BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Joint Application of American Transmission Company, ITC Midwest LLC, and Dairyland Power Cooperative, for Authority to Construct and Operate a New 345 kV Transmission Line from the Existing Docket No. 5-CE-146 Hickory Creek Substation in Dubuque County, Iowa, to the Existing Cardinal Substation in Dane County, Wisconsin, to be Known as the Cardinal-Hickory Creek Project.	Docket No. 5-CE-146

DIRECT TESTIMONY OF RAO KONIDENA
ON BEHALF OF
DRIFTLESS AREA LAND CONSERVANCY
AND WISCONSIN WILDLIFE FEDERATION.

TESTIMONY SUMMARY

Based on the Application in this proceeding, the direct testimony and exhibits submitted by the Applicants, the responses to data requests from the parties and the testimony and exhibits submitted by witnesses for the Driftless Area Land Conservancy and Wisconsin Wildlife Federation (DALC/WWF), it is my opinion that there is no reliability threat to Wisconsin if the Commission denies the Application and orders the Applicants to rerun their models using updated assumptions and develop an alternative transmission solution like the ones described by DALC/WWF witnesses Kerinia Cusick and Jon Wellinghoff. MISO operating guides will be followed in the interim to ensure that there is no reliability threat posed by a delay. If Applicants go back to MISO, MISO will follow the transmission planning tariff in place and assess the current needs of the system in the context of any updated proposal to address any future reliabilty concerns.

INTRODUCTION

Q. Please state your name, employer, title, and business address.

A. My name is Rao Konidena. I am Chief Executive Officer for Rakon Energy LLC. My business address is 2309 Auerbach St, Roseville, MN 55113.

Q: Please describe your current position and provide your education and professional experience as it relates to this direct testimony.

A: I have been an independent consultant for the past eleven (11) months working with the Energy Storage Association, a Danish wind and solar production forecasting company, and representing municipal utilities Missouri Joint Municipal Electric Utilities Commission, Missouri River Energy Services, and WPPI Energy in support of their comments on the Midcontinent Independent System Operator, Inc.'s ("MISO") June 5, 2018 Deficiency Response in FERC Docket No. ER18-1173.

I worked at MISO from September 2003 thru May 2018. I started as an Applications Engineer for Planning, where I ran Loss of Load Expectation ("LOLE") studies, Capacity Benefit Margin ("CBM") calculations, and Load Deliverability analysis for the MISO Transmission Expansion Plan ("MTEP"). I was later promoted to Lead, Resource Forecasting in 2006, where I was responsible for a team of engineers running the capacity forecasting software EPRI EGEAS. That forecasting work was used in the MTEP process. After a promotion to Manager of Resource Forecasting in 2009, I was responsible for leading Demand Response, Energy Efficiency forecasting for MTEP, including interfacing with consultants at Applied Energy Group and NG Planning.
I worked in compliance, process, and project management for the entire Transmission Asset Management ("TAM") division, as Senior Manager, TAM Operations from 2013. In this role, my team and I were responsible for division-

wide financial and strategic planning, supporting corporate planning and compliance efforts.

I came back to the Policy Studies department in the Principal Policy Advisor role for MISO in 2015, leading the long-term load forecasting project with Purdue University's State Utility Forecasting Group and Applied Energy Group demand response ("DR"), energy efficiency ("EE") and distributed generation ("DG") potential study at MISO.

Before leaving MISO in 2018, I was responsible for leading policy efforts on energy storage and distributed energy resources. I presented to MISO state commissions including Iowa's Utilities Board, South Dakota State Public Utilities Commission, and the Organization of MISO States.

I received a BE in Electrical & Electronics Engineering from Bangalore University, a MSEE in Electrical Engineering from University of Texas at Arlington, and an MBA from University of Minnesota. My complete résumé is attached as Ex.-DALC/WWF-Konidena-1.

Q: On whose behalf are you testifying in this proceeding?

A: I am testifying on behalf of the Driftless Area Land Conservancy and the Wisconsin Wildlife Federation ("DALC/WWF"), intervenors in this proceeding.

Q: What is the purpose of your direct testimony?

A: The purpose of my testimony is to (1) explain why building the proposed Cardinal-Hickory Creek Transmission ("CHC") project is not necessary to keep the lights on; (2) question whether generation retirements have increased congestion and their importance to this application; (3) explain that the CHC project was never evaluated by MISO as an individual project; (4) demonstrate that the CHC project is not the only or best way to increase transfer capacity in

Wisconsin; (5) describe how the Applicants have overstated the importance of the CHC project to increasing the competitiveness of the wholesale market; and (6) show that the Applicants have not sufficiently considered the impacts of utility scale solar native to Wisconsin. Therefore, it is my testimony that the Commission can and should deny the Application and require Applicants to go back to the drawing board to properly evaluate the costs, benefits, and need for the CHC project while also creating and modeling a proper alternative transmission solution to the project as outlined in the testimony of Ms. Cusick and Mr. Wellinghoff.

Q: Is it necessary to build the CHC project in order to keep the lights on in Wisconsin?

A: No, it is not necessary to build the CHC project to maintain reliability and keep the lights on in Wisconsin. There is no emergency requiring the Commission's approval of the CHC project.

Q: Can you explain why building CHC line is not necessary to ensure reliability?

A: MISO conducts seasonal assessments to determine operating protocols if system limitations arise in upcoming seasons.[1] In other words, MISO prepares in advance for how to handle any imminent emergencies on the grid. MISO operators develop "Operating Guides" as a result of this process.[2]

[1] MISO, Description of Coordinate Seasonal Assessment, available at: https://www.misoenergy.org/planning/resource-adequacy/#t=10&p=0&s=FileName&sd=desc ("The assessment highlights potential system limitations and issues in the upcoming seasons to help system operators develop preventative actions and confirm past experiences or assumptions.").

[2] There are 3 operating guides mentioned in the CHC Project area discussed in the Applicants' Application. (PSC REF #: 352698) Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit.

ATC also performs its own seasonal assessments. An example conclusion from ATC's 2018 Summer Assessment is, [redacted][3]

As a transmission owner, ATC also performs detailed operations studies that identify possible limitations to the MISO grid. An example conclusion from ATC's 2018 Supplemental Operations IROL Summer Assessment ("SOSA") is, [redacted][4] If ATC finds an reliability issue, an example conclusion from ATC's 2017 SOSA is, [redacted][5]

I have not found a study from MISO in their role as the Transmission Provider or ATC in their role as the Transmission Owner that concludes that the CHC project is needed to address an identified reliability issue. Therefore, in my opinion, building the CHC project is not necessary to ensure reliability.

Q: Are you saying MISO has not experienced any recent reliability issues?

A: No, MISO has recently experienced operational issues due to weather related events such as the MISO Max Gen Event on Jan 30-31 2019[6] and the September 15, 2018 South Region Maximum Generation Event.[7] The former was cold weather related, and the latter was hot weather related.

Q: What are "Max Gen Events"?

[3] Ex.-DALC/WWF-Konidena-2p. Att. 8 to 01-DALC-ATC-06. 2018 ATC OSA Report (CONF Cat. A)
[4] Ex.-DALC/WWF-Konidena-3p. Att. 7 to 01-DALC-ATC-06. 2018 ATC Ops Supp. Seasonal Assessment (CONF Cat. A)-1
[5] Ex. DALC/WWF/-Konidena-4p. Att. 1 to 04-DALC-ATC. ATC Ops Supplemental Seasonal Assessment. Report. - CONF Cat. A, C
[6] MISO, MISO January 30-31 Maximum Generation Event Overview (Feb 27, 2019) available at: https://cdn.misoenergy.org/20190227%20RSC%20Item%2004%20Jan%2030%2031%20Max%20Gen%20Event322139.pdf
[7] MISO, MISO September 15 Maximum Generation Even Overview (Oct 11, 2018), available at: https://cdn.misoenergy.org/20181011%20MSC%20Item%2003%20Max%20Gen%20Event282648.pdf

A: When system conditions are tight, meaning load is higher than anticipated and/or generation is lower than expected, and/or several transmission lines are out at the same time, MISO operators need additional generation to cover the gap between supply (generation) and demand (load). The operator declares a "max gen event" to put asset owners on notice. This allows asset owners to take necessary steps to help ensure reliability, such as putting planned maintenance of generating units on hold so that they can be used to meet demand.

Q: How does MISO define and when does MISO issue "Max Gen Events"?

A: MISO's definition of max gen events is:

> MISO's forecasted or real-time energy demand and Operating Reserve Requirements within the MBAA (or sub-area due to a transmission constraint) can **NOT** be satisfied with Economic Maximum Limits of all available Resources.[8]

MISO issues these events when there is a shortage of economic resources.[9]

Q: How did MISO operations perform during the January 2019 and September 2018 Max Gen events?

A: MISO as a region performed well. One of MISO's key takeaways was a need for improvement of operational management and forecasting: "[w]inter preparedness by MISO and its members ensured readiness for the extreme conditions, but, we note areas of needed improvement in load and wind forecasting, and voluntary load curtailment impacts."[10]

However, MISO did not recommend construction of new large transmission projects to address these kinds of max gen events.

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[8] SO-P-EOP-00-002 Rev 7 MISO Market Capacity Emergency333797, available at: https://cdn.misoenergy.org/SO-P-EOP-00-002%20Rev%207%20MISO%20Market%20Capacity%20Emergency333797.pdf

[9] *ibid*

[10] MISO, MISO January 30-31 Maximum Generation Event Overview (Feb 27, 2019) available at: https://cdn.misoenergy.org/20190227%20RSC%20Item%2004%20Jan%2030%2031%20Max%20Gen%20Event322139.pdf

Q: If there is no reliability emergency requiring construction of the CHC project, have the Applicants identified any market constraints they think justify the need for the project?

A: Yes, the Applicants identify the Nelson Dewey 161/138 kV transformer as the main constraint identified justifying the market-based reliability need for the CHC project.[11] MISO provides historical Market Reports. When I researched Nelson Dewey 161/138 kV transformer in past MISO "Yearly Historical Day-Ahead Binding Constraints[12]" for 2017 and year to date in 2019, I find the number of hours on a downward trend[13] for the Nelson Dewey 161/138 kV transformer. This could mean that the Nelson Dewey constraint is already resolving without the CHC project.

Q: Why do the Applicants consider this a particularly important constraint?

A: I don't know why the Applicants picked Nelson Dewey 161/138 kV transformer as the main constraint. MISO's 2018 flowgate summary[14] indicates [redacted][15]

[redacted][16]

[11] PSC REF #: 358984. Applicants' response to DALC/WFW's 1st Data Request (01-DALC-ATC-6).
[12] Available at: https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=%2FMarketReportType%3ADay-Ahead%2FMarketReportName%3AYearly%20Historical%20Day-Ahead%20Binding%20Constraints%20(csv)&t=10&p=0&s=MarketReportPublished&sd=desc
[13] In 2017, Nelson was binding for total of 4,179 hours compared to 2,442 in 2018. For 2019, data is only available up to 04/26/2019. Hence, I went back to 2017 and 2018 and compared for the same time period. I find Nelson was binding for 1,960 hours out of 4,179 during 01/01/2017 – 04/26/2017, and 791 hours out of 2,442 during 01/01/2018 – 04/26/2018. In summary, Nelson transformer was a constraint for 1960 (2017), 791 (2018) and 181 (2019), for the same time window (01/01-YY to 04/26/YY).
[14] Ex.-DALC-WWF-Konidena-5p. Att. 12 to 04-DALC-ATC. red_CEII_ATC_Market_Constraints_YTD2018 CONF Cat. A, C
[15] [redacted]
[16] Revised Appendix D Exhibit 1PAD Appendices Redline CONFIDENTIAL, Table D-1-9 at page 464 of 470 (REDACTED: PSC REF# 363775) (PUBLIC: PSC REF# 363774)

[redacted][17][redacted][18][redacted][19][redacted][20][redacted][21][redacted][22][redacted][23] These conclusions by MISO and ATC indicate that the Nelson Dewey 161/138 kV transformer is not a n operationally significant problem.

Q: Do you agree that this constraint requires the construction of the CHC project?

A: No, I do not think the constraint at the Nelson Dewey 161/138 kV transformer is a reason to build the CHC project. MISO's Market Constraints report for ATC, LLC Footprint, which identifies transmission constraints that can lead to reliability problems and potential solutions to those constraints, [redacted]

[17] Ex.-DALC-WWF-Konidena-6p. Att. 13 to 04-DALC-ATC. SO-RA-NOP-00-429 Rev 1 Tower Contingency CONF Cat. A

[18] Ex.-DALC-WWF-Konidena-3p. Att. 1 to 04-DALC-ATC. ATC Ops Supp. Seasonal Asses. Rpt. - CONF Cat. A, C-1

[19] "Interconnection Reliability Operating Limits ("IROL") are system operating limits which, if violated, could lead to instability, uncontrolled separation, or cascading outages that adversely impact the reliability of the Bulk Power System", 2018 Summer MISO Coordinated Seasonal Assessment

[20] [redacted]

[21] 2018 Summer CSA Report 204447, available at: https://cdn.misoenergy.org/2018%20Summer%20CSA%20Report204447.pdf

[22] "No steady-state/thermal IROLs were identified in this assessment" *ibid*

[23] 2017 Summer CSA Report 125208, available at: https://cdn.misoenergy.org/2017%20Summer%20CSA%20Report125208.pdf

[redacted][24]

[redacted]

[redacted]

In other words, MISO does not consider the CHC project necessary to maintain reliability and address any market emergencies. If MISO had determined that the CHC project were necessary for emergency purposes, it would classify it as such. Instead, the MISO report clearly states [redacted]

[redacted]

[redacted]

I also note that the MISO Constraints report shows [redacted]

[redacted]

[redacted][25]

Q: What is the difference between the Real Time and Day Ahead markets?

A: In Real Time markets, the MISO grid operator algorithm is finding the most economical solution for 5-minute intervals, running software every 4 seconds. This is done while balancing the frequency at the regional level. In Day Ahead markets, the MISO market closes approximately a day before, and then another algorithm "commits" the resources to meet the anticipated demand for the next day.

Q: Why is the distinction between real time and day ahead limitations important?

[24] Ex.-DALC/WWF-Konidena-7p. 01-DALC-ATC 06, Att. 9 ("ATC Market Constraints YTD2018 (CONF Cat. A)") (primary response PSC REF#:358984).
[25] *ibid*

A: Grid changes such as transmission system outages, generation outages, and high or low demand due to weather happen all the time. As a result, the frequency[26] and magnitude[27] of transmission limitations that show up in a Day Ahead market may be reduced or eliminated or even increased in a Real Time market, depending on how different the real time conditions are relative to day before.

In my opinion, the real time market is more indicative of persistent reliability issues than the day ahead market. [redacted] Nelson is not indicative of a persistent reliability issue in Wisconsin.

Q: If the CHC project is not needed for immediate reliability reasons, can you explain if and/or when there will be a reliability need for the CHC project?

A: Given the information provided by MISO and the Applicants, I am unable to identify any specific year by which the CHC project could be necessary. MISO has not studied the need for the CHC project using 2019 data and information. Instead, it's most recent MVP Triennial Review relied on 2016 vintage powerflows "to maintain consistency with economic and reliability models".[28] Further, recent MISO models always include the CHC project as a baseline assumption, so there are no studies done that start without the CHC project but use current load and generation information. This issue is discussed further in the direct testimony of DALC/WWF witness Mihir Desu. In fact, even in the only cases where the Company appears to have modeled the CHC project using assumptions closer to current load and generation information, it is unclear what the reliability benefits of the project are.

[26] How many (number) times the transmission element is a constraint.
[27] How long (hours) is the transmission element a constraint.
[28] 05-DALC-ATC-RFP, attachment 10 ("2017 MVP TRIENNIAL REVIEW REPORT, section 3, MTEP17 MVP Review Model Development") at 15 (PSC REF#:364226).

Q: Are there reliability concerns if the Commission denies the Application and the Applicants take several years to properly examine alternatives before reapplying to the Commission?

A: No, there do not appear to be any reliability concerns if the in-service date for the CHC project or a replacement is delayed for several years. The Applicants are using study years 2022 and 2027 for an in-service date of 12/31/2023 for the CHC project. If we assume an additional 2-3 years of robust alternatives modeling to the CHC project, the delay will not lead to any reliability issues in Wisconsin because MISO resource adequacy calculations, which look out five years, show there is enough capacity to meet the reliability standard of 1 day in 10. MISO 2019 LOLE Study Report[29] section 6.1 provides 2024-2025 Local Reliability Requirement[30] ("LRR") for Wisconsin zone 2[31] as 14,942 MW.[32] This is close to 2019-2020 LRR value for zone 2 of 14,667 MW,[33] which is already being met. Further, as I explain later in my testimony, there will be considerable additional capacity installed in Wisconsin, which will provide more than enough capacity to meet the zone 2 LRR for the next 5 years (2019-2024).

Q: If the CHC project is not needed for reliability, how did the alleged need arise?

A: The CHC project was designed as part of MISO's Multi Value Projects ("MVP") portfolio, which was approved by FERC in 2011. In 2008, MISO began

[29] MISO Loss of Load Expectation Working Group, Planning Year 2019-2020 Loss of Load Expectation Study report, available at: https://cdn.misoenergy.org/2019%20LOLE%20Study%20Report285051.pdf
[30] "Local Reliability Requirement (LRR) is the amount of UCAP MWs required to yield a 0.1-day-per-year LOLE at the load level for the LRZ at the time of the LRZ peak, without assistance from resources outside the respective LRZ", section 5.2.2.2., MISO Resource Adequacy BPM 011. UCAP is Unforced Capacity, basically quantifies the installed capacity taking into account outage statistics, for MISO's Resource Adequacy market purposes.
[31] This is MISO Local Resource Zone ("LRZ") 2. MISO region is divided into 10 LRZs for the purposes of meeting the reliability standard of 1 day in 10. Western part of Wisconsin is part of LRZ1, and eastern part of Wisconsin is LRZ2. I am focusing on zone 2, because the Applicants mostly focus on the parts of Wisconsin covered by zone 2.
[32] Table 6-3: Planning Year 2024-2025 LRZ Local Reliability Requirements, *ibid*
[33] Table 6-1: Planning Year 2019-2020 LRZ Local Reliability Requirements, *ibid*

development of the portfolio as part of a "top-down"[34] planning exercise called the "Regional Generation Outlet Study."[35] The study was designed to help states meet Renewable Portfolio Standards.[36] The MVP portfolio came out of this process.

Q: What do you mean by "top-down" planning?

A: Top-down planning is designed to find transmission project that benefit MISO as a whole.

Q: What benefits did MISO seeking with top-down planning?

A: Top-down planning results in projects that address economic and/or public policy drivers. As explained in MISO's Business Practice Manuals, "[r]egional or subregional top-down projects are developed in a top-down manner by MISO staff working in conjunction with stakeholders to address regional economic and/or public policy Transmission Issues."[37]

Q: Does top-down planning seek to improve reliability?

A: No, reliability is not a driver in top-down planning. It is possible that regional and subregional projects that address economic or public policy drivers could have positive reliability benefits, but MISO does not use the top-down process to find and resolve reliability concerns. The CHC project, like all of the MVP projects, was developed as part of a portfolio designed to meet public policy goals.

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[34] Top-Down Projects are defined in the MISO Transmission Planning Business Practices Manual ("BPM") 020, section 2.3.1.2. Available at: https://www.misoenergy.org/legal/business-practice-manuals/

35 Regional Generation Outlet Study, Midwest ISO, November 2010, MISO response to DALC 1st Data Request. (PSC REF # 363984)

[36] "Renewable Portfolio Standards (RPS) passed by most Midwest ISO member states mandate meeting significant percentages of total electrical energy with renewable energy resources. To develop transmission portfolios fulfilling these requirements and meeting the objective function of achieving the lowest delivered dollar per MWh cost, Midwest ISO , with the assistance of state regulators and industry stakeholders, conducted the Regional Generator Outlet Study (RGOS)." Regional Generation Outlet Study, MISO Responses to DALC 1st Data Request. (PSC REF # 363984)

[37] MISO Transmission Planning Business Practices Manual 020, section 2.3.1.2, available at: https://www.misoenergy.org/legal/business-practice-manuals/

Q: Did MISO study the need for the CHC project outside of the MVP portfolio process?

A: MISO did not evaluate the CHC project outside of the MVP portfolio. While Applicants cite the MVP approval[38] and subsequent triennial reviews[39] as evidence that the CHC project will bring regional benefits, MISO only evaluates the MVP portfolio as a whole. MISO, therefore, has never reviewed the CHC project in isolation or done any analysis of the effect on the MVP portfolio if the Applicants never build the project. A similar conclusion is drawn by DALC/WWF witness Kerinia Cusick in her testimony.

Q: Why do you believe that MISO has never studied the CHC project in isolation?

A: In my experience at MISO, the MVP projects were only ever reviewed as a portfolio. This is made clear in MISO triennial reviews, which only ever provide evaluations of the portfolio as a whole. Also, in emails received as part of discovery in this proceeding, MISO states, "MISO has consistently taken the position that it does not model the costs and benefits of any single MVP outside the context of an MVP portfolio."[40]

Q: Why is it relevant that MISO has never modeled the CHC project outside of the context of the MVP portfolio?

A: Because MISO has never modeled the costs and benefits of the CHC project outside the context of the MVP portfolio, there is no reason to believe that denying or delaying the CHC project while the Applicants examine robust alternatives would materially affect the MVP portfolio as a whole. As I believe

[38] Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit, September 2018 ("In December 2011, after a comprehensive planning analysis, the MISO Board of Directors approved a **portfolio** of projects under its Multi-Value Project (MVP) Tariff that included the Project."). Ex.-ATC-Application-Vol. 2: 14

[39] 05-DALC-ATC-RFP, att. 10, MTEP17 MVP Triennial Review (PSC REF # 364226).

[40] (PSC REF#:363983) 01-DALC-MISO-06, Lauren Azar Email

DALC/WWF witness Desu has testified, the CHC project is not expected to provide significant benefits above its cost as currently proposed. Further, it is my understanding that Wisconsin has already met its renewable portfolio standard targets. I also understand there are increasing opportunities for in-state solar and other renewable project development in Wisconsin that were not fully considered as part of the MVP planning process prior to 2011. Therefore, it would not be a burden on the MVP portfolio or the region's public policy goals if this project is denied or delayed.

Q: What impact do generation retirements have on reliability?

A: MISO has 174,678 MW of generation capacity and 127,125 MW of peak load.[41] So, it is inevitable that some generating units retire. Not all generation retirements impact the reliability of the MISO transmission system. MISO studies these "retirement" requests much like "interconnection" requests to find the reliability impact of that particular unit retirement on rest of the transmission grid. The Applicants state that recent generation retirements in the area have increased congestion in the area.[42]

Q: Why do the Applicants believe that this congestion caused by generation retirements is important?

A: The Applicants state that the congestions caused by retirements have stressed the system and pose reliability risks.[43]

Q: Do you agree with the Applicants that recent generation retirements have increased the threat of reliability problems?

[41] Available at: https://www.misoenergy.org/about/media-center/corporate-fact-sheet/
[42] *See* Section 2.1.2.2. of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit ("Recent generation retirements in the area such as the retirement of the Nelson Dewey units have led to congestion"). Ex.-ATC-Application-Vol. 2: 48
[43] *See* Section 2.1.2.2. of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit ("Even moderate additional wind capacity to the west of Wisconsin would further stress this already constrained system."). Ex.-ATC-Application-Vol. 2: 48

A: No, I do not agree with the Applicants that recent generation retirements have increased the threat of reliability problems in Wisconsin.

First, as Applicants state in their Application, MISO operating guides already ensure reliability even as generating units retire.[44] Wisconsin can continue to rely on these MISO operating guides if the Commission denies the Application.

Second, plant retirements in Wisconsin or the rest of MISO are nothing new and have not caused reliability problems. Wisconsin utility WEC Energy Group has stated that the transition away from coal-fueled generation started in 2005.[45] There have been a total of 1,490 MW of retirements alone by WEC Energy Group[46] and to date these have not caused any reliability emergencies. There is nothing to suggest that the CHC project going in-service on December 31, 2023 will be necessary to maintain reliability due to generation retirements.

Third, if a retiring unit in MISO is needed for reliability purposes, MISO would identify that need through its generation retirement process, known as "Attachment Y." Upon identification, MISO would designate the unit as a "System Support Resource," which would require the unit to stay in operation until a permanent reliability solution is found and implemented. Therefore, generation retirements in Wisconsin do not pose reliability concerns.

Q: What are transfer capacity limits?

A: When power is transferred from point A to point D on the transmission system, there is the possibility that congestion from point B to point C on the way from A

[44] Section 2.1.2.4 of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit. Ex.-ATC-Application-Vol. 2: 54

[45] *See* WEC Energy Group, Generation reshaping plan includes solar project, coal plant closures, available at: https://www.wecenergygroup.com/home/generation-reshaping-plan.htm ("We began reducing CO2 emissions from coal-fueled generation through the conversion of the We Energies Port Washington Power Plant (now Port Washington Generating Station) and Valley Power Plant to natural gas in 2005-08 and 2014-15, respectively.").

[46] WPS 200-MW Pulliam Power Plant in Green Bay, Wisconsin, We Energies 100-MW share of Edgewater 4 in Sheboygan, Wisconsin, and We Energies 1,190-MW Pleasant Prairie Power Plant in Pleasant Prairie, Wisconsin. Available at: https://www.wecenergygroup.com/home/generation-reshaping-plan.htm

to D could "limit" the transfer from A to D. The risk of this limit increases as you try to transfer more and more power. For example, it might be trivial to transfer 1,000 MW from A to D, but when there is a need to transfer 10,000 MW congestion could emerge at B to C along the way that makes it impossible to transfer all 10,000 MW. In this case, the elements from B to C would be "overloaded."

Q: What kinds of things affect transfer capacity limits?

A: In my earlier example, an injection of power at points B and C could limit the ability to transfer power from A to D. Another limit could be load points A and D. Varying the generation, i.e. "re-dispatching," at points B and C is one of the many things that affects the B to C transmission limiting element.

Q: So, re-dispatching resolves the B to C problem, but does it resolve the load at A or D problem?

A: If the load at A or D can be reduced[47], then that might also be a solution. Reducing load at points A or D would have an impact on the transfer capacity limit from A to D.

Q: Do the Applicants believe that the CHC project will increase transfer capacity between Iowa and Wisconsin?

A: Yes, the Applicants claim that the CHC project will increase the transfer capacity between Iowa and Wisconsin.[48] Applicants point to MISO's Loss of Load Expectation ("LOLE") study report to show constraints between Iowa and

[47] *See* Mr. Wellinghoff's direct testimony (PSC REF# 364939).

[48] "Increase the transfer capability of the electric system between Iowa and southwest and southcentral Wisconsin by approximately 1,300 MW, thereby easing congestion, increasing generator competition, and allowing the transfer of additional low-cost wind energy into the state;" Project Need section 2.1, Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit, September 2018. Ex.-ATC-Application-Vol. 2: 30

Wisconsin.[49] Applicants also point to subsequent MISO LOLE reports from 2018 and 2019.[50]

Q: Do you agree that the CHC project is necessary to increase transfer capacity?

A: For reasons explained below, I do not believe that the CHC project is necessary to increase transfer capacity between Iowa and Wisconsin.

Q: Why do the Applicants believe that reducing transfer capacity limits is beneficial to Wisconsin?

A: The Applicants believe power transfers from Iowa to Wisconsin will provide access to low-cost wind energy and hence be beneficial to Wisconsin.[51] In my earlier example, points A and D are Iowa and Wisconsin respectively.

Q: What elements from MISO's LOLE studies are important to the CHC project application?

A: Applicants identified the Stoneman-Nelson Dewey 161 kV and Seneca to Gran Grae 161 kV lines as capacity import limits.[52] In my earlier example, points B and C are Stoneman-Nelson Dewey, and Seneca to Gran Grae respectively.

Q: What do you find when you examine the capacity transfer import limits Applicants reference in their discovery responses?

A: MISO's LOLE studies provide modeled capacity import limits for 2021. When I compared the modeled 2021 capacity import limits for the Stoneman to Nelson

[49] 01-DALC-ATC 18, Att 2 ("2017 LOLE Study report") (PSC REF#:358984).
[50] 01-DALC-ATC-6 (PSC REF#358984) ("Likewise, MISO's Loss of Load Expectation Study reports for planning years 2018-2019 and 2019-2020 identify the Stoneman-Nelson Dewey 161 kV and Seneca to Gran Grae 161 kV lines as capacity import limits.*")*
[51] "Increase the transfer capability of the electric system between Iowa and southwest and southcentral Wisconsin by approximately 1,300 MW, thereby easing congestion, increasing generator competition, and allowing the transfer of additional low-cost wind energy into the state;" Project Need section 2.1, Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit, September 2018. Ex.-ATC-Application-Vol. 2: 30
[52] 01-DALC-ATC-6 (PSC REF#358984)

Dewey 161 kV monitoring element from the 2017[53] and 2018 LOLE reports,[54] I found that the 2021 limit increased from 1,447 MW to 2,495 MW.[55]

Q: Why would the capacity import limit change in just one year?

A: In my opinion, the transmission system "re-dispatched" the generation, increasing the import capability into Zone 2. In fact, the 2,075 MW limit in the 2017 LOLE Study report is after redispatch has been considered by MISO.[56]

Q: What does this sudden change in the import limit mean about the impact of the CHC project?

A: This swift change in the import limit constraints leads me to question whether the CHC project is necessary to increase the import limit. It might be possible that generation redispatch in the area would increase limits as much as the CHC project at much lower cost. The Applicants have likely significantly overstated the import constraint benefits of the CHC project.

Q: Did the Applicants' model generation redispatch as an option to increase the capacity import limit in any of their alternatives?

A: No, I did not see Applicants model the redispatch of generation as an option, in any of their alternatives shown in their latest model results provided in April 2019.[57]

[53] 01-DALC-ATC 18, Att 2 ("2017 LOLE Study report") (PSC REF#:358984).
[54] MISO Loss of Load Expectation Working Group, Planning Year 2018-2019 Loss of Load Expectation Study report at 19, Table 3-5, available at https://cdn.misoenergy.org/2018%20LOLE%20Study%20Report89286.pdf (attached as Ex.-DALC/WWF-Konidena-8 at page 2).
[55] This means, more power (2,495 minus 1,447 equals 1048 MW) was able to flow into zone 2 until a limit was reached, for the same monitored element Stoneman – Nelson Dewey in one year (2017 to 2018 study) for the same study year 2021.
[56] 01-DALC-ATC 18, Att 2 ("2017 LOLE Study report") at 15, fn 5 (PSC REF#:358984). ("The 17-18 Limit represents the limit after redispatch has been considered.").
[57] Revised Appendix D Exhibit 1PAD Appendices Redline CONFIDENTIAL, Table D-1-9 at page 464 of 470 (REDACTED: PSC REF# 363775) (PUBLIC: PSC REF# 363774)

Q: Have the capacity import limits changed from year to year in MISO's LOLE studies?

A: Yes, the capacity import limits have changed in each of the past three years. When I compared capacity import limits from the 2017, 2018, and 2019 MISO LOLE study reports I found that the capacity import limit into Zone 2 has changed over each of the past three study years: 2,075 MW in 2017,[58] 2,317 MW in 2018,[59] and 1,713 MW in 2019.[60] This rapid change up and down of the import limits leads me to believe that we will see additional changes to the capacity import limit when MISO releases its 2020 LOLE Study report in November 2019. We could see even more changes in subsequent years as MISO adapts its generation dispatch to meet system needs. Therefore, it seems unlikely that the CHC project alone will be responsible for increasing the transfer capacity limit into Wisconsin. It is likely that there are other underlying transmission system improvements and generation redispatch approaches that improve the import capacity limit into Wisconsin without construction of the CHC project. Some of these options are discussed in the direct testimony of DALC/WWF witness Kerinia Cuskick. The Applicants have not modeled these potential approaches in their alternatives analyses.

Q: Do the Applicants argue that increasing the capacity transfer limit will affect competitiveness in the wholesale electric markets in Wisconsin?

A: Yes. The Applicants state that increasing the transfer capacity in Wisconsin is a good thing because it increases the competitiveness of wholesale electric market

[58] 01-DALC-ATC 18, Att 2 ("2017 LOLE Study report") at 12, table 3.3-1 (PSC REF#:358984).
[59] MISO Loss of Load Expectation Working Group, Planning Year 2018-2019 Loss of Load Expectation Study report at 12, Table 3-3, available at: https://cdn.misoenergy.org/2018%20LOLE%20Study%20Report89286.pdf (Ex-DALC/WWF-Konidena-8 page 2).
60 MISO Loss of Load Expectation Working Group, Planning Year 2019-2020 Loss of Load Expectation Study report at 12, Table 3-3, available at: https://cdn.misoenergy.org/2019%20LOLE%20Study%20Report285051.pdf (Ex-DALC/WWF-Konidena-8 at page 3).

(i.e. MISO) opportunities.[61] The Applicants mistakenly point to constraints in the Western Upper Michigan System ("WUMS") as an area that will see competition benefits from the line.[62]

Q: Why are Applicants mistaken in relying on the WUMS as an example of an area where the CHC project could increase competition?

A: In their Application, the Applicants point to the fact that the MISO Independent Market Monitor ("IMM") has designated the WUMS as a Narrow Constrained Area ("NCA") to demonstrate how the CHC project will increase competition.[63] However, it is possible that the IMM will no longer designate the WUMS as an NCA with FERC acceptance of MISO's Dynamic Narrow Constrained Areas[64] ("Dynamic NCAs"). Therefore, the importance of the CHC project in increasing the transfer capacity and thereby increasing the competitiveness of the wholesale market is likely overstated.

Q: What else can have an impact on available transfer capacity in Wisconsin?

A: Utility scale solar can have an impact on the available transfer capacity in Wisconsin. It appears from the deposition of Applicant witness Mr. Dagenais that the Applicants have included only one 30 MW utility scale solar in their calculations. For example, Mr. Dagenais stated, "We went with a 30 megawatt utility-scale solar farm" when describing the utility scale solar used in the non-

[61] Section 2.1.2.3 of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit ("[T]he increased [First Contingency Incremental Transfer Capability] of each alternative would increase the competitiveness of the wholesale power market."). Ex.-ATC-Application-Vol. 2: 52

[62] Section 2.1.2.3 of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit. [62] Section 2.1.2.3 of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit ("[T]he increased [First Contingency Incremental Transfer Capability] of each alternative would increase the competitiveness of the wholesale power market."). Ex.-ATC-Application-Vol. 2: 52 (*id*)

[63] Section 2.1.2.3 of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit. [63] Section 2.1.2.3 of Application for PSCW Certificate of Public Convenience and Necessity and WDNR Utility Permit ("[T]he increased [First Contingency Incremental Transfer Capability] of each alternative would increase the competitiveness of the wholesale power market."). Ex.-ATC-Application-Vol. 2: 52 (*id*)

[64] FERC Docket Number ER17-2097-001

transmission alternative portfolio.[65] This, however, vastly understates the potential for utility scale solar already in development in Wisconsin.

Two recent solar projects Badger Hollow (9697-CE-100) and Two Creeks (9696-CE-100) were recently approved by the PSC.[66] Badger Hollow is a 300 MW project in the vicinity of the CHC project footprint and Two Creeks is a 150 MW project. Both have in-service dates of 2020. Additionally, there are at least two more utility solar projects in Wisconsin – WPPI's 100 MW at Point Beach, and DPC's Badger State of 149 MW.[67]

These projects alone amount to nearly 700 MW of new utility scale solar in Wisconsin. Applicants did not model this 700 MW nor have they considered the approximately 4,500 MW of solar in Wisconsin under "Active" study status as of March 2019.[68] This failure to model large amounts of utility solar is important to the transfer capacity topic discussed earlier. Transmission flows will change due to reduced peak load at transmission buses where this solar is interconnected. When transmission flows are reduced, the flow-gates and other transmission elements will not be overloaded. As a result, more transfer capacity will be made available on transmission lines.

It is reasonable to expect that not all the 4,500 MW of Wisconsin-based solar in MISO's current interconnection queue will ultimately be constructed.[69] However, a substantial amount will interconnect and that will "free up" more transfer capacity on existing transmission lines in Wisconsin. The point is that Applicants have not studied these changed circumstances when evaluating the need for the CHC project. The Applicants' NTA of 30 MW of solar does not reflect what is actually occurring with solar development in Wisconsin, and these new solar

[65] Deposition of Dagenais at page 46.
[66] Available at: https://www.renewwisconsin.org/psc-approves-5-fold-solar-expansion-in-wisconsin/
[67] Available at: https://www.dairylandpower.com/content/dairyland-power-announces-major-solar-energy-facility
[68] Available at: https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/
[69] *See* Ex.-DALC-WWF-Konidena-9 of this testimony.

projects can have an impact on the transfer capacity need that Applicants have stated in their Application.

Q: Did the Applicants model this large influx of utility scale solar in Wisconsin?

A: I do not think they did. [redacted] Therefore, it appears that the Applicants have not properly modeled the solar recently approved by the Commission or in the MISO queue.

Q: What is your recommendation to the Commission about this new utility scale solar in Wisconsin?

A: The Commission should deny the Application and require Applicants to include the latest utility scale solar in Wisconsin and reasonable projections of future Wisconsin-based solar development in MISO economic models when re-running their analysis. This issue is further discussed in the direct testimony of DALC/WWF witnesses Jon Wellinghoff and Kerinia Cusick.

Q: Does this conclude your testimony?

A: Yes it does.