plan 3j ultimately is not constructed in its entirety, the WRAO has identified transmission plan 5b (Apple River-Weston 230 kV) as an alternative. <sup>[169]</sup>

NAWO urges that "administrative notice" be taken that Brief the Chisago-Apple River 230 kV project has been withdrawn. <sup>[170]</sup> The activity listed as "associated projects and upgrades" in the WIRES <sup>[171]</sup> Phase II Report for Plan 3j does not include the Chisago-Apple River 230 kV project. <sup>[172]</sup> The language cited by NAWO from the Executive Summary describes the withdrawn Chisago-Apple River project as "an integral system reinforcement and is also critical for local load serving." This language, without more, does not support a conclusion that the absence of the Chisago-Apple River 230 kV project will eliminate the benefits of the Arrowhead project.

MP has demonstrated that the Arrowhead project will result in improvements in adequacy and security and benefit electric consumers in both MAPP (including Minnesota) and MAIN.

### **Relationship to Other Projects**

NAWO, SOUL, and WOLF maintain that MP cannot obtain an exemption in this matter because the Arrowhead Project is part of a connected action or phased upgrade of other facilities to provide the electricity that will be transmitted to Wisconsin, and that, when taken together, these actions will require a Certificate of Need from the Minnesota Public Utilities Commission.

Minn. Rule 4410.0200, subd. 9b defines "connected actions" and subd. 60 defines "phased action." Both of these rules set out the standards for determining if different projects must be combined to determine the appropriate scope of review. NAWO, SOUL, and WOLF asserted that an exemption to the PPSA process cannot be granted since the Arrowhead Project cannot be completed without also completing

associated projects that would trigger the Certificate of Need review process.<sup>[173]</sup> These associated projects are asserted to be the Hilltop upgrade, modifications to the Forbes HVTL, and the Blackberry HVTL. There is no evidence indicating that any upgrades to the Forbes HVTL or the Blackberry HVTL are being undertaken by MP.

A portion of the Arrowhead Project upgrades a 3.2 mile portion of the existing 115 kV power line (Line 22) to the capacity for operation at 230 kV. MP intends to continue operating Line 22, now running from the Arrowhead substation to the Cloquet substation, at 115 kV. Additional upgrades are required before MP will be able to operate Line 22 at 230 kV and reconfigure the connection to transmit electricity to the Hilltop substation.<sup>[174]</sup>

No time frame has been established for performing the additional upgrades to Line 22 and the eastern portion of Line 70 to operate that line at 230 kV.

NAWO, SOUL, and WOLF maintain that the upgrade of Line 22 demonstrates that the Arrowhead Project is a phased upgrade, and thus the distance between the Arrowhead and Hilltop substations must be added to the length of the HVTL. Minn. Rule 4400.1310, subp. 1.G., requires that utilities include planning for additional upgrades along existing rights of way whenever a project is planned. Excluding projects for complying with the rule for prior planning is not consistent with the statutorily-authorized exemption process. There is no evidence to establish that a timetable exists to complete a 230 kV HVTL between the Arrowhead and Hilltop substations.

In the course of planning the Arrowhead Project, the potential for finishing a 230 kV HVTL between the Arrowhead and Hilltop substations became apparent.<sup>[175]</sup> The need for a 230 kV HVTL is not anticipated in the Hilltop substation service area before 2005 to 2010.<sup>[176]</sup> This does not constitute either a phased action or connected action.

The Arrowhead Project is essentially identified in the WIRES Study as the Minnesota portion of Plan 3j. Plan 3j has a number of "associated projects and upgrades" identified as needed to complete Plan 3j. The activity listed as "associated projects and upgrades" in the WIRES Phase II Report all occurs in Wisconsin.<sup>[177]</sup> These "associated projects and upgrades" are not part of the Arrowhead Project and do not constitute phased or connected actions.

The only changes required to substations other than Arrowhead and Gary are upgrading software to accommodate the relaying needs of the altered system.<sup>[178]</sup> These changes do not preclude MP from obtaining an exemption from the PPSA on that basis.

### **Environmental Effects from Coal-fired Generation**

NAWO and the National Wildlife Federation (NWF) introduced substantial evidence that coal-fired electricity generation (such as that conducted in North Dakota) causes pollutants, including mercury, to be emitted into the atmosphere.<sup>[179]</sup> Once in the atmosphere, mercury is deposited into bodies of water, where it collects.<sup>[180]</sup> Once in these bodies of water, mercury is absorbed by fish and from there to aquatic animals and humans.<sup>[181]</sup> Mercury contamination poses both an adverse environmental effect and an adverse public health impact.<sup>[182]</sup>

MP maintained that the Arrowhead Project would result in the reduction of mercury emissions from existing coal-fired generating plants.<sup>[183]</sup> This estimate was based on computer-modeling performed by a consultant indicating that completion of the Arrowhead project would reduce line losses.<sup>[184]</sup> SOUL introduced an assessment of the computer-modeling performed that identified limitations of with this analysis.<sup>[185]</sup> A number of the concerns were conceptual in nature, addressing the potential for long-term changes in the electricity generation mix that might result from the Arrowhead Project.<sup>[186]</sup>

One specific concern raised by SOUL was the critical dependence on the data used to generate its model.<sup>[187]</sup> Under cross-examination, MP's witness on the computer model was unable to respond to questions regarding the specific data relied upon for the computer model.<sup>[188]</sup> Some of the data initially provided by MP had been incorrectly used.<sup>[189]</sup> Some of the data used in the modeling appears to have been of the "best guess" variety.<sup>[190]</sup> The data run of the information was not retained or produced to support the conclusions reached.<sup>[191]</sup> If the data input into the model cannot be verified, the model's conclusions cannot be relied upon.<sup>[192]</sup>

The reduction in mercury asserted by MP is predicated on the need to burn less coal since less electricity is lost in transmission. MP does not appear to have considered the possibility that reducing line losses will result in the current production of electricity being maintained and more of the electricity produced reaching consumers.<sup>[193]</sup> The record in this proceeding indicates that demand for electricity is increasing.<sup>[194]</sup> MP relies upon an assertion, unsupported by the record, that the increased generating needs will be met with natural gas-fired generation.<sup>[195]</sup> The evidence indicates that a reduction of line losses accomplished by the Arrowhead Project will most likely result in more electricity being purchased, not less coal burned to produce electricity. Such an outcome would not reduce mercury emissions. MP's evidence does not support a finding that mercury emissions will be reduced as a result of the Arrowhead Project.

While the evidence is insufficient to show mercury reduction, MP is not required to demonstrate that mercury emissions will be reduced. There is no evidence in this record that mercury deposition will increase in Minnesota from construction of the proposed project. Absent an increase in mercury deposition, the Arrowhead Project does not result in significant impact on the environment through deposition of that pollutant.

### **Potential for Inducing New Generation Sources**

MP asserted that no additional lignite coal-fired electricity generation from North Dakota is likely to be caused by the Arrowhead Project.<sup>[196]</sup> This assertion is based upon the fact that current coal-fired generators are operating at near full capacity.<sup>[197]</sup> NAWO, SOUL, and WOLF dispute claims regarding that capacity.

The existing coal-fired generators are operating at between 76% and 82% of their rated capacities.<sup>[198]</sup> The trend over the last ten years is for those generators to operate at slightly higher percentages of their rated capacity.<sup>[199]</sup> The increase is attributable to efficiencies developed over time to enable these generators to operate with less "down-time" for maintenance and repairs.<sup>[200]</sup> These plants are among the

lowest cost producers of electricity available to utilities such as MP.<sup>[201]</sup> For this reason, there has always been an incentive for these producers to operate at the maximum possible capacity. This incentive exists whether or not the Arrowhead Project is built. The current operating percentages are unlikely to be changed due to the Arrowhead Project.

While marginal efficiencies in electric transmission are likely to result from the additional transmission capacity afforded by the Arrowhead Project, the potential for the construction of new baseline generation always exists.<sup>[202]</sup> There is no evidence in the record to indicate that new coal-fired generation has been proposed or is sufficiently far into the approval process to conclude that the Arrowhead Project is connected to, or a phase of, some additional project that would include new electricity generation.

### Conclusion

MP has demonstrated by a preponderance of the evidence that, with one exception, the Arrowhead Project will not create significant human or environmental impact, as set out in Minn. Stat. § 116C.57, subd. 5. The sole exception is the impact caused by noise generated at the Arrowhead substation by the new transformers to be installed. The impact of that noise can be mitigated by the use of sound barriers, the installation of quieter transformers, or the use of both. With noise mitigation, the Arrowhead Project will have no significant impact and the MEQB may grant the requested exemption from the Minnesota Power Plant Siting Act.

K.A.N.

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<sup>[1]</sup> Because of a scheduling conflict, the final day of hearing was held in the basement of the Forbes First Methodist Church, Proctor, Minnesota

<sup>[2]</sup> Tr. at 1688.

<sup>[3]</sup> MEQB Exhibit 1, at 19

<sup>[4]</sup> MEQB Exhibit 1.

<sup>[5]</sup> MEQB Exhibit 8.

<sup>[6]</sup> Tr. at 1619.

<sup>[7]</sup> The substation location is further identified as T50N, R15N, Section 31. MEQB Exhibit 1 at 1.

<sup>[8]</sup> Tr. at 1615.

<sup>[9]</sup> Tr. at 1616. The twelve lines are as follows: to the south, one 230kV and five 115 kV circuits; to the north, three 115kV circuits and two 230 kV circuits; and to the west, one 250 kV DC line.

<sup>[10]</sup> MEQB Exhibit 1.

<sup>[11]</sup> Line 22 turns and heads west to connect with MP's Cloquet substation. Line 70 turns east and connects to MP's Hibbard substation. A portion of Line 70 was rebuilt to 230 kV standards in 1992. MEQB Exhibit 11.

<sup>[12]</sup> The proposed right of way travels south on the eastern side of the DM&IR railroad tracks and connects to MP's Gary substation.

<sup>[13]</sup> The proposed line would be 345/230kV for the initial 3.2 miles. The remainder would be 345/115kV.

<sup>[14]</sup> MEQB Exhibit 1; at 1 and 10; Tr. at 1527-9.

<sup>[15]</sup> MEQB Exhibit 11, Attachment 28.

<sup>[16]</sup> *Id.*

- [17] Tr. at 1619.
- [18] Tr. at 1623.
- [19] MEQB Exhibit 1, at 1.
- [20] MEQB Exhibit 1, at 1.
- [21] See REL-17 and REL-18
- [22] That power line is designated as Line 22, which is the line currently running from the Arrowhead substation to the Cloquet substation.
- [23] MEQB Exhibit 1, at 1.
- [24] See REL-18 and REL-19; MEQB Exhibit 1, at 2.
- [25] REL-19
- [26] MEQB Ex. 1, at 2.
- [27] Tr. at 1450.
- [28] MEQB Exhibit 1, at 10, Public Hearing Transcript, at 165.
- [29] Tr. at 1452-3.
- [30] MEQB Ex. 14
- [31] Tr. at 1542 and 1553
- [32] MEQB Exhibit 1, Appendix E.
- [33] Tr. at 1567.
- [34] Tr. at 1556
- [35] MEQB Exhibit 1, at 18.
- [36] *Id.*
- [37] Minn. Stat. § 116C.57, subd. 5. Should the MEQB exercise its discretion and deny the exemption, Minn. Rules 4400.3900, provide: "If the board denies an HVTL exemption, it shall indicate the reason and indicate the project changes necessary for approval."
- [38] Those impacts are:
- 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. archaeological and historic resources;
  - E. effects on the natural environment;
  - F. rare and unique natural resources;
  - G. application of design options which maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission capacity;
  - H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;
  - I. electrical system reliability;
  - J. costs of constructing, operating, and maintaining the HVTL which are dependent on design and route; and
  - K. adverse human and natural environmental effects which cannot be avoided.
- [39] MEQB Exhibit 1 at 12.
- [40] Tr. at 312. In its application, MP identified 11 residences as being within 300 feet of the centerline of the route. MEQB Exhibit 1, at 12. MP reduced that number at the time of hearing.
- [41] Tr. at 313-4. A homeowner indicated that "From the edge of the existing power line to the middle of our home is 117 feet. Our garage/workshop is 50 feet from the line." Peters Comment, at 2. These distances appear to be from the edge of the existing right of way. This residence appears to be located south of the Midway segment and the right of way is not proposed for widening at the homeowner's location. REL-2.
- [42] REL-2.
- [43] WOLF Exhibit 1, at 37-8. However, NIEHS has suggested "that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards." *Id.* at 38.
- [44] MEQB Exhibit 11, Attachment 16.

- [45] In its application, MP concluded that that noise impact would not be increased provided low noise transformers or other sound reduction methods were used. During the hearing, MP indicated it had concluded that noise reduction was not necessary. Tr. at 1234.
- [46] MP Exhibit 17, DLV-13. The number indicates the percentage of time the measured noise exceeds the indicated level. Thus, L(90) means the indicated noise level is exceeded ninety percent of the time.
- [47] *Id.*
- [48] *Id.*
- [49] MP Exhibit 18, at 20; Minn. Rule 7030.0040, subp. 2.
- [50] MP Exhibit 2, at 8.
- [51] MP Exhibit 2, at 8.
- [52] MP Exhibit 2, at 7.
- [53] MP Exhibit 2, at 7.
- [54] MP Exhibit 17, DLV-11.
- [55] WOLF Exhibit 3, Appendix, Results of Long Term Measurements.
- [56] WOLF Exhibit 3, at 4.2 ("Any location at a distance of less than 2000 feet will have a higher level of transformer noise impact."); MP Exhibit 18, at 6.
- [57] MP Exhibit 18, at 9.
- [58] WOLF Exhibit 3, at 6.0-7.0.
- [59] Tr. at 138.
- [60] Tr. at 137.
- [61] MEQB Exhibit 1; Appendix F, Bloomberg Letter dated June 10, 1999.
- [62] [62] There are also single pole wood supports on the existing line. MEQB Exhibit 1 at 12.
- [63] Tr. at 1569.
- [64] Tr. at 1565-66. The record is not clear, however, on what approach will be taken at angled locations. Testimony at the hearing indicted that single-pole structures would be used. Tr. at 1552 and 1572. MP has earlier indicated that alternatives such as lattice structures, self-supporting monopoles, and self-supporting twin monopoles (each supporting a separate circuit) could be used at such locations. MEQB Exhibit 11, at 4.
- [65] Tr. at 1569.
- [66] MEQB Exhibit 1 at 12.
- [67] Tr. at 1571.
- [68] Tr. at 1572.
- [69] REL-18.
- [70] REL-2; REL-3.
- [71] MEQB Exhibit 1, Figure 5.
- [72] Tr. at 882.
- [73] Tr. at 323.
- [74] MEQB Exhibit 1, Figure 5.
- [75] *Id.*
- [76] Tr. at 882.
- [77] MEQB Exhibit 1, Figures 5 and 6.
- [78] Tr. at 896-97.
- [79] Tr. at 259.
- [80] Tr. at 257 and 291.
- [81] REL-3.
- [82] REL-3.
- [83] REL-3.
- [84] REL-2.
- [85] REL-2.
- [86] REL-2.
- [87] MEQB Exhibit 1, at 14.
- [88] MEQB Exhibit 1, at 14.
- [89] MEQB Exhibit 1 at 14.
- [90] MEQB Exhibit 1 at 15.
- [91] MP Exhibit 17; DLV-1, Sheets 1-6.

- [92] *Id.*
- [93] MP Exhibit -17; DLV-4, Sheets 1-6.
- [94] By way of comparison, an electric stove emits an EMF field of 21.6 mG at distance of one foot. A person making a photocopy is exposed to an EMF field of 31 mG. MP-17; DLV-6.
- [95] MP Exhibit 17, at 6.
- [96] Minn. Stat. § 116C.57, subd. 4(1).
- [97] WOLF Exhibit 1, EMF-RAPID, at 10. MP Ex. 1 at 8.
- [98] NAWO Exhibit 1.
- [99] Tr. at 77-78.
- [100] Ringstad Comment, *Electrical and Biological Effects of Transmission Lines: A Review*, at 1-19 (Public Comments).
- [101] Tr. at 2291.
- [102] Tr. at 2292.
- [103] MP Exhibit 6, at 38; Tr. at 491.
- [104] Tr. 283-84, and 1631.
- [105] MEQB Exhibit 1; Appendix D, DNR-NHNRP Letter dated June 21, 1999.
- [106] *Id.*
- [107] MP withdrew its original proposal to lower noise levels by specifying quieter transformers. Tr. at 1417.
- [108] Tr., at 889.
- [109] Minn. Stat. § 116B.03
- [110] ***People for Environmental Enlightenment & Responsibility (PEER), Inc. v. Minnesota Environmental Quality Council***, 266 N.W.2d 858, at 867 (Minn. 1978).
- [111] ***In the Matter of the Quantification of Environmental Costs***, 578 N.W.2d 794, 801 (Minn. App. 1998), *rev. denied* (Minn. Aug. 18, 1998)("...the commission's determination that parties must present a preponderance on the evidence is consistent with established contested case procedure.").
- [112] Minn. Rule 4400.3900, subp. 7.
- [113] SOUL Ex. 2, at 25.
- [114] MP Brief, at 17.
- [115] MP Brief, at 17.
- [116] ***State by Schaller v. County of Blue Earth***, 563 N.W. 2d 260, 265 (1997)
- [117] ***Iron Rangers for Responsible Ridge Action v. Iron Range Resources***, 531 N.W.2d 874, 881 (Minn.App. 1995)(citing ***Audubon Soc'y v. Dailey***, 977 F.2d 428, 435-36 (8th Cir.1992) for the proposition that "agency may base determination of no significant impact on fact that mitigation measures keep the impacts below significant level.").
- [118] The issue of whether power lines themselves create a significant human or environmental impact is not properly before the ALJ. There is a power line currently operating in the corridor. The only question is whether the proposal so changes conditions as to create a significant human or environmental impact that does not now exist.
- [119] WOLF Exhibit 1, EMF-RAPID, at iii.
- [120] WOLF Exhibit 1, EMF-RAPID, at 35. NIEHS suggests that the electric industry maintain its current practice of siting power lines to reduce exposures. At 38.
- [121] Tr. at 1455.
- [122] MP Exhibit 17, DLV-4.
- [123] SOUL Brief, at 3; Tr. at 255.
- [124] MP-17, at 5.
- [125] MP Brief, at 20.
- [126] WOLF Brief, at 24.
- [127] WOLF Brief, at 24.
- [128] WOLF Exhibit 1, at iii.
- [129] Under the classification scheme used by the NIEHS group in the EMF-RAPID study, there are only two categories for substances studied for carcinogenic effects. A substance is a known carcinogen when the causal link between the substance and a health effect is demonstrated. All other substances are "possible carcinogens."
- [130] Tr. at 456-57.
- [131] MP Brief, at 22.

- [132] SOUL Exhibits 1 and 2.
- [133] MP Brief, at 35.
- [134] MP Exhibit 2, at 3.
- [135] MP Brief at 35.
- [136] MP Reply Brief at 19.
- [137] Tr. at 132.
- [138] MP-18, at 17.
- [139] *Id.*
- [140] *Id.*
- [141] *Id.*
- [142] WOLF-3, Attachment on Meter Locations.
- [143] *Id.*
- [144] Khosrovani Direct, at 3.
- [145] WOLF-3, at 4.2.
- [146] WOLF-3, at 7.0.
- [147] Tr. at 131.
- [148] Tr. at 144.
- [149] Tr. 1, at 128.
- [150] DLV-11; Tr. at 1404-5.
- [151] REL-13, REL-18.
- [152] MP Reply Brief, at 22.
- [153] See Finding 41.
- [154] WOLF Exhibit 8.
- [155] WOLF Exhibits 5 and 6.
- [156] REL-19.
- [157] REL-19.
- [158] NAWO Exhibit 4.
- [159] NAWO Exhibit 4; MP-14.
- [160] WOLF Exhibit 4.
- [161] DOC Exhibit 4, at 9.
- [162] MP Exhibit 27.
- [163] *Id.*
- [164] MP Exhibit 27, at 2.
- [165] MP Exhibit 1, at 6.
- [166] WOLF Brief, at 46.
- [167] The Arrowhead Project is essentially identified in the WIRES Study as Plan 3j. Plan 3j has a number of "associated projects and upgrades" identified as needed to complete Plan 3j.
- [168] WRAO is the Wisconsin Reliability Assessment Organization, a group formed of the MAPP and MAIN reliability councils, utilities in those regions, and interested regulatory agencies acting as *ex officio* members. DOC Exhibit 3, at 1.
- [169] MEQB Exhibit 1, Appendix F, Executive Summary of the WRAO Report.
- [170] NAWO Brief, at 25.
- [171] WIRES is the Wisconsin Interface Reliability Enhancement Study, a report to the WRAO.
- [172] DOC-3, WIRES Phase II Report, Appendix C1-3.
- [173] A certificate of need is required if the project is a "large energy facility." Minn. Stat. § 216B.243, subd. 2. "Large energy facility" for power lines is defined as:
- (2) any high voltage transmission line with a capacity of 200 kilovolts or more and with more than 50 miles of its length in Minnesota; or, any high voltage transmission line with a capacity of 300 kilovolts or more with more than 25 miles of its length in Minnesota . . . Minn. Stat. § 216B.2421, subd. 2(2).
- [174] MEQB Ex. 11, Attachment 28.
- [175] MEQB Exhibit 11, Attachment 28.
- [176] *Id.*

- [177] DOC Exhibit 3, WIRES Phase II Report, Appendix C1-3.
- [178] Tr. at 1622.
- [179] NAWO Exhibit 26; NWF Public Exhibit, Attachment 10.
- [180] NAWO Exhibits 13-16, 18 and 19; NWF Public Exhibit, Attachment 3.
- [181] NWF Public Exhibit, Attachments 1 and 2.
- [182] NAWO Exhibits 13-16, 18 and 19; NWF Public Exhibit, Attachments 1, 4 and 12.
- [183] MP Brief, at 29.
- [184] MP Exhibit 3.
- [185] SOUL Exhibit 3.
- [186] SOUL Exhibit 3, at 7.
- [187] SOUL Exhibit 3, at 8.
- [188] Tr. at 164.
- [189] Tr. at 1837.
- [190] Tr. at 1988-89, 1992-93.
- [191] Tr. at 192.
- [192] Tr. at 1943-45.
- [193] Tr. at 2085.
- [194] MP Exhibit 3, at 6 (estimating the increase in demand in MAPP over the next 10 years at 8,000 megawatts).
- [195] MP Exhibit 3, at 7.
- [196] MP Exhibit 30; MP Brief, at 27.
- [197] MP Brief, at 27.
- [198] Tr. at 161.
- [199] MP Exhibit 30.
- [200] Tr. at 210-12.
- [201] Tr. at 189-90.

[202] The Pimickikamak Cree Nation raised objections to the Arrowhead project, asserting that improving the capacity of electricity transmission into northern Wisconsin would cause Manitoba Hydro to increase its hydroelectric generation capacity. To do so, Manitoba Hydro would need to inundate more of the Nelson River Watershed. Public Hearing Tr., at 17. The Tataskweyak Cree Nation indicated that any increase in the generating capacity from the Nelson River Watershed would be controlled by the Northern Flood Agreement. Public Hearing Tr., at 20. Environmental review would be conducted as part of that process. *Id.* at 21. The MEQB has expressly addressed the limits to the issues that are to be considered in this proceeding. In its Scope Order, the MEQB stated:

IT IS HEREBY ORDERED, ... that the hearing be limited to impacts from construction or operation of the project facility on human health and the environment experienced in Minnesota. MEQB Ex. 7, at 8.

The environmental and human impacts of expanded hydroelectric generation would not be experienced in Minnesota. Under the Scope Order, evidence of those impacts must not be considered in determining whether the Arrowhead project qualifies for an exemption from the routing process in the PPSA.