

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.

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9 **MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR, INC.**

10  
11 **I. INTRODUCTION AND WITNESS QUALIFICATIONS**

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

13 A. My name is Jeffrey R. Webb, and I am the Senior Director of Expansion Planning  
14 for Midcontinent Independent System Operator, Inc. (hereinafter, "MISO"). My  
15 business address is 720 City Center Drive, P.O. Box 4202, Carmel, Indiana  
16 46082-4202.

17 **Q. Please summarize your educational background and professional experience.**

18 A. I hold a bachelor's degree and a master's degree in electrical power engineering  
19 from Rensselaer Polytechnic Institute. I have also taken a variety of courses and  
20 seminars in utility planning and engineering during my career. I have taught  
21 courses in circuit analysis, distribution system analysis, and electric power system  
22 analysis at the Illinois Institute of Technology. In addition, I have served on

23 national and regional groups dedicated to ensuring transmission system reliability.  
24 I have served as a member of the Planning Committee of the Mid-America  
25 Interconnected Network (“MAIN”), a Regional Reliability Organization that has  
26 now merged to form the Reliability First Corporation. I have served as past  
27 Chairman of the Transmission Task Force, the Data Bank Group, and Standards  
28 Compliance Task Force of MAIN. I have served as a member of the North  
29 American Electric Reliability Corporation (“NERC”) Planning Committee  
30 representing the regional transmission organization (“RTO”) sector, and the  
31 NERC Planning Standards Subcommittee (“NERC PSS”). As a member of the  
32 NERC PSS, I have participated in the development of the NERC Reliability  
33 Standards related to transmission planning. I have facilitated a number of  
34 stakeholder groups related to transmission planning at MISO, including the  
35 Planning Advisory Committee, the Planning Subcommittee, and the Regional  
36 Expansion Criteria and Benefits Task Force that developed transmission  
37 investment cost allocation mechanisms in place today under the MISO Open  
38 Access Transmission, Energy and Operating Reserve Markets Tariff (“Tariff”).<sup>1</sup>  
39 Throughout my career, I have analyzed and planned electric transmission and  
40 distribution systems, with a focus on transmission. I began my professional

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<sup>1</sup> 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).

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

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

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

65 **Q. What is MISO?**

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

70 **Q. What are MISO's responsibilities?**

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

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<sup>2</sup> 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.

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

93  
94 **II. PURPOSE AND SCOPE**

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

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

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

107 **Q. What is the purpose of your testimony?**

108 A. The purpose of my testimony is to generally describe the planning functions  
109 performed by MISO, and MISO’s planning process, including MTEP. Given that  
110 the Illinois Rivers Project was approved by the MISO Board of Directors on  
111 December 8, 2011 as part of MISO’s MTEP 11,<sup>3</sup> I will also provide a summary of  
112 findings based on MISO’s analysis of the Illinois Rivers Project within the MTEP  
113 process, and discuss the integration of the Project within MISO’s regional plan  
114 (i.e., as explained further below, the Project is part of a portfolio of projects that  
115 together form a Multi-Value Project (“MVP”) portfolio<sup>4</sup>), and explain how the  
116 Project promotes the development of an efficiently competitive electricity market.

117

118 **III. MISO REGIONAL TRANSMISSION PLANNING**

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

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

<sup>4</sup> 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>.

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

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<sup>5</sup> 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>.

<sup>6</sup> *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).

<sup>7</sup> *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).

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

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

145 A. MISO uses a “bottom-up, top-down” approach in developing this plan. The  
146 “bottom-up” portion relies on the ongoing responsibilities of the individual TOs  
147 to continuously review and plan to reliably and efficiently meet the needs of their  
148 local systems. MISO then reviews these local planning activities with  
149 stakeholders and performs a top-down review of the adequacy of and  
150 appropriateness of the local plans in a coordinated fashion with all other local  
151 plans to most efficiently ensure that all of the needs are cost effectively met. In  
152 addition, MISO considers, together with stakeholders, opportunities for  
153 improvements and expansions that would reduce consumer costs by providing  
154 access to new low cost resources that are consistent with and required by evolving  
155 legislative energy policies. Our planning process also examines congestion that  
156 may limit access to the most efficient resources, and considers improvements that  
157 may be needed to meet forecasted energy requirements. Stakeholders, including  
158 state regulatory authorities, are engaged to develop future system scenarios that

159 are guided by stakeholder assessments of possible future state and federal energy  
160 policy decisions. The possible future scenarios and energy polices (“futures”)  
161 form the basis for forecasts of resources and load that would be economical and  
162 consistent with policy. Transmission needs are then assessed and plans developed  
163 to reliably and efficiently deliver the necessary energy from resources to load.

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

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

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

173 A. There are numerous considerations in planning for a regional transmission  
174 system; however, two considerations are crucial. First, the security of the  
175 transmission system must be maintained. That is, the transmission system must  
176 be able to withstand disturbances (generator and/or transmission facility outages)  
177 without interruption of service to load. This is achieved, in part, by assuring that  
178 disturbances do not lead to cascading loss of other generator and transmission  
179 facilities. Second, the transmission system must be adequately planned to be able  
180 to accommodate load growth and/or changes in load and load growth patterns, as

181 well as changes in generation and generation dispatch patterns without causing  
182 equipment to perform outside of its design capability. Additional considerations  
183 include addressing constraints that limit market efficiency and providing for  
184 expansions that enable energy policy mandates to be achieved.

185

186 **IV. RELIABILITY PLANNING CONSIDERATIONS**

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

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

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

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

203

204

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

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

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

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

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

219 A. Certain conditions could cause a generating unit to lose synchronism with the rest  
220 of the system or cause bulk power voltages to decline rapidly in an uncontrolled  
221 manner. These severe contingencies, while unlikely, must be tested to ensure that  
222 the transmission system is strong enough to prevent their occurrence, or that in such  
223 instances protective systems act to regain control of the system, either by rapid  
224 tripping of the out-of-step generator, or by controlled shedding of load to arrest

225 voltage decline. Without these measures in place, such disturbances could affect  
226 the secure operation of wide areas of the inter-connected transmission systems of  
227 the state and of the nation.

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

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

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

241 A. Yes. Effects on other portions of the existing transmission system must be  
242 considered. A plan must also be capable of being constructed and operated within  
243 the time required to meet the need. The plan should avoid excessive equipment  
244 damage or widespread service outages in case events more severe than planned  
245 occur. Finally, a suitably robust plan should also consider longer-range  
246 requirements for system operation with future growth, and should be compatible

247 with or support energy supply policies such as state renewable portfolio standards  
248 (“RPS”).

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

251 A. MISO plans its transmission system in compliance with NERC, Regional Entity,  
252 and Transmission Owning member transmission planning standards. In addition,  
253 planning practices are dictated by FERC Order Nos. 890 and 1000.<sup>8</sup> MISO  
254 implements these practices through its governing and informational documents,  
255 including Attachment FF to the Tariff, TOA, and MISO’s Business Practices  
256 Manual (“BPM”).<sup>9</sup>

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

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

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<sup>8</sup> See supra n.6, n.7.

<sup>9</sup> See supra n.1, n.5; also see the MISO’s Business Practices Manual, Transmission Planning, BPM-020-r6, Section 4 (November 15, 2011).

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

267 A. The NERC Transmission Planning (“TPL”) reliability standard is applicable to  
268 transmission planning and governs planning requirements to ensure reliable  
269 transmission system performance.<sup>10</sup> The standard addresses system performance:  
270 under normal (no contingency) conditions; following events resulting in the loss  
271 of a single transmission element; following events resulting in loss of multiple  
272 elements; and following more extreme events that result in loss of many  
273 transmission elements such as entire generating or switching stations or rights-of-  
274 way.

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

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

281

282 **V. REGIONAL ELECTRIC SYSTEM PLANNING FOR THE ILLINOIS**  
283 **RIVERS PROJECT**

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

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

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

289 **Q. What is an MVP under the MISO Tariff?**

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

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

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<sup>11</sup> MVP Order at PP 1, 3; MVP Rehearing Order at P 1.

- 306           • Criterion 2: A Multi Value Project must provide multiple types of  
307           economic value across multiple pricing zones with a Total MVP  
308           Benefit-to-Cost ratio of 1.0 or higher where the Total MVP  
309           Benefit-to-Cost ratio is described in Section II.C.7 of this  
310           Attachment FF. The reduction of production costs and the  
311           associated reduction of LMPs resulting from a transmission  
312           congestion relief project are not additive and are considered a  
313           single type of economic value.
- 314           • Criterion 3: A Multi Value Project must address at least one  
315           Transmission Issue associated with a projected violation of a  
316           NERC or Regional Entity standard and at least one economic-  
317           based Transmission Issue that provides economic value across  
318           multiple pricing zones. The project must generate total financially  
319           quantifiable benefits, including quantifiable reliability benefits, in  
320           excess of the total project costs based on the definition of financial  
321           benefits and Project Costs provided in Section II.C.7 of  
322           Attachment FF.<sup>12</sup>

323   **Q.    What is the MVP portfolio?**

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

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<sup>12</sup> MISO Tariff, Attachment FF at Section II.C.

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

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

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

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<sup>13</sup> See supra n.4.

<sup>14</sup> See MISO’s Regional Generation Outlet Study, publicly available at:  
<https://www.midwestiso.org/Planning/Pages/RegionalGenerationOutletStudy.aspx>.

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

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

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

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

364 A. Yes.

365

366

367 **Q. Please summarize those findings.**

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

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

384 A. A reliability analysis, as I described earlier, was conducted to identify  
385 transmission system equipment loadings and voltages with respect to safe  
386 equipment design tolerances. The MISO reliability analysis of the ATXI system  
387 and the Ameren Illinois system included steady state analysis of thermal loading  
388 and voltages, as well as system stability. These analyses identified numerous

389 thermal loading, voltage, and stability issues that will occur for the projected  
390 future system if the Illinois Rivers Project is not completed. The Illinois Rivers  
391 Project addresses these issues by strengthening supply to the existing 138 kV  
392 transmission system across south-central Illinois, and by providing alternative 345  
393 kV paths to relieve heavy power flows from west to east across the state.

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

395 A. The Illinois Rivers Project alleviates transmission constraints in the Quincy,  
396 Peoria, Quad Cities, and Bloomington areas in Western and Central Illinois, as  
397 well as in the Champaign area. Thermal overloads in the Quincy area are  
398 primarily driven by contingent loss of the 345 kV transmission lines connected to  
399 Palmyra station. The Palmyra connection is part of a very limited existing 345  
400 kV system connecting western Illinois to Missouri and southeastern Iowa.  
401 Contingent conditions involving loss of these 345 kV interconnections result in  
402 power being directed on alternate underlying 138 kV network transmission  
403 connections into and out of Palmyra station, including the 345/138 kV  
404 transformer at Palmyra, loading these facilities above or very near their thermal  
405 capacity. Heavy thermal loadings also are projected to occur on the 138 kV  
406 system in a broad area between the Quad Cities area and Peoria. This is a result  
407 of heavy west to east flows towards Chicago for which the existing 345 kV paths  
408 will not be sufficient. For contingencies on the existing 345 kV and 138 kV  
409 systems, such as the 345 kV line between Maple Ridge and Tazewell, Maple  
410 Ridge and Duck Creek or the 138 kV lines between Edwards and Tazewell,

411 excessive loading occurs on the Fargo 345/138 kV Transformer and the 138 kV  
412 lines out of Fargo 138 kV station, as well as 138 kV line between Mason City and  
413 Havana. These flows are alleviated by providing additional parallel 345 kV paths  
414 for the prevailing west to east flows. The Illinois Rivers Project works in  
415 conjunction with the existing 345 kV system between Peoria northeast towards  
416 Chicago to ensure that under contingency loss of facilities, the bulk power flows  
417 remain on the 345 kV system. Loss of generation at Clinton further aggravates  
418 the existing transmission system by drawing the prevailing west to east flows onto  
419 the underlying 138 kV system under contingent conditions. For example, the  
420 Havana to Bloomington 138 kV path becomes overloaded. This path is also  
421 relieved by the addition of Illinois Rivers Project, which provides alternative  
422 support to the area for the loss of the Clinton generating station. Thermal  
423 constraints were also identified in the Champaign area. Constraints in the  
424 Champaign area are on the 345 kV Sidney to Eugene line, which is one of only  
425 two high voltage ties between central Illinois and Indiana. Constraints are also  
426 identified on the parallel 138 kV transmission line from Weedman to Mahomet to  
427 Champaign. The addition of the Project introduces a new parallel 345 kV path  
428 offloading the existing 345 kV bulk electric system interconnection thereby  
429 mitigating overloads on it and underlying transmission facilities. Our analysis  
430 also identified generator instability at the Coffeen generating station. This  
431 condition arises when a fault occurs on the 345 kV substation equipment at  
432 Coffeen under the projected future system conditions. Unstable generators are a

433 safety hazard as the generator rotor and turbine accelerate to unsafe levels, and  
434 therefore need to be removed from the system which can exacerbate system  
435 voltage and supply capability. The Illinois Rivers Project provides additional 345  
436 kV capability to deliver the Coffeen station generation by providing new outlets  
437 from Pana, which is directly connected to Coffeen. Specifically, the Illinois  
438 Rivers Project provides a new outlet from Pana to Sugar Creek, forming a path  
439 parallel to the heavily loaded existing Coffeen outlet to Ramsey 345 kV. This  
440 additional capability mitigates the instability condition. Finally, by closing the  
441 short electrical gap in the 345 kV network between Sidney and Rising stations  
442 near Champaign, IL, the Illinois Rivers Project relieves constraints on the Rising  
443 Transformer and downstream 138 kV lines.

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

445 A: Alternative designs for the Illinois Rivers Project were investigated. A Palmyra  
446 to Sioux 345 kV transmission line was considered as an alternative means of  
447 providing additional outlet from Palmyra to the existing 345 kV system. This  
448 design alternative to the Palmyra to Meredosia to Ipava and Meredosia to Pawnee  
449 sections of the Illinois Rivers Project would also alleviate identified transmission  
450 issues in the Palmyra area. The alternative was rejected because while it would  
451 successfully mitigate the Palmyra issues, it would not mitigate transmission issues  
452 in and around Tazewell County because it is too remote from that area. More  
453 specifically, constraints identified near the Quad Cities and Peoria areas, as noted  
454 above, will remain unmitigated. In addition, to address other constraints

455 identified in central and east-central Illinois the alternative project would need to  
456 be extended back to the Pawnee area resulting in a longer and more costly  
457 solution to the combined needs identified in Illinois. A more northerly route from  
458 Tazewell to Brokaw (Tazewell County and Bloomington areas) to Reynolds  
459 (along the Paxton to Gilman to Goodland 138 kV transmission path) 345 kV  
460 transmission line was considered as a design alternative to the Pawnee to Sugar  
461 Creek section of the Illinois Rivers Project. This would alleviate identified  
462 transmission issues between central Illinois and Indiana such as the heavy loading  
463 on the Sidney to Eugene 345 kV line for loss of the only other high voltage tie  
464 between Central Illinois and Indiana (Breed to Casey 345 kV). It would also  
465 address heavy loadings on the parallel 138 kV lines in the Champaign area from  
466 Weedman to Mahomet to Champaign for loss of the Clinton to Goose Creek 345  
467 kV line and other sections extending from the Sidney to Eugene 345 kV line.  
468 This alternative was rejected because this transmission path traversed through  
469 more heavily populated areas between Tazewell County and Bloomington,  
470 Illinois, and would require about 30 additional miles of transmission making the  
471 alternative more costly. In addition, this proposed path is further away from the  
472 majority of constraints on the existing Rising to Sidney to Eugene 345 kV  
473 transmission line and less effective in resolving these issues. The recommended  
474 section of the Illinois Rivers Project on the other hand is electrically adjacent to  
475 these identified constraints and is more effective in mitigating them through a  
476 direct 345 kV connection between Kansas and Sidney thereby facilitating

477 significant load reduction of over 280 MVA on the 345 kV line from Sidney to  
478 Eugene. In the Champaign area, alternatives of reinforcing the overloaded Rising  
479 transformer and the underlying constrained lines were rejected as imprudent use  
480 of local lower voltage facilities to provide for regional bulk power flow  
481 requirements. Reinforcing the overloaded Rising transformer would increase  
482 supply to the 138 kV system, but result in further loading of those facilities  
483 impacting reliability. Overall, MISO found that alternative paths for the Illinois  
484 Rivers Project were less effective and more costly due to longer line lengths.

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

487 A. The MVP portfolio allows for a more efficient dispatch of generation resources,  
488 opening markets to competition and spreading the benefits of low cost generation  
489 throughout the MISO footprint. These benefits were outlined through a series of  
490 production cost analyses, which captured the economic benefits of the low cost  
491 generation resources that can be reliably delivered with the addition of the MVP  
492 transmission. These benefits reflect the savings achieved through the reduction of  
493 transmission congestion and through more efficient use of generation resources.  
494 The analyses indicated that the MVP portfolio will produce an estimated \$12.4 to  
495 \$40.9 billion in present value adjusted production cost benefits to the aggregate  
496 MISO footprint under existing energy policies, depending on the period over  
497 which benefits are calculated, discount rates applied, and assumptions about  
498 growth rates of energy and demand. Under additional possible futures

499 representing sensitivities to variations in energy policies from existing, this  
500 benefit increases to a maximum present value of \$91.7 billion. While congestion  
501 driven production cost benefits were by far the single greatest benefit identified,  
502 additional benefits of the transmission were also identified. These additional  
503 benefits included reductions in operating reserve requirements, planning reserve  
504 margin requirements, transmission system losses, capital costs of renewable  
505 resources, and deferrals of transmission investments. These additional factors  
506 contribute between \$3.1 billion and \$8.2 billion in additional present value of  
507 benefits above the production cost savings. When compared to the present value  
508 of the revenue requirements for the MVP portfolio, the portfolio produces total  
509 benefits of between 1.8 and 3.0 times the costs on a present value basis, under  
510 existing policies. When these system-wide benefits were evaluated for their  
511 distribution within the MISO footprint, benefits to Illinois amounted to between  
512 1.8 and 2.8 times portfolio costs to Illinois.

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

514 A. Yes. Along with other Midwestern states, Illinois has adopted RPS requirements;  
515 the Project will facilitate the satisfaction of these RPS.<sup>15</sup>

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

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

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

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

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

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

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

537 A. MISO employed multiple models in order to project future system conditions and  
538 performance. Power flow models were developed representing transmission  
539 system topology for the year 2021 and were used to evaluate transmission  
540 reliability. Transmission topology was developed by adding to existing system

541 facilities transmission upgrades previously approved in the MISO MTEP regional  
542 planning process, and projects identified by MISO in prior MTEPs as expected to  
543 be needed to meet NERC reliability standards. Load forecasts applied in the  
544 reliability models are supplied by MISO transmission owners via the annual  
545 reliability model building process. Peak and off-peak conditions were simulated.  
546 Generation in the power flow models included existing generation, committed  
547 generation from the MISO generation interconnection process, and generation in  
548 renewable energy zones sufficient to meet regional renewable energy mandates  
549 and guidelines. In addition to power flow models, production cost models were  
550 used to analyze the production costs savings enabled by the MVP portfolio under  
551 several different future scenarios. Production cost models were developed for  
552 years 2021, 2026, and 2031. In arriving at the range of production cost benefits,  
553 benefits for both a 20-year case and a 40-year case were calculated and discount  
554 rates for present value calculations of 3% and 8.2% were applied. Demand and  
555 energy growth rates were developed through the MISO stakeholder process and  
556 ranged from 0.78% to 1.28% for demand and 0.79% to 1.42% for energy. Natural  
557 gas prices were projected to be \$5 per Mcf in the Business As Usual cases in 2011  
558 dollars. Other fuel costs and generator operating parameters we obtained from a  
559 vendor provided comprehensive energy market data repository, which contains  
560 detailed operating characteristics for generating units derived from public sources.  
561  
562

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

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

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

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

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<sup>16</sup> 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](http://www.nrel.gov/electricity/transmission/pdfs/aws_truewind_final_report.pdf).

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

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

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

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

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

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

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

603 A. MVP project costs are recovered from MISO transmission customers on an  
604 equitable basis based on their pro-rata usage of energy. The methodology is

605 described in Attachment MM of the MISO Tariff.<sup>17</sup> MVP project costs are  
606 recovered on a per MWh basis from (i) MISO load energy withdrawals, and (ii)  
607 applicable MISO export and wheel-through schedules. Applicable MISO export  
608 and wheel-through schedules do not include schedules that deliver energy to PJM  
609 load. Furthermore, energy withdrawals associated with load served under  
610 Grandfathered Agreements are also excluded from MVP cost recovery. MVP  
611 cost recovery is achieved by applying a monthly MWh usage rate to (i) net energy  
612 consumed by MISO load; (ii) net energy consumed by MISO generation if a net  
613 consumer of energy for the month; and (iii) applicable scheduled energy exports  
614 and wheel-through transactions in a specific calendar month. The monthly usage  
615 rate will vary from month to month and is determined by multiplying the current  
616 MVP annual revenue requirements by a monthly weighting factor and then  
617 dividing the result by the sum of the total load energy consumed by MISO load  
618 and, if applicable, MISO generation for the billing month as well as the total  
619 energy scheduled on applicable export and wheel-through transactions for the  
620 billing month. The current MVP annual revenue requirements are updated in  
621 conjunction with updates to Attachment O by Transmission Owners either at the  
622 beginning of a calendar year or on June 1 of each year depending on their elected  
623 accounting treatment pursuant to the Tariff.<sup>18</sup> The monthly weighting factor is

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

<sup>18</sup> See MISO Tariff, Attachment O, Rate Formulae.

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

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

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

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

641 A. In the context of this Project, if the Project was not constructed as planned, it  
642 would result in the inability of the existing ATXI and Ameren Illinois systems to  
643 continue to provide reliable service. As I have described, the MISO analyses of  
644 the Project identified numerous 345 kV and 138 kV transmission facilities that  
645 will be loaded above safe operating levels or below adequate voltage levels

646 without the Project. In addition, the MISO MVP analysis identified economic  
647 benefits to Illinois as I have described that would not be able to be adequately  
648 distributed to Illinois without the Project.

649

650 **VI. CONCLUSION**

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

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

658 **Q. Does this conclude your prepared direct testimony?**

659 **A.** Yes, it does.