MISO Exhibit 1.0 (Rev)

ILLINOIS COMMERCE COMMISSION

DOCKET NO. 12-0598

REVISED DIRECT TESTIMONY

OF

JEFFREY R. WEBB

Submitted on Behalf

Of

MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC., F/K/A

MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR, INC.

November 8, 2012

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I. <u>INTRODUCTION AND WITNESS QUALIFICATIONS</u>

Q. Please state your name, business address, and present position.

A. My name is Jeffrey R. Webb, and I am the Senior Director of Expansion Planning for Midcontinent Independent System Operator, Inc. (hereinafter, "MISO"). My business address is 720 City Center Drive, P.O. Box 4202, Carmel, Indiana 46082-4202.

Q. Please summarize your educational background and professional experience.

A. I hold a bachelor's degree and a master's degree in electrical power engineering from Rensselaer Polytechnic Institute. I have also taken a variety of courses and seminars in utility planning and engineering during my career. I have taught courses in circuit analysis, distribution system analysis, and electric power system analysis at the Illinois Institute of Technology. In addition, I have served on national and regional groups dedicated to ensuring transmission system reliability. I have served as a member of the Planning Committee of the Mid-America Interconnected Network ("MAIN"), a Regional Reliability Organization that has now merged to form the Reliability First Corporation. I have served as past Chairman of the Transmission Task Force, the Data Bank Group, and Standards Compliance Task Force of MAIN. I have served as a member of the North American Electric Reliability Corporation ("NERC") Planning Committee representing the regional transmission organization ("RTO") sector, and the NERC Planning Standards Subcommittee ("NERC PSS"). As a member of the NERC PSS, I have participated in the development of the NERC Reliability Standards related to transmission planning. I have facilitated a number of stakeholder groups related to transmission planning at MISO, including the Planning Advisory Committee, the Planning Subcommittee, and the Regional Expansion Criteria and Benefits Task Force that developed transmission investment cost allocation mechanisms in place today under the MISO Open Access Transmission, Energy and Operating Reserve Markets Tariff ("Tariff").[1] Throughout my career, I have analyzed and planned electric transmission and distribution systems, with a focus on transmission. I began my professional

[1] See MISO Tariff, Attachment FF, Transmission Expansion Planning Protocol Version: 5.0.0 Effective: 7/1/2012, *accepted by, Midwest Independent Transmission System Operator, Inc*., 133 FERC ¶61,221 (2010) ("MVP Order"), *order on reh'g*, 137 FERC ¶61,074 (2011) ("MVP Rehearing Order"); see also, *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228 (2009), *order on clarification*, Order No. 890-D, 129 FERC ¶ 61,126 (2009).

career working for Commonwealth Edison Company ("ComEd") in 1976 as a Transmission Planning Engineer. Between 1988 and September of 2000, I held a variety of supervisory and management positions in the bulk power planning area of ComEd, including Technical Studies Supervisor, Bulk Power Planning Supervisor, System Planning Engineer, and Transmission Planning Manager. As Transmission Planning Manager, I led a department responsible for analyzing the transmission lines, substations, and interconnections that form ComEd's bulk-power transmission network in order to determine when modifications and reinforcements are necessary to maintain adequate, efficient, and reliable service to customers. My responsibilities as Transmission Planning Manager included ensuring that ComEd's transmission grid could meet regional and national adequacy and reliability standards, and whenever appropriate, developing and analyzing cost effective, available alternatives for modifications or expansion that best meet those requirements. I provided testimony before the Illinois Commerce Commission in several dockets involving transmission line certification prior to my position with MISO. I have also provided testimony before the North Dakota Public Service Commission, the Wisconsin Public Service Commission, and the Minnesota Public Utilities Commission regarding certification of transmission lines included in the MISO Transmission Expansion Plan ("MTEP"), which is explained more fully below.

Q. What are your duties and responsibilities in your present position?

A. My duties include directing the evaluation of reliability studies in support of development of the MISO MTEP and the overall coordination of planning study results into a cohesive regional transmission expansion plan.

Q. What is MISO?

A. MISO is a not-for-profit, member-based RTO providing reliability and market services over 49,600 miles of transmission in 11 states and one Canadian province. MISO is governed by an independent eight-member Board of Directors.

Q. What are MISO's responsibilities?

A. As an RTO, MISO is responsible for operational oversight and control, market operations, and planning of the transmission systems of its member Transmission Owners ("TOs"). Among many other responsibilities, MISO also monitors and calculates Available Flowgate Capability ("AFC"), and provides tariff administration for its Tariff, accepted by the Federal Energy Regulatory Commission ("FERC").[2] MISO is the Reliability Coordinator for its footprint, providing real-time operational monitoring and control of the transmission system. MISO operates a real-time and a day-ahead locational marginal price based energy market in which each market participant's offer to supply energy is matched to demand and is cleared based on a security constrained economic

[2] MISO's Tariff was initially accepted by FERC in 1998, but suspended until adopted subsequently in 2001. See *Midwest Indep. Transmission Sys. Operator, Inc.*, 97 FERC ¶ 61,326 (2001); *Midwest Indep. Transmission Sys. Operator, Inc.*, 97 FERC ¶ 61,033 (2001), *order on reh'g*, 98 FERC ¶ 61,141 (2002). MISO began providing transmission service under its Tariff in 2002.

dispatch process. In addition, MISO operates a market for Financial Transmission Rights ("FTR"), which are used by market participants to hedge against congestion costs, and an ancillary services market, which provides for the services necessary to support transmission of capacity and energy from resources to load. MISO is responsible for approving transmission service, new generation interconnections, and new transmission interconnections to and within the MISO footprint, and for ensuring that the system is planned to reliably and efficiently provide for existing and forecasted usage of the transmission system. MISO is the Planning Coordinator for its footprint, which includes Illinois, and performs planning functions collaboratively with its TOs with stakeholder input throughout, while also providing an independent assessment and perspective of the needs of the transmission system overall.

II. PURPOSE AND SCOPE

Q. Are you familiar with the Project proposed in the Petition filed by Ameren Transmission Company of Illinois ("ATXI") in this proceeding?

A. Yes. ATXI filed an application seeking a Certificate of Public Convenience and Necessity ("Certificate") pursuant to Sections 8-406.1 and 8-503 of the Illinois Public Utilities Act, authorizing it to construct, operate, and maintain a 345 kV electric transmission line (the "Transmission Line") in an area extending from the Mississippi River near Quincy, Illinois, eastwards across the state to the Indiana state line, and including portions connecting Sidney and Rising substations and

Meredosia and Ipava Substations. ATXI is also seeking authorization to construct new substations and related facilities. The Transmission Line and related facilities are together referred to in my testimony as the "Illinois Rivers Project" or the "Project."

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to generally describe the planning functions performed by MISO, and MISO's planning process, including MTEP. Given that the Illinois Rivers Project was approved by the MISO Board of Directors on December 8, 2011 as part of MISO's MTEP 11,[3] I will also provide a summary of findings based on MISO's analysis of the Illinois Rivers Project within the MTEP process, and discuss the integration of the Project within MISO's regional plan (i.e., as explained further below, the Project is part of a portfolio of projects that together form a Multi-Value Project ("MVP") portfolio[4]), and explain how the Project promotes the development of an efficiently competitive electricity market.

III. MISO REGIONAL TRANSMISSION PLANNING

Q. What are the requirements and objectives of the MISO regional planning process?

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[3] See MTEP 2011 Report, publicly available at: https://www.midwestiso.org/PLANNING/TRANSMISSIONEXPANSIONPLANNING/Pages/MTEP11.aspx.

[4] For a copy of MISO's publicly available MVP Project Portfolio Report (January 10, 2012), see: https://www.misoenergy.org/Library/Repository/Study/Candidate%20MVP%20Analysis/MVP%20Portfolio%20Analysis%20Full%20Report.pdf.

A. Regional planning at MISO is performed in accordance with several guiding documents. The Agreement of Transmission Facilities Owners to Organize the Midwest Independent Transmission System Operator, Inc., a Delaware Non-Stock Corporation ("Transmission Owners Agreement" or "TOA") includes the Planning Framework which describes the planning responsibilities of MISO and of transmission owning members.[5] Responsibilities of MISO include the development of the MISO Transmission Expansion Plan in collaboration with Transmission Owners and stakeholders. In addition, MISO adheres to the nine planning principles outlined in FERC Order No. 890.[6] In so doing, MISO provides an open and transparent regional planning process which results in recommendations for expansion that are reported in what is generally known as the MTEP. Recent FERC Order No. 1000 furthered the planning principles outlined in FERC Order No. 890 and included the requirements to plan for public policy and for coordinated inter-regional planning and cost allocation.[7] Consistent with these planning principles, the objectives of the MTEP process are to identify transmission system expansions that will ensure the reliability of the

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[5] See MISO Transmission Owners Agreement (TOA), Version: 0.0.0 Effective: 7/31/2010, Appendix B, Section VI, publicly available at: https://www.misoenergy.org/Library/Repository/Tariff/Rate%20Schedules/Rate%20Schedule%2001%20-%20Transmission%20Owners%20Agreement.pdf.

[6] *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g and clarification*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228 (2009), *order on clarification*, Order No. 890-D, 129 FERC ¶ 61,126 (2009).

[7] *Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, Order No. 1000, 136 FERC ¶ 66,051 (2011), *order on reh'g*, Order No. 1000-A, 139 FERC ¶ 61,132 (2012), *order on reh'g and clarification*, Order No. 1000-B, 141 FERC ¶ 61,044 (2012).

transmission system that is under the operational and planning control of MISO, to identify expansion that is critically needed to support the reliable and competitive supply of electric power by this system, and to identify expansion that is necessary to support energy policy mandates in effect within the MISO footprint. In addition, the MTEP Report provides assessments of resource adequacy, analyses of various energy policy scenarios, and the development of long-term resource forecasts based on those scenarios.

Q. Please describe the planning process that is used to develop the MTEP.

A. MISO uses a "bottom-up, top-down" approach in developing this plan. The "bottom-up" portion relies on the ongoing responsibilities of the individual TOs to continuously review and plan to reliably and efficiently meet the needs of their local systems. MISO then reviews these local planning activities with stakeholders and performs a top-down review of the adequacy of and appropriateness of the local plans in a coordinated fashion with all other local plans to most efficiently ensure that all of the needs are cost effectively met. In addition, MISO considers, together with stakeholders, opportunities for improvements and expansions that would reduce consumer costs by providing access to new low cost resources that are consistent with and required by evolving legislative energy policies. Our planning process also examines congestion that may limit access to the most efficient resources, and considers improvements that may be needed to meet forecasted energy requirements. Stakeholders, including state regulatory authorities, are engaged to develop future system scenarios that are guided by stakeholder assessments of possible future state and federal energy policy decisions. The possible future scenarios and energy polices ("futures") form the basis for forecasts of resources and load that would be economical and consistent with policy. Transmission needs are then assessed and plans developed to reliably and efficiently deliver the necessary energy from resources to load.

Q. What does it mean for a project to be approved by the MISO Board of Directors as a part of the MTEP?

A. The MTEP plan consists of the many individual projects or portfolios of projects that are recommended by the MISO staff to the MISO Board of Directors. In accordance with the TOA, approval of a MISO MTEP Plan by the Board certifies the MTEP as MISO's plan for meeting the transmission needs of all stakeholders subject to any required approvals by federal or state regulatory authorities.

Q. In preparing the MTEP regional plans, what considerations are taken into account by MISO?

A. There are numerous considerations in planning for a regional transmission system; however, two considerations are crucial. First, the security of the transmission system must be maintained. That is, the transmission system must be able to withstand disturbances (generator and/or transmission facility outages) without interruption of service to load. This is achieved, in part, by assuring that disturbances do not lead to cascading loss of other generator and transmission facilities. Second, the transmission system must be adequately planned to be able to accommodate load growth and/or changes in load and load growth patterns, as well as changes in generation and generation dispatch patterns without causing equipment to perform outside of its design capability. Additional considerations include addressing constraints that limit market efficiency and providing for expansions that enable energy policy mandates to be achieved.

IV. RELIABILITY PLANNING CONSIDERATIONS

Q. What must be considered in planning, operating, and maintaining an adequate, efficient, and reliable transmission system?

A. A transmission system must have capacity sufficient to meet projected power flows while maintaining required voltage levels and system stability.

Q. How do you determine if a transmission system has capacity sufficient to meet projected power flows while maintaining required voltage levels and stability?

A. This requires an engineering evaluation of the system as a whole, as well as an evaluation of critical individual system components (transformers, lines, switchgear), under both normal and contingency conditions (conditions where one or more system components are out of service). Power system simulation models are developed for use in these analyses. Projected peak load power flows for each major component are checked to ensure that rated capacities are not exceeded. Voltage levels are also checked to ensure that voltage levels are maintained above the minimums required for safe operation of the system and above the minimums required for supply of adequate voltage to customers. The model system is tested for both generator and voltage stability following severe disturbances.

Q. Why is it necessary to provide capacity to meet projected power flows?

A. There are several reasons. First, overloaded equipment threatens the system's ability to continue to provide adequate and reliable service to its customers. Overloaded equipment can fail and cause brownouts and blackouts (which, for major transmission components, can be widespread and extended) as well as potentially dangerous conditions. In addition, overloads reduce the service life of equipment and tend to increase the probability of component failure in the future.

Q. Why is it necessary to ensure that voltage levels are maintained?

A. Transmission voltages must be maintained within specified tolerances both to ensure that adequate customer voltage is maintained and to ensure that relays and other voltage-sensitive equipment operate properly. Customer voltage is dependent on a number of variable factors, which include transmission voltage level, load magnitude, and load power factor.

Q. Why is it necessary to ensure that system stability is maintained?

A. Certain conditions could cause a generating unit to lose synchronism with the rest of the system or cause bulk power voltages to decline rapidly in an uncontrolled manner. These severe contingencies, while unlikely, must be tested to ensure that the transmission system is strong enough to prevent their occurrence, or that in such instances protective systems act to regain control of the system, either by rapid tripping of the out-of-step generator, or by controlled shedding of load to arrest voltage decline. Without these measures in place, such disturbances could affect the secure operation of wide areas of the inter-connected transmission systems of the state and of the nation.

Q. Why do you study contingency conditions as well as normal operating conditions?

A. Generating units and major transmission system components cannot be assumed to be in operation 100% of the time. In addition to scheduled maintenance requirements, unscheduled outages can occur. Therefore, reliability must be maintained for an appropriate range of possible system failures. For example, the transmission system must, at a minimum, continue to operate adequately with any single line or transformer in an area out of service. In addition, where the behavior of the transmission system in an area is heavily dependent on the output of a particular generating unit or units, it is necessary to consider the ability of the system to continue to operate when those generating units are unavailable.

Q. Are there any other factors which must be considered in evaluating alternative plans, once the need for transmission system reinforcement is demonstrated?

A. Yes. Effects on other portions of the existing transmission system must be considered. A plan must also be capable of being constructed and operated within the time required to meet the need. The plan should avoid excessive equipment damage or widespread service outages in case events more severe than planned occur. Finally, a suitably robust plan should also consider longer-range requirements for system operation with future growth, and should be compatible with or support energy supply policies such as state renewable portfolio standards ("RPS").

Q. What are the standards that govern MISO planning practices to ensure reliable transmission system performance?

A. MISO plans its transmission system in compliance with NERC, Regional Entity, and Transmission Owning member transmission planning standards. In addition, planning practices are dictated by FERC Order Nos. 890 and 1000.[8] MISO implements these practices through its governing and informational documents, including Attachment FF to the Tariff, TOA, and MISO's Business Practices Manual ("BPM").[9]

Q. Can you briefly summarize the scope of the FERC planning practices?

A. As I mentioned briefly earlier, Order No. 890 is primarily concerned with ensuring that transmission planning takes place in an open and transparent environment where stakeholders to the planning process are engaged in and have opportunities to provide input and comment on the development of local area as well as regional transmission plans. The planning process also addresses economic and regulatory policy considerations in addition to the NERC standards for reliability. There are also requirements aimed at ensuring coordination with neighboring planning regions and proper cost allocation.

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[8] See supra n.6, n.7.

[9] See supra n.1, n.5; also see the MISO's Business Practices Manual, Transmission Planning, BPM-020-r6, Section 4 (November 15, 2011).

Q. What is the NERC transmission planning standard and what does it require?

A. The NERC Transmission Planning ("TPL") reliability standard is applicable to transmission planning and governs planning requirements to ensure reliable transmission system performance.[10] The standard addresses system performance: under normal (no contingency) conditions; following events resulting in the loss of a single transmission element; following events resulting in loss of multiple elements; and following more extreme events that result in loss of many transmission elements such as entire generating or switching stations or rights-of-way.

Q. What are the associated system performance requirements for contingency events prescribed under the NERC transmission planning standard?

A. For all but the extreme events, the standard requires that system stability be maintained and that no cascading outages occur for the prescribed contingency events, and that facilities remain at all times within applicable thermal and voltage ratings.

V. REGIONAL ELECTRIC SYSTEM PLANNING FOR THE ILLINOIS RIVERS PROJECT

Q. What is the status of the Illinois Rivers Project in the MISO regional planning process?

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[10] See NERC Transmission Planning Standard, TPL-001-2, publicly available at: http://www.nerc.com/page.php?cid=2|20.

A. The Illinois Rivers Project was approved by the MISO Board of Directors on December 8, 2011 as a part of the MTEP 11. The Project is part of a portfolio of projects that together form a MVP portfolio.

Q. What is an MVP under the MISO Tariff?

A. An MVP is a relatively new type of transmission project recently developed by MISO and stakeholders and accepted by the Federal Energy Regulatory Commission.[11] An MVP is a project that must be i) evaluated as part of a portfolio of MVPs whose benefits are spread broadly across the MISO footprint and ii) must meet at least one of the following criteria:

- Criterion 1: A Multi Value Project must be developed through the transmission expansion planning process for the purpose of enabling the Transmission System to reliably and economically deliver energy in support of documented energy policy mandates or laws that have been enacted or adopted through state or federal legislation or regulatory requirement that directly or indirectly govern the minimum or maximum amount of energy that can be generated by specific types of generation. The MVP must be shown to enable the transmission system to deliver such energy in a manner that is more reliable and/or more economic than it otherwise would be without the transmission upgrade.

[11] MVP Order at PP 1, 3; MVP Rehearing Order at P 1.

- Criterion 2: A Multi Value Project must provide multiple types of economic value across multiple pricing zones with a Total MVP Benefit-to-Cost ratio of 1.0 or higher where the Total MVP Benefit-to-Cost ratio is described in Section II.C.7 of this Attachment FF. The reduction of production costs and the associated reduction of LMPs resulting from a transmission congestion relief project are not additive and are considered a single type of economic value.
- Criterion 3: A Multi Value Project must address at least one Transmission Issue associated with a projected violation of a NERC or Regional Entity standard and at least one economic-based Transmission Issue that provides economic value across multiple pricing zones. The project must generate total financially quantifiable benefits, including quantifiable reliability benefits, in excess of the total project costs based on the definition of financial benefits and Project Costs provided in Section II.C.7 of Attachment FF.[12]

Q. What is the MVP portfolio?

A. The MVP portfolio is a group of transmission projects distributed across the MISO grid that enables the reliable delivery of the aggregate of current state RPS

[12] MISO Tariff, Attachment FF at Section II.C.

mandates within MISO, and provides for economic benefits in excess of the portfolio costs primarily by reducing production costs.[13] The portfolio was approved for implementation by the MISO Board of Directors as part of MTEP 11. Each project within the MVP portfolio approved by the MISO Board of Directors was evaluated as part of the portfolio of MVPs and determined to be a necessary component of the portfolio that provides benefits that span broadly across the MISO footprint and meets at least one of the criteria set forth above.

Q. Please describe the overall process by which the Illinois Rivers Project became a part of the MVP portfolio of projects.

A. In addressing its RTO planning responsibilities, MISO undertook a multi-year planning process aimed at addressing the regional transmission plans necessary to enable RPS mandates to be met at the lowest delivered wholesale energy cost. This effort was known as the Regional Generation Outlet Study ("RGOS"), and was conducted between 2008 and 2010.[14] The RGOS identified indicative transmission options that would provide sufficient transmission capacity and connectivity needed for the efficient and reliable delivery of new generation capacity to meet the combined renewable portfolio standards of the MISO region, while providing value across the footprint. These indicative plans were further consolidated into a proposed MVP portfolio in collaboration with transmission

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[13] See supra n.4.

[14] See MISO's Regional Generation Outlet Study, publicly available at: https://www.midwestiso.org/Planning/Pages/RegionalGenerationOutletStudy.aspx.

owning MISO members and their representatives, including Ameren Services, and evaluated for effectiveness in meeting the RGOS objectives.

Q. What factors were considered by MISO and the transmission owner members in identifying the proposed MVP portfolio?

A. Each of these transmission owners, including Ameren Services, identified potential transmission expansions that were consistent with the regional needs, and also would address identified needs and provide additional benefits on their respective systems. The overall goal for the MVP portfolio analysis was to design a transmission portfolio which takes advantage of the linkages between local and regional reliability and economic benefits to promote a competitive and efficient electric market within MISO. The portfolio was designed using reliability and economic analyses, applying several future scenarios to determine the robustness of the designed portfolio under a number of potential energy policies. Local system needs and benefits of the Illinois Rivers Project are described in the testimony of ATXI Witness Kramer.

Q. Did MISO perform analyses to determine the effectiveness of the Illinois Rivers Project in providing adequate, reliable, and efficient services and promoting the development of an effectively competitive and efficient electric market?

A. Yes.

Q. Please summarize those findings.

A. As explained more fully later in my testimony, the MVP portfolio analyses evaluated the expected future conditions on the MISO regional grid. Our analyses found that the Illinois Rivers Project will be needed in order to ensure the continued reliable operation of the ATXI and Ameren Illinois transmission systems into the future. In addition, our analyses show that the MVP portfolio of projects that include the Illinois Rivers Project provides additional connectivity across the grid, reducing congestion and enabling access to a broader array of resources by loads in Illinois and elsewhere. These improvements increase market efficiency, competitive supply, and provide opportunity for economic benefits to ratepayers well in excess of the portfolio costs. The MVP portfolio, including the Illinois Rivers Project, represents the overall best solution for delivering these improvements, when considering generation, transmission, and other factors based on the expected future conditions.

Q. Please describe in more detail the reliability analyses performed and the needs identified in Illinois in the MISO regional analysis if the Illinois Rivers Project is not built.

A. A reliability analysis, as I described earlier, was conducted to identify transmission system equipment loadings and voltages with respect to safe equipment design tolerances. The MISO reliability analysis of the ATXI system and the Ameren Illinois system included steady state analysis of thermal loading and voltages, as well as system stability. These analyses identified numerous thermal loading, voltage, and stability issues that will occur for the projected future system if the Illinois Rivers Project is not completed. The Illinois Rivers Project addresses these issues by strengthening supply to the existing 138 kV transmission system across south-central Illinois, and by providing alternative 345 kV paths to relieve heavy power flows from west to east across the state.

Q. Please describe areas of concern and issues that your analyses identified.

A. The Illinois Rivers Project alleviates transmission constraints in the Quincy, Peoria, Quad Cities, and Bloomington areas in Western and Central Illinois, as well as in the Champaign area. Thermal overloads in the Quincy area are primarily driven by contingent loss of the 345 kV transmission lines connected to Palmyra station. The Palmyra connection is part of a very limited existing 345 kV system connecting western Illinois to Missouri and southeastern Iowa. Contingent conditions involving loss of these 345 kV interconnections result in power being directed on alternate underlying 138 kV network transmission connections into and out of Palmyra station, including the 345/138 kV transformer at Palmyra, loading these facilities above or very near their thermal capacity. Heavy thermal loadings also are projected to occur on the 138 kV system in a broad area between the Quad Cities area and Peoria. This is a result of heavy west to east flows towards Chicago for which the existing 345 kV paths will not be sufficient. For contingencies on the existing 345 kV and 138 kV systems, such as the 345 kV line between Maple Ridge and Tazewell, Maple Ridge and Duck Creek or the 138 kV lines between Edwards and Tazewell, excessive loading occurs on the Fargo 345/138 kV Transformer and the 138 kV lines out of Fargo 138 kV station, as well as 138 kV line between Mason City and Havana. These flows are alleviated by providing additional parallel 345 kV paths for the prevailing west to east flows. The Illinois Rivers Project works in conjunction with the existing 345 kV system between Peoria northeast towards Chicago to ensure that under contingency loss of facilities, the bulk power flows remain on the 345 kV system. Loss of generation at Clinton further aggravates the existing transmission system by drawing the prevailing west to east flows onto the underlying 138 kV system under contingent conditions. For example, the Havana to Bloomington 138 kV path becomes overloaded. This path is also relieved by the addition of Illinois Rivers Project, which provides alternative support to the area for the loss of the Clinton generating station. Thermal constraints were also identified in the Champaign area. Constraints in the Champaign area are on the 345 kV Sidney to Eugene line, which is one of only two high voltage ties between central Illinois and Indiana. Constraints are also identified on the parallel 138 kV transmission line from Weedman to Mahomet to Champaign. The addition of the Project introduces a new parallel 345 kV path offloading the existing 345 kV bulk electric system interconnection thereby mitigating overloads on it and underlying transmission facilities. Our analysis also identified generator instability at the Coffeen generating station. This condition arises when a fault occurs on the 345 kV substation equipment at Coffeen under the projected future system conditions. Unstable generators are a safety hazard as the generator rotor and turbine accelerate to unsafe levels, and therefore need to be removed from the system which can exacerbate system voltage and supply capability. The Illinois Rivers Project provides additional 345 kV capability to deliver the Coffeen station generation by providing new outlets from Pana, which is directly connected to Coffeen. Specifically, the Illinois Rivers Project provides a new outlet from Pana to Sugar Creek, forming a path parallel to the heavily loaded existing Coffeen outlet to Ramsey 345 kV. This additional capability mitigates the instability condition. Finally, by closing the short electrical gap in the 345 kV network between Sidney and Rising stations near Champaign, IL, the Illinois Rivers Project relieves constraints on the Rising Transformer and downstream 138 kV lines.

Q: What alternatives to the Illinois Rivers Project did MISO consider?

A: Alternative designs for the Illinois Rivers Project were investigated. A Palmyra to Sioux 345 kV transmission line was considered as an alternative means of providing additional outlet from Palmyra to the existing 345 kV system. This design alternative to the Palmyra to Meredosia to Ipava and Meredosia to Pawnee sections of the Illinois Rivers Project would also alleviate identified transmission issues in the Palmyra area. The alternative was rejected because while it would successfully mitigate the Palmyra issues, it would not mitigate transmission issues in and around Tazewell County because it is too remote from that area. More specifically, constraints identified near the Quad Cities and Peoria areas, as noted above, will remain unmitigated. In addition, to address other constraints identified in central and east-central Illinois the alternative project would need to be extended back to the Pawnee area resulting in a longer and more costly solution to the combined needs identified in Illinois. A more northerly route from Tazewell to Brokaw (Tazewell County and Bloomington areas) to Reynolds (along the Paxton to Gilman to Goodland 138 kV transmission path) 345 kV transmission line was considered as a design alternative to the Pawnee to Sugar Creek section of the Illinois Rivers Project. This would alleviate identified transmission issues between central Illinois and Indiana such as the heavy loading on the Sidney to Eugene 345 kV line for loss of the only other high voltage tie between Central Illinois and Indiana (Breed to Casey 345 kV). It would also address heavy loadings on the parallel 138 kV lines in the Champaign area from Weedman to Mahomet to Champaign for loss of the Clinton to Goose Creek 345 kV line and other sections extending from the Sidney to Eugene 345 kV line. This alternative was rejected because this transmission path traversed through more heavily populated areas between Tazewell County and Bloomington, Illinois, and would require about 30 additional miles of transmission making the alternative more costly. In addition, this proposed path is further away from the majority of constraints on the existing Rising to Sidney to Eugene 345 kV transmission line and less effective in resolving these issues. The recommended section of the Illinois Rivers Project on the other hand is electrically adjacent to these identified constraints and is more effective in mitigating them through a direct 345 kV connection between Kansas and Sidney thereby facilitating significant load reduction of over 280 MVA on the 345 kV line from Sidney to Eugene. In the Champaign area, alternatives of reinforcing the overloaded Rising transformer and the underlying constrained lines were rejected as imprudent use of local lower voltage facilities to provide for regional bulk power flow requirements. Reinforcing the overloaded Rising transformer would increase supply to the 138 kV system, but result in further loading of those facilities impacting reliability. Overall, MISO found that alternative paths for the Illinois Rivers Project were less effective and more costly due to longer line lengths.

Q. Please describe in more detail the economic benefits to Illinois that MISO identified will be made available by the Illinois Rivers Project.

A. The MVP portfolio allows for a more efficient dispatch of generation resources, opening markets to competition and spreading the benefits of low cost generation throughout the MISO footprint. These benefits were outlined through a series of production cost analyses, which captured the economic benefits of the low cost generation resources that can be reliably delivered with the addition of the MVP transmission. These benefits reflect the savings achieved through the reduction of transmission congestion and through more efficient use of generation resources. The analyses indicated that the MVP portfolio will produce an estimated $12.4 to $40.9 billion in present value adjusted production cost benefits to the aggregate MISO footprint under existing energy policies, depending on the period over which benefits are calculated, discount rates applied, and assumptions about growth rates of energy and demand. Under additional possible futures representing sensitivities to variations in energy policies from existing, this benefit increases to a maximum present value of $91.7 billion. While congestion driven production cost benefits were by far the single greatest benefit identified, additional benefits of the transmission were also identified. These additional benefits included reductions in operating reserve requirements, planning reserve margin requirements, transmission system losses, capital costs of renewable resources, and deferrals of transmission investments. These additional factors contribute between $3.1 billion and $8.2 billion in additional present value of benefits above the production cost savings. When compared to the present value of the revenue requirements for the MVP portfolio, the portfolio produces total benefits of between 1.8 and 3.0 times the costs on a present value basis, under existing policies. When these system-wide benefits were evaluated for their distribution within the MISO footprint, benefits to Illinois amounted to between 1.8 and 2.8 times portfolio costs to Illinois.

Q. Are there other ways in which the Project will further Illinois policy?

A. Yes. Along with other Midwestern states, Illinois has adopted RPS requirements; the Project will facilitate the satisfaction of these RPS.[15]

Q. How will the Project facilitate satisfaction of these RPS?

A. The Illinois Rivers Project is an integral part of the MVP portfolio of projects. Together this portfolio is essential to ensuring that the RPS requirements of all of

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[15] See Section 1-75(c) of the Illinois Power Agency Act (20 ILCS 3855/1-75(c)).

the MISO states can be met while ensuring the continued reliable performance of the system and distributing economic benefits primarily from reduced congestion to ratepayers in all states within the region. Wind generation, while available in many areas within the MISO region, tends to be located in areas of superior wind quality. These areas are primarily in areas to the west of Illinois. The Illinois Rivers Project provides for the integration of wind in both Illinois and in areas remote from Illinois with better wind quality to support the satisfaction of the Illinois RPS. Without the Project, MISO identified that approximately 34% of the existing and planned wind development within the MISO portion of Illinois would need to be curtailed in addition to curtailment of baseload coal generation in order to maintain reliable system loading levels.

Q. Are there other benefits to Illinois of the Project?

A. Yes. In the event that legislation or environmental regulation leads to the retirement of some coal-fired plants, transmission investment through the Project provides a robust transmission supply that will be available to provide needed support to maintain reliable service.

Q. What assumptions were used in projecting the expected future conditions upon which the MISO need and benefit analyses were based?

A. MISO employed multiple models in order to project future system conditions and performance. Power flow models were developed representing transmission system topology for the year 2021 and were used to evaluate transmission reliability. Transmission topology was developed by adding to existing system facilities transmission upgrades previously approved in the MISO MTEP regional planning process, and projects identified by MISO in prior MTEPs as expected to be needed to meet NERC reliability standards. Load forecasts applied in the reliability models are supplied by MISO transmission owners via the annual reliability model building process. Peak and off-peak conditions were simulated. Generation in the power flow models included existing generation, committed generation from the MISO generation interconnection process, and generation in renewable energy zones sufficient to meet regional renewable energy mandates and guidelines. In addition to power flow models, production cost models were used to analyze the production costs savings enabled by the MVP portfolio under several different future scenarios. Production cost models were developed for years 2021, 2026, and 2031. In arriving at the range of production cost benefits, benefits for both a 20-year case and a 40-year case were calculated and discount rates for present value calculations of 3% and 8.2% were applied. Demand and energy growth rates were developed through the MISO stakeholder process and ranged from 0.78% to 1.28% for demand and 0.79% to 1.42% for energy. Natural gas prices were projected to be $5 per Mcf in the Business As Usual cases in 2011 dollars. Other fuel costs and generator operating parameters we obtained from a vendor provided comprehensive energy market data repository, which contains detailed operating characteristics for generating units derived from public sources.

Q. How were the renewable energy zones that you mentioned developed?

A. Energy zone development began during the RGOS referenced previously in my testimony. MISO staff evaluated multiple energy zone configurations possible to meet renewable energy requirements. Zone selection was based on a number of potential locations developed by MISO utilizing wind data supplied by the National Renewable Energy Laboratory ("NREL") of the US Department of Energy.[16] Zone selection involved a great deal of stakeholder interaction, including with regulatory bodies such as the Upper Midwest Transmission Development Initiative ("UMTDI") and various state agencies within the MISO footprint, including the Midwest Governors Association. The final set of energy zones selected represented a balance between sourcing renewable energy locally while also taking advantage of the higher wind potential areas within the MISO market footprint. The analyses and selection process located wind zones distributed across the region.

Q. Please describe the future scenarios that you mentioned, and how they were applied.

A. To account for out-year public policy and economic uncertainties, MISO collaborated with its stakeholders to refresh available future policy scenarios to better align them with potential policy outcomes taking place. The future scenarios were designed to "bookend" the potential range of future policy

[16] See NREL's Development of Eastern Regional Wind Resource and Wind Plant Output Datasets (March 2008-March 2010) Final Report (December 2009), publicly available at: http://www.nrel.gov/electricity/transmission/pdfs/aws_truewind_final_report.pdf.

outcomes, ensuring that the most likely future policy scenarios and their impacts were within the range bounded by the results. Four futures were refreshed and analyzed as follows:

1) A Business As Usual with Continued Low Demand and Energy Growth ("BAULDE") future assumes that current energy policies will be continued, with continuing recession level low demand and energy growth projections.

2) A Business As Usual with Historic Demand and Energy Growth ("BAUHDE") future assumes that current energy policies will be continued, with demand and energy returning to pre-recession growth rates.

3) A Carbon Constrained future assumes that current energy policies will be continued, with the addition of a carbon cap modeled on the Waxman-Markey Bill.

4) A Combined Energy Policy future assumes multiple energy policies are enacted, including a 20 percent federal RPS, a carbon cap modeled on the Waxman-Markey Bill, implementation of a smart grid, and widespread adoption of electric vehicles.

A range of benefits enabled by the MVP portfolio was derived from the two Business As Usual futures, while the remaining futures were considered sensitivities to more varied possible future conditions.

Q. As an MVP under the MISO Tariff, how are the Project's costs recovered?

A. MVP project costs are recovered from MISO transmission customers on an equitable basis based on their pro-rata usage of energy. The methodology is described in Attachment MM of the MISO Tariff.[17] MVP project costs are recovered on a per MWh basis from (i) MISO load energy withdrawals, and (ii) applicable MISO export and wheel-through schedules. Applicable MISO export and wheel-through schedules do not include schedules that deliver energy to PJM load. Furthermore, energy withdrawals associated with load served under Grandfathered Agreements are also excluded from MVP cost recovery. MVP cost recovery is achieved by applying a monthly MWh usage rate to (i) net energy consumed by MISO load; (ii) net energy consumed by MISO generation if a net consumer of energy for the month; and (iii) applicable scheduled energy exports and wheel-through transactions in a specific calendar month. The monthly usage rate will vary from month to month and is determined by multiplying the current MVP annual revenue requirements by a monthly weighting factor and then dividing the result by the sum of the total load energy consumed by MISO load and, if applicable, MISO generation for the billing month as well as the total energy scheduled on applicable export and wheel-through transactions for the billing month. The current MVP annual revenue requirements are updated in conjunction with updates to Attachment O by Transmission Owners either at the beginning of a calendar year or on June 1 of each year depending on their elected accounting treatment pursuant to the Tariff.[18] The monthly weighting factor is

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[17] See MISO Tariff, Attachment MM, Multi-Value Project Charge (MVP Charge), Version: 2.6.0 Effective: 1/1/2012.

[18] See MISO Tariff, Attachment O, Rate Formulae.

required to allocate the annual revenue requirements into twelve monthly revenue requirements that will sum up to the annual revenue requirements.

Q. What is the impact on the MISO regional plan if one of the projects that has received MISO approval does not get constructed as planned?

A. The purpose of the very extensive planning functions of MISO is to involve all stakeholders in a process that will derive the most cost-efficient expansion plan that will meet local and regional needs for reliability, optimize access to economical power resources, and deliver other important values that benefit the ultimate consumer and society. The MTEP amounts to the design of a very complex system that will serve both short- and long-term needs of the bulk electrical grid in a coordinated manner. If one key element of the regional expansion plan, especially a 'backbone' element, such as this Project, designed for both reliability and economic attributes, is not constructed it could require considerable re-design involving possible delay, additional expense, and impacts to the reliable addition of new generation supplies and service to load.

Q. More specifically, what would be the system impacts if the Illinois Rivers Project were not constructed as planned?

A. In the context of this Project, if the Project was not constructed as planned, it would result in the inability of the existing ATXI and Ameren Illinois systems to continue to provide reliable service. As I have described, the MISO analyses of the Project identified numerous 345 kV and 138 kV transmission facilities that will be loaded above safe operating levels or below adequate voltage levels without the Project. In addition, the MISO MVP analysis identified economic benefits to Illinois as I have described that would not be able to be adequately distributed to Illinois without the Project.

VI. <u>CONCLUSION</u>

Q. Based upon the results of MISO planning studies, as well as your review and analyses, outlined in your discussion above, how would you summarize the MISO recommendations for the Project?

A. We believe that the Project as proposed by ATXI is a necessary project that meets the local load serving needs of the system in the Illinois Rivers area and that also fits well as a component of the MISO Regional Plan for the continued development of a reliable and efficient regional transmission system.

Q. Does this conclude your prepared direct testimony?

A. Yes, it does.