Exhibit No.:	4NP
Issue(s):	Transmission Planning and Needs of the System
Witness:	Dennis D. Kramer
Type of Exhibit:	Surrebuttal Testimony
Sponsoring Party:	Ameren Transmission Company of Illinois
File No.:	EA-2015-0146
Date Testimony Prepared:	November 16, 2015

MISSOURI PUBLIC SERVICE COMMISSION

File No. EA-2015-0146

SURREBUTTAL TESTIMONY

OF

DENNIS D. KRAMER

ON

BEHALF OF

AMEREN TRANSMISSION COMPANY OF ILLINOIS

ATXI Exhibit No. 4-NP
Date 1/25/16 Reporter JE
File No. EA-2015-0146

St. Louis, Missouri
November, 2015

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SURREBUTTAL TESTIMONY

OF

DENNIS D. KRAMER

FILE NO. EA-2015-0146

Q. Please state your name.

A. My name is Dennis D. Kramer.

Q. By whom and in what capacity are you employed?

A. I am currently the Senior Director of Transmission Policy, Planning and Stakeholder Relations at Ameren Services Company ("Ameren Services").

Q. Are you the same Dennis D. Kramer who filed direct testimony in this case?

A. Yes, I am.

Q. What is the purpose of your surrebuttal testimony?

A. The purpose of my surrebuttal testimony is to respond to the many assertions made by Neighbors United witness William E. Powers. Certain of Mr. Power's assertions will also be addressed by ATXI witness Matt Michels, Midcontinent Independent System Operator, Inc. ("MISO") witness Jameson T. Smith, and wind development expert Robert M. Vosberg.

Q. Please summarize your key conclusions.

A. My key conclusions are as follows:

- Mr. Powers' estimate of peak electric loads in Northeast Missouri is far too low. This is because Mr. Powers utilized a fundamentally flawed and overly simplistic methodology in deriving his estimate. In fact, the expected peak

load is approximately **[redacted]** times as high as his estimate. This causes him to reach incorrect and unsupported conclusions about the reliability concerns that exist in Northeast Missouri and that are being addressed by the Mark Twain Project (the "Project"), including the amount of load at risk of loss due to existing reliability concerns.

- Aside from his flawed peak load assumptions, Mr. Powers' overemphasis on historic peak loads also reflects a fundamental misunderstanding of how transmission systems are planned. This leads him to incorrect conclusions about the need for the Project.
- Mr. Powers fails to understand, or accurately portray, the severity of the reliability concerns that exist, or even the events or system configurations that could lead to a significant loss of load (i.e., significant outages) for both Ameren Missouri and rural electric cooperative customers in Northeast Missouri.
- Mr. Powers offers no credible evidence that his vague litany of suggested alternatives will address the reliability concerns that currently exist, or that they would address them in a cost-effective manner.
- The solution to the low-voltage reliability problems proposed by Mr. Powers is to attempt to reclassify the **[redacted]** NERC[1] Category C Contingencies that cause the **[redacted]** system configurations that present the reliability concerns that the Project addresses, to a lower level Category D contingency such that these concerns would appear to be of less importance and present no

[1] North American Reliability Corporation.

immediate threat that should be addressed. He assumes that Associated Electric Cooperative, Inc. ("AECI") would support such an attempt.[2] Even if the SERC Reliability Corporation ("SERC") would agree to reclassify the reliability concern, which is far from a certainty, the result would be that Ameren Missouri and cooperative customers in Northeast Missouri would be served by a less reliable system than would customers in the rest of the Ameren Missouri system.

- Mr. Powers fails to understand that using load shedding is only available as a method of addressing **[redacted]** of the **[redacted]** NERC Category C contingencies and is therefore not a complete solution. His partial solution would require shedding approximately **[redacted]** MW (approximately **[redacted]**) of Ameren Missouri load in Northeast Missouri as a pre-emptive action to prevent the potential loss due to a low-voltage event of at least **[redacted]** MW of load in Northeast Missouri. This is neither an appropriate nor viable permanent solution to these low-voltage events and would be a violation of the Ameren Transmission Planning Criteria and Guidelines.
- There is significant wind potential in Northern and Northeast Missouri as shown by Mr. Powers' Exhibit PE-08 and as confirmed by MISO studies and other witnesses, but the full wind potential cannot be realized without the addition of the significantly greater output capability that the Project will provide.

[2] References to AECI are to AECI or its member cooperatives that actually own the transmission lines a the load at issue.

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A. ERRORS IN MR. POWERS' CALCULATION OF PEAK ELECTRICAL LOAD IN NORTHEAST MISSOURI FOR TRANSMISSION PLANNING PURPOSES.

Q. Mr. Powers devotes several pages of his testimony to explaining his methodology to estimate the current amount of load during peak load conditions in Northeast Missouri. Do you agree with his methodology and the results of his analysis?

A. No. His methodology is fundamentally flawed and therefore the results of his analysis provide an unreliable and erroneous estimate of the peak load in Northeast Missouri, both now and in the future.

Q. Please explain the flaws in his methodology.

A. The first step in his methodology is an attempt to estimate the total number of meters physically located in what he identifies as the Adair Wind Zone[3] and along the pathway of the Project. Based upon his calculations, he estimates that approximately 1% of Ameren Missouri meters (12,946 by his calculation) are located in Northeast Missouri.

He then assumes that this 1% of the total Ameren Missouri meters will supply 1% of the current Ameren Missouri peak load. He makes this assumption without any exceptions or conditions and provides no evidence in support. He ignores the fact that the amount of load supplied by a group of meters during peak load conditions will vary greatly depending upon the mix of customers being supplied in a given area (residential, commercial, industrial, institutional, etc.). It is clear upon simple observation that 1% of the meters in an urban area such as the St. Louis metro area will supply a different percentage of the current Ameren Missouri peak load than the same number of meters in rural areas of the Ameren Missouri service territory. He offers no evidence that the Ameren Missouri customers he calculates

[3] Mr. Powers defines the "Adair Wind Zone" as Schuyler, Putnam, Sullivan and Adair counties.

are located in Northeast Missouri or that their associated peak loads are a representative sample of the entire set of Ameren Missouri customers and the total current Ameren Missouri peak load. Therefore, his assumption that 1% of the Ameren Missouri meters in Northeast Missouri supply 1% of the current Ameren Missouri peak load is unsubstantiated, unreliable and incorrect based upon simple observation.

Mr. Powers then compounds his error by applying his erroneous assumption that 1% of the Ameren Missouri meters will supply 1% of the Ameren Missouri peak load, to then state that because the recent Ameren Missouri peak load was approximately 8,000 MW, the 1% of the meters he determined as being in Northeast Missouri will supply 80 MW (or 1%) of the current Ameren Missouri peak load.

Q. Putting aside Mr. Powers' flawed methodology, is the reliance on historical peak loads in Northeast Missouri the determining factor of whether transmission system expansion is needed to maintain safe and reliable service to customers?

A. No. Sole reliance on historical peak loads is not sufficient to determine whether an expansion of the transmission system is needed. The need for transmission system expansion is determined through a detailed and comprehensive transmission planning process that utilizes sophisticated mathematical models which allow examination of how the system will perform under a wide variety of conditions. Simply using historical peak loads will not provide adequate information to make those determinations.

Q. Please explain.

A. In performing the transmission planning function, Ameren Services uses sophisticated system models that incorporate future load projections. The load serving

entities in the Eastern Interconnect, including Ameren Missouri and cooperatives in Missouri, provide their load forecasts to the designated developer[4] of the system models used for transmission planning purposes throughout the Eastern Interconnect. The load serving entities provide the load they expect to serve at various system conditions (peak, shoulder period, off peak, etc.) for selected future years (2021, 2026, etc.). As explained in the Ameren Missouri 2014 Integrated Resource Plan, Ameren Missouri's load forecasting process incorporates multiple inputs, not only historical load information, when developing expected future load values. The result is a system model that represents the most accurate future representation of system conditions under various scenarios for the entire Eastern Interconnect.

Q. You mentioned that loads for the entire Eastern Interconnect are used in the modeling. Please explain why.

A. Systems operated by Ameren Services and all of the systems in MISO's footprint are part of a much larger, interconnected transmission system called the Eastern Interconnect. The Eastern Interconnect essentially covers much of the United States and parts of Canada from the East Coast to the Rocky Mountains, except for portions of Texas. One must model the entire system in order to ensure the results of the transmission planning process are comprehensive, accurate and will withstand audit scrutiny from NERC and the SERC Reliability Corporation.

Q. You mentioned NERC and SERC. Before addressing these flawed assumptions, can you please explain what is NERC, as well as SERC Reliability Corporation?

[4] The Multiregional Modeling Working Group (MMWG) has responsibility for developing all Eastern Interconnection power flow and dynamic base case models. The Eastern Interconnection Reliability Assessment Group (ERAG) Management Committee oversees the MMWG.

A. NERC, or the North American Reliability Corporation, is a non-profit, Federal Energy Regulatory Commission-certified Electric Reliability Organization ("ERO") for the United States. As the ERO, NERC may delegate authority to Regional Entities to monitor and enforce NERC Reliability Standards. NERC and the Regional Entities work to safeguard the reliability of the Bulk Power System ("BPS") throughout North America. SERC Reliability Corporation is one of the Regional Entities to which NERC has delegated authority. SERC is a nonprofit regulatory authority that promotes effective and efficient administration of BPS reliability in all or parts of 16 central and southeastern states. As one of eight Regional Entities, SERC is delegated to perform certain functions from the ERO and is subject to oversight from the FERC. SERC promotes and monitors compliance with mandatory Reliability Standards, assesses seasonal and long-term reliability, monitors the BPS through system awareness, and educates and trains industry personnel. Ameren is a member of SERC.

Q. When performing the transmission planning function to maintain compliance with the applicable NERC Reliability Standards and SERC regional criteria, as well the Ameren Transmission Planning Criteria and Guidelines, does Ameren Services use Mr. Powers' methodology of simply counting the number of customer meters in a given area to calculate the expected future peak load in that same area?

A. No, it doesn't for the reasons I previously explained in this testimony.

Q. How much peak load can reasonably be expected to exist in Northeast Missouri, as determined by the system models used by Ameren Services to perform the transmission planning process?

A. The forecast peak load in 2021 in Northeast Missouri is forecast to be approximately **[redacted]** MW with Ameren Missouri peak load being **[redacted]** MW and the cooperative peak load being **[redacted]** MW. The load forecasts do not provide an estimate of the number of customers that constitute the peak load.

Q. Does Mr. Powers have serious errors in his methodology to determine the amount of current load that will be at risk of loss due to the low-voltage events?

A. Yes. Mr. Powers assumes that the load that he calculated as currently being supplied by the Adair substation (64 MW as calculated by his flawed methodology) is the only load located in Northeast Missouri that would be at risk of loss due to the low-voltage events.

Q. Is he right?

A. No, he is not. He ignores the fact that there is an extensive 69 kV sub-transmission system that spreads throughout Northeast Missouri and **[redacted]** Consequently, his 64 MW estimate is erroneously based upon only the number of Ameren Missouri meters in Adair County. **[redacted]** Therefore, even if by some random act of chance his assumption that 1% of the Ameren Missouri meters in a given area will always supply 1% of the current Ameren Missouri peak load (that is, even if his 80 MW estimate were correct), he drastically understates the number of customers and amount of load that would be at risk of loss due to the low-voltage events in Northeast Missouri **[redacted]**.

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Additionally, as I stated, Mr. Powers ignores the fact that the **[redacted]**.

B. AMEREN TRANSMISSION PLANNING PROCESS, AND DETERMINING THE AMOUNT OF LOAD THAT IN THE FUTURE WILL BE AT RISK OF LOSS DUE TO THE LOW-VOLTAGE EVENTS

Q. Does Ameren Services follow a well-developed and thoughtful transmission planning process?

A. Yes. Ameren Services has comprehensive Transmission Planning Criteria and Guidelines developed over many years of experience in planning transmission systems. The Ameren Services transmission planning process achieves compliance with NERC reliability standards and SERC regional criteria, Ameren Transmission Planning Criteria and Guidelines, applicable state regulations and public policy requirements. The criteria, guidelines, and performance standards compiled in the Ameren Transmission Planning Criteria and Guidelines document are used by Transmission Planning engineers as an aid to assess the capabilities of the transmission systems operated under Ameren Services' supervision when performing planning or screening studies.

The transmission planning criteria are unconditional and are the principles by which a reliable transmission system is planned. The criteria and guidelines have evolved over a number of years and reflect considerable planning and operating experience.

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Q. Over what timeframe is the transmission system studied to maintain compliance with the guidelines, criteria and NERC requirements?

A. Transmission plans typically cover a time period of up to ten years into the future and include a detailed five-year construction plan, and a year six through ten-year planning horizon. Therefore, it is vital for the system model to contain forecast system conditions five to ten years into the future. Longer timeframe transmission projects are sometimes also identified in order to guide system development.

Q. Why is transmission planning conducted on a planning horizon of up to 10 years?

A. Major transmission projects have a construction lead time of several years. Ameren Services typically estimates that a transmission project will require one and one-half years for study and regulatory approval and four years for design, right-of-way easement acquisition, environmental studies, applying for and receipt of permits, and construction. As a result, transmission planning must look at projected loads several years into the future and, based on those projected loads, determine where transmission or other infrastructure projects are needed, in order to allow sufficient time for planning and construction of new facilities. Put another way, Ameren Services cannot determine in year one that an area will experience inadequate low voltage or thermal overloads in year two and then construct the needed facilities by year two to allow continued provision of adequate and reliable service – longer planning horizons are required.

Q. Why, in particular in the context of this case, is it important to recognize that new transmission lines and other significant improvements can require several years to implement?

A. Several of the hypothetical actions that Mr. Powers suggests be pursued to address the low-voltage reliability concerns are beyond the direct control of ATXI, or any other of the companies to which Ameren Services provides services (such as Ameren Missouri), to implement or cause to occur. If Ameren Missouri relies upon the hypothetical actions that Mr. Powers proposes and they fail to materialize, then Ameren Missouri may not have sufficient time to implement an effective solution to the low voltage concerns.

Q. Can you provide some examples?

A. Yes. He makes several unsupported assumptions, including:

- That Ameren Missouri can convince AECI and its member cooperatives to support a petition at SERC, to reclassify the **[redacted]** NERC Category C contingency events to Category D contingency events. There is no reason to believe that AECI and its members would agree to a level of Ameren Missouri transmission system reliability in Northeast Missouri that is less than the level of reliability required for the rest of the Ameren Missouri system, to which the cooperatives are also connected. In fact, there is significant reason to believe AECI would oppose such an effort. Nor is there any evidence that SERC would approve such a reclassification.
- That Ameren Missouri customers in Northeast Missouri are willing to voluntarily participate in programs that will:
    - Install Ameren Missouri controlled demand response on their central air conditioner systems and agree to allow Ameren Missouri to curtail their system during peak load periods which are typically the hottest days of summer. Mr. Powers does not mention in his testimony any

payment to the customers for allowing Ameren Missouri to control their air conditioners on peak load days, which would almost certainly be required and which, obviously, would have a cost that Mr. Powers has not taken into account. Moreover, as ATXI witness Matthew Michels explains in his surrebuttal testimony, the demand response potential in the area falls far short of that needed to address the concerns in any event.

- Install higher energy efficiency appliances and equipment than they currently own. As Mr. Michels testifies, Mr. Powers is assuming that customers in this area would participate in energy efficiency programs at a rate that is five to ten times greater than the participation Ameren Missouri has seen over the past few years, and he ignores that to gain participation would have costs.

- That Ameren Missouri customers in the Kirksville area will voluntarily install significant solar on rooftops and parking lots.

Even if Ameren Missouri were to pursue Mr. Powers' laundry list of hypothetical actions and one or more of them were not to come to fruition, then Ameren Missouri would be faced with needing to address the low-voltage event in an impossibly short timeframe. This is especially problematic because the best solution is to provide a new additional source of supply to the Adair substation which is exactly what the Project will provide. Therefore, relying upon all or some undefined combination of actions suggested by Mr. Powers could leave the Northeast Missouri area customers exposed to low-voltage events for a significantly longer period of time than if the Project is completed on schedule.

Q. What criteria does Ameren Services use when determining if a low-voltage event places load at risk of loss and an expansion of the transmission system is needed?

A. We use the Ameren Transmission Planning Criteria and Guidelines which states that transmission system voltage below 95% of nominal is an indication of a possible deficiency. Conditions which result in 86% - 89% of nominal voltage in the steady-state analysis carry significant risk for voltage collapse. It should be noted that 85% of nominal is the level at which a voltage collapse is essentially assured.

Q. Does Mr. Powers provide any information about the low-voltage event criteria used by other entities that have transmission planning processes?

A. Yes. In his Exhibit PE-16, he lists testimony from a Southern California Edison case before the Public Utilities Commission of the State of California. The testimony deals with allowable system voltage limits. His Exhibit PE-16 contains Table III-2 "CAISO Voltage Requirements" which provides specific bandwidths and percentage deviations of thresholds to prevent voltage collapse events in which voltages in a portion of the electric system decrease catastrophically causing a blackout. The voltage percent of nominal in this Table III-2 is almost identical to the values Ameren Services uses to perform the same analysis. Both Ameren and the CAISO, as indicated in Table III-2, classify voltages below 90% of nominal as carrying significant risk for voltage collapse.

Q. How did Ameren Services determine the amount of load that in the future will be at risk of loss due to the low voltages caused by the NERC Category C contingency events?

A. As stated previously in this testimony, the transmission planning process does not rely solely upon historical peak load amounts because the planning process must look several years into the future in order to maintain compliance with the NERC Reliability Standards, SERC regional criteria and the Ameren Transmission Planning Criteria and Guidelines. Therefore, the transmission planning process used the Eastern Interconnect models for 2021 summer peak load conditions that incorporate the future forecasts for all loads in the Eastern Interconnect.

As I stated in my direct testimony, Ameren Services determined that the Northeast Missouri area, including Kirksville, would be exposed to unacceptable low voltages for certain contingency conditions at peak load levels. Ameren Services determined that if certain NERC Category C contingency events occurred during peak load periods, then low-voltage conditions would occur in Northeast Missouri that could result in the loss of customer load in the area. By "loss of customer load," I mean that customers would lose their electric service.

Q. He states on page 21 of his testimony that ATXI does not actually state that the NERC Category C contingency event in question is the simultaneous loss of its two 161 kV lines interconnected to the Adair Substation. Would you describe the system configurations that are caused by the Category C events in question?

A. A system configuration that results in low voltage during peak load periods that can be caused by **[redacted]** separate NERC Category C contingency events is the loss of the two Ameren Missouri 161 kV lines that supply the Adair substation. There are actually **[redacted]** separate system configurations that can result in low voltages in Northeast Missouri during peak load periods. The **[redacted]** system configurations are caused by

various NERC Category C contingencies that could occur in Northeast Missouri during peak load periods. These ** [redacted] ** system configurations are:

** [redacted]

[redacted] **

** [redacted]

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[redacted]

[redacted]**

Q. Please describe these system configurations in more detail and the load at risk of loss.

A. Ameren Services analyzed the **[redacted]** system configurations individually and the details of the analysis are contained in Schedule DDK-SR2. They are arranged with the most severe low-voltage event at the top of the table. The first column of the table is a brief description of the system configuration that results in the low-voltage event. The second column identifies what types of NERC Category C contingency events **[redacted]** that cause the system configuration to occur. The third column indicates the amount of load that will experience voltages less than 90% of nominal and would be lost in Northeast Missouri (both Ameren Missouri and cooperative) when the system configuration occurs during summer peak load periods. The fourth column indicates the amount of load that Ameren Missouri would need to shed as a preventive action due to a NERC Category C3 (N-1-1) event. The load would be shed following the failure of the first system element and before the failure of the second system element. NERC Reliability Standards allow system adjustments after the first system element failure and before the failure of the second system element. The fifth column indicates the amount of load that will experience voltages less than 95% of nominal in Northeast Missouri when the system configuration occurs during summer peak load periods. Voltages less than 95% are an indication of a possible deficiency and should be further studied.

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Q. Briefly explain the different NERC Category C contingency events.

A. The contingency events are described in detail in the NERC Transmission Planning Standards. Ameren Services is required to examine the transmission system to ensure these events are appropriately addressed. The pertinent contingency events for the system configurations that are of concern are ** [redacted] ** which I describe below: **

[redacted]

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[redacted]

- [redacted]

[redacted]**

Q. Is one system configuration of particular concern?

A. Yes, the system configuration with the loss of the ** [redacted]

[redacted]

[redacted]** This scenario will place at least ** [redacted] ** MW of load in Northeast Missouri at less than 90% of nominal voltage and at significant risk of loss due to low-voltage conditions. ** [redacted]

[redacted]

[redacted]

[redacted]**

Q. Are the low-voltage events on the Ameren Missouri system caused by these ** [redacted] ** system configurations eliminated by the Project?

A. Yes. The Project completely addresses the low voltage problems caused by all ** [redacted] ** of the system configurations. In summary, the Project will provide a new 345 kV source to the Northeast Missouri area that will maintain adequate system voltages when any of the identified system configurations occur during peak load periods, while also providing the full set of Multi-value Portfolio ("MVP") benefits.

Q. Throughout his testimony Mr. Powers states that there is a low probability that the NERC Category C events would ever occur. Please respond.

A. Let me first state that whatever Mr. Powers means by "low" is wrong, in that he ignored the fact that there are ** [redacted] ** system configurations caused by ** [redacted] ** NERC Category C contingency events, as shown in Schedule DDK-SR2, and not the single system configuration he mentions that results in low voltage in Northeast Missouri during peak load periods. Moreover, Mr. Powers provides no formal analysis such as a probabilistic risk assessment to support his contention that there is a "low" probability of the system configuration he mentions occurring during periods of peak demand. Therefore, it is impossible to determine his definition of what he considers "low probability." At a minimum, Mr. Powers ought to agree that the presence of ** [redacted] ** system configurations as documented in Schedule DDK-SR2 that could trigger low-voltage event in the Northeast Missouri area instead of his single assumed configuration, would increase the probability of a low-voltage event occurring in that area. Therefore, based upon simple arithmetic, there is a

higher probability of a low-voltage event occurring in Northeast Missouri than Mr. Powers considered when making his assertion that it has a low probability.

Q. On page 22 of his testimony he estimates that the number of customers that a low-voltage event in Northeast Missouri due to a NERC Category C contingency "could inconvenience" by loss of their electric supply would be 10,308. Do you agree with his estimate of the number of customers that would suffer a loss of electrical supply if this event were to occur?

A. No. As I explained previously, Mr. Powers' methodology for estimating the customers and current load that would be at risk for loss due to the low-voltage events is fatally flawed and provides unreliable and erroneous results. Therefore, his estimate that only 10,308 customers would suffer loss of their electric supply is incorrect because he limits the number of affected customers to only those in Adair County and only Ameren Missouri customers. In fact, the 69 kV system that is supplied by the Adair substation supplies a large portion of Northeast Missouri

Q. He states that to the customers suffering loss of service it would be an "inconvenience." Do you agree?

A. To claim that the loss of customer load due to a low-voltage event would merely be an "inconvenience" displays a complete lack of understanding of how a low-voltage event occurs, how expansive it can become and the time and effort required to return service to the interrupted customers as small groups of customers are returned to service sequentially so the system can adjust to the increasing load. Any reasonable person should understand that the electric service providers (Ameren Missouri and the cooperatives) and their customers are unlikely to view such an event as a mere "inconvenience."

C. MR. POWERS' CONFUSION REGARDING THE TRANSMISSION PLANNING PROCESS AND THE ANALYSIS OF LOW-VOLTAGE EVENTS CAUSED BY NERC CATEGORY C CONTINGENCY EVENTS.

Q. On page 18, line 6, his response is "300 MVA (300 MW)" to the Question: "What load does ATXI assume must be dropped at the Adair Substation in the event of loss of both Ameren Missouri 161 kV transmission lines interconnecting at the Adair Substation, described as a NERC Category C contingency by ATXI." Do you agree with his conclusion?

A. No. He appears to misunderstand the appropriate application of transmission system modeling techniques and the analysis of system fault conditions. His testimony seems to indicate that if the low-voltage events occur due to NERC Category C contingencies, then Ameren Missouri would be required to "drop" up to 300 MW at the Adair substation. The load that would be lost due to the low-voltage events is a result of the system's automatic response to inadequate voltage support at the Adair substation and the resultant impact on the 69 kV sub-transmission network it supplies. Once the low-voltage event occurs and load has started to be lost, Ameren Missouri would not have time to initiate "dropping" of load as a preventative action. Ameren Missouri would have no control over the amount of load that would be lost due to the low-voltage event. Put another way, the load will be lost because of the response of the system, not because of any action by the electric service providers.

Q. He states that the ATXI's claim that up to 300 MW of load would be dropped due to the low-voltage event is not "credible." Do you agree with his statement?

A. No. He makes that incorrect claim based upon his flawed conclusion, already addressed above, that only 64 MW of current Ameren Missouri load would be at risk of loss. As I earlier noted, he understates the at-risk load by almost **[redacted]**

Q. How is the amount of load at risk of loss due to the low voltage events determined?

A. By the transmission planning process and modeling tools. As previously explained in my testimony, the transmission planning process is focused upon the future due to the time required to place system expansions into service. Ameren Services and other transmission planners use system models that incorporate load forecast data for future years. When performing the analysis of the **[redacted]** separate system configurations that are caused by the **[redacted]** NERC Category C contingencies that could occur in Northeast Missouri, Ameren Services uses a system model with load forecast data for summer peak load periods in 2021. The results of the analysis of each of the seven low-voltage events are shown in Schedule DDK-SR2. The analysis of the most severe low-voltage event **[redacted]** **[redacted]** indicates that at least **[redacted]** MW of load in Northeast Missouri is at risk of loss due to low-voltage conditions. **[redacted]**

[redacted]

[redacted]**

D. MR. POWERS' CLAIM THAT THE EXISTING AMEREN MISSOURI AND AECI 161 KV LINES ARE SUFFICIENT.

Q. Mr. Powers seems to claim that the existing Ameren Missouri and AECI 161 kV lines are sufficient to address the low-voltage reliability issues in Northeast Missouri. Do you agree with his analysis?

A. No. I will explain below how the existing 161 kV system in Northeast Missouri is inadequate to address the low-voltage events that Mr. Powers describes as "on-peak low voltage Category C NERC contingency at the Adair substation if the two Ameren MO 161 kV lines go out-of-service at the same time with a 300 MW load on the substation" as well as other Category C contingencies.

Q. Did Mr. Powers make some errors in his analysis methodology and results?

A. Yes. As I explain earlier in my testimony, the methodology that Mr. Powers used to calculate the amount of current load that would be at risk for loss due to low-voltage events due to system configurations caused by NERC Category C contingency events is fatally flawed and produces unreliable and erroneous results. Therefore, any of his additional analysis that relies upon his erroneous load estimates is likewise erroneous. His erroneous load assumptions undermine his conclusion that the existing 161 kV lines are adequate.

Q. He states that as part of the interchange agreement between Ameren Missouri and AECI, AECI has the right to send 50 MW of power to the Adair substation and over the Ameren Missouri 161 kV line to Appanoose and the ITC Midland 161 kV line in Iowa at any time. Is this interchange agreement capability

relevant to the transmission planning process and the requirement to comply with NERC Reliability Standards?

A. No. All interconnected utilities have an obligation to support each other during system emergencies and work together to maintain safe and reliable service. Actions taken can include temporary, short-term higher energy transfers across available transmission paths. What Mr. Powers fails to mention in this section of his testimony is that the low-voltage events are not due to a lack of energy flow (in MW or MVA) into the Adair substation. Therefore, the capability for AECI to supply an additional 50 MW or more of energy from its resources would not prevent the low-voltage event from occurring. The low-voltage events are caused by the loss of adequate voltage support to the Adair substation during summer peak load periods which drives a corresponding low voltage condition on the 69 kV system that the Adair substation supplies and thereby exposes a significant amount of Ameren Missouri and cooperative load to potential loss. I am greatly surprised that Mr. Powers mistakenly believes that simply having AECI send an additional 50 MW of energy to the Adair 161 kV bus will address the low voltage condition because in other sections of his testimony he goes into great detail describing how he believes installation of static VAR compensators (which provide only voltage support and NOT energy in MW or MVA) could, in his opinion, be used to address the low-voltage events.

Additionally, as stated previously in my testimony, ** [redacted] ** of the system configurations that cause low-voltage events are caused by the effective loss of the **

[redacted]

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[redacted]** The fact that AECI could send an additional 50 MW of energy across its 161 kV line to Adair substation is simply not a solution to the low-voltage events described in my testimony.

Q. He states that "ATXI is not asserting that the project will resolve a real deficiency in the reliability of the existing 161 kV system, only that a low probability hypothetical contingency event, one that has apparently never occurred in decades of successful operation of the existing 161 kV system, would be resolved without loss of load if the proposed ATXI 345 kV line is built." Do you agree?

A. No. The results of the analysis performed by Ameren Services as described in Schedule DDK-SR2 clearly indicate that there are actually **[redacted]** system configurations that are caused the **[redacted]** NERC Category C contingency events that result in low system voltages during summer peak load periods in Northeast Missouri. **[redacted]**

Q. Has Ameren Services been able to maintain and demonstrate compliance with NERC Transmission Planning Standards?

A. Yes. Every three years Ameren is audited by SERC for compliance with NERC Standards including the Transmission Planning Standards. At the conclusion of each

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of the last three audits, for a period of nine years, SERC has found that we are in compliance with all applicable Transmission Planning Standards with no deficiencies or findings.

Q. What is the significance of the audit findings?

A. The audit findings are independent verification that Ameren Services is following the applicable NERC Reliability Standards and designing the Ameren Missouri transmission system to achieve a consistent and high level of reliability.

Q. He claims that this is a "low probability hypothetical contingency event." Does Ameren Services apply a probability assumption when it performs its Transmission Planning studies to ensure compliance with NERC Transmission Planning Standards?

A. No. As stated in the NERC Reliability Assessment Guidebook Version 3.1, dated August 2012, Chapter 2 - Bulk Power System Planning for Reliability, page 9, "Industry practices generally incorporate both deterministic and probabilistic methods. However, the requirements of the current NERC Reliability Standards are deterministic." In other words, the NERC Reliability Standards do not apply a threshold level of probability before a problem identified in the analysis needs to be addressed. Therefore, Ameren Services is following the requirements of the current NERC Reliability Standards for Transmission Planning and does not consider the probability of any particular contingency when assessing the performance of the transmission system and the need to expand the transmission system.

Q. In his testimony he indicates that ATXI is claiming the rapid onset of the low voltage condition when the loss of two of the existing 161 kV lines that supply the Adair substation occur during peak load conditions is caused by a highly inflated

assumed load directly supplied by the Adair substation (300 MW instead of the 64 MW calculated by Mr. Powers). Is ATXI attempting to "cook the books" in this instance?

A. No. As stated previously, he apparently thinks the 300 MW figure is inflated because he fails to understand the configuration of the electric system in Northeast Missouri and used a flawed methodology to develop his estimate for the current load in Northeast Missouri and the current and future load that would be at risk of loss due to the scenarios that cause NERC Category C low-voltage events. As I explained earlier in this testimony, the transmission planning process by necessity is focused upon the future and therefore used system models that incorporate future load forecasts. As stated previously, the models used in the analysis have the forecast summer peak load in 2021 in Northeast Missouri to be approximately **[redacted]** MW, with Ameren Missouri peak load being **[redacted]** MW and cooperative peak load being **[redacted]** MW.

E. PETITION SERC TO HAVE THE NERC CATEGORY C CONTINGENCIES RECLASSIFIED AS CATEGORY D CONTINGENCIES.

Q. Mr. Powers states that ATXI should petition SERC to have all of the NERC Category C contingencies reclassified as Category D contingency events. Do you agree with his suggestion?

A. No. Assuming Mr. Powers is seeking to have all **[redacted]** of the NERC Category C contingencies reclassified as NERC Category D, the simple fact that there are **[redacted]** separate contingencies that could result in **[redacted]** system configurations that cause low voltage in Northeast Missouri would create a significant hurdle in receiving agreement from AECI to support the petitions and for SERC to grant the reclassification. I can foresee no reason for AECI to support the petitions.

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Q. **[redacted]**

[redacted]

A. **[redacted]**

[redacted]

Q. What would be the practical impact if Ameren Missouri was able to convince AECI and the cooperatives to support the petition and was successful in convincing NERC to reclassify the contingency event from Category C to Category D?

A. It would create a two-tiered level of reliability for the Ameren Missouri transmission system and the customers it supplies. The majority of the Ameren Missouri transmission system would be designed and constructed to achieve the level of reliable operation as specified in the NERC Reliability Standards and Ameren Transmission Planning Criteria and Guidelines while the Ameren Missouri transmission system in Northeast

Missouri would be designed and constructed to a lower level of reliability. This means that the Ameren Missouri and cooperative customers in Northeast Missouri would be more exposed to loss of service for the described and documented low-voltage events than Ameren Missouri and cooperative customers in other areas.

Q. Is this significant?

A. Yes. The two-tiered system results in Ameren Missouri customers in Northeast Missouri paying for an expected level of reliable service that is compliant with the applicable NERC Reliability Standards and Ameren Transmission Planning Criteria and Guidelines and in fact receiving a lower level of reliability compared to similarly situated customers. This two-tiered system would be inherently unfair.

Q. Would this reclassification, if it was successful, address all of the issues that the Mark Twain Project will address and provide the same set of benefits to the Missouri customers?

A. No. The Mark Twain project is an MVP which by definition means that it provides multiple benefits and addresses multiple issues. The ability of the Project to address the subject scenarios that cause low-voltage events is just one of the many benefits it provides. If the subject low-voltage events could be made to suddenly disappear, the system overloads identified by MISO would still need to be addressed and the full set of Project benefits would not be provided by the actions that Mr. Powers advocates. The Project provides a broad set of benefits including meeting the MVP criteria #1 that was approved by FERC and was therefore included in the MVP Portfolio that was approved by the Independent MISO Board of Directors. I discuss these criteria in my direct testimony.

Q. If by some remote possibility the SERC Reliability Corporation where to agree to reclassify all ** [redacted] ** NERC Category C Contingency events to be NERC Category D contingency events, would the Project still be needed?

A. Absolutely. The fact that the Project addressed all of the NERC Category C Contingency events is not the primary reason why the Project is needed. As explained by MISO witness Jameson T. Smith, the Project is part of an MVP Portfolio that provides multiple benefits to the Missouri customers that far exceed the cost they will pay for the Project. In the unlikely event that the NERC Category C Contingency events were to suddenly disappear, the Project's remaining set of benefits would more than justify its implementation.

F. IMPLICATIONS AND IMPACT OF AMEREN MISSOURI DIRECTED CUSTOMER LOAD SHEDDING AS A PERMANENT SOLUTION TO THE LOW-VOLTAGE EVENTS IN NORTHEAST MISSOURI.

Q. Do the Ameren Transmission Planning Criteria and Guidelines discuss using "load shedding" to address NERC Category C events?

A. Yes.

Q. Would Ameren Missouri directed customer load shedding be applicable to the system configurations that cause low-voltage events in Northeast Missouri?

A. Yes, but only if the system configurations were caused by NERC Category C3 (N-1-1) events where a sequential outage of transmission lines is assumed. It would not be applicable for the scenarios ** [redacted] ** A list of the applicable NERC Category C events is contained in Schedule DDK-SR2.

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Q. Does the Ameren Transmission Planning Criteria and Guidelines establish limits on how much load that is allowed to be dropped?

A. Yes, Ameren's Criteria allows for C3 (N-1-1) events the controlled shedding of up to 100 MW of system load as an emergency operational procedure to reduce the loading of transmission elements or to return voltages to acceptable levels. The shedding can be via automatic actions or operator-initiated actions.

Q. How much load would Ameren Missouri need to shed in order to adequately address the most severe NERC Category C3 (N-1-1) events?

A. In order to adequately address the most severe Category C3 scenario, Ameren Missouri would need to drop service to approximately **[redacted]** MW of customer load in Northeast Missouri after **[redacted]**

Q. For the NERC Category C3 (N-1-1) event where load shedding is allowed, do the Ameren criteria address what should be done when the exposure to either automatic or operator-initiated shedding of 100 MW or more occurs?

A. Yes. The criteria state that corrective action should be investigated and implemented as soon as practicable to eliminate the projected exposure to automatic or operator-initiated shedding of 100 MW or more of load associated with the concurrent outage of any two transmission elements. In practical terms, this means that the shedding of load should *not be considered* a permanent solution and that corrective action should be

investigated and implemented as soon as practical to eliminate the exposure of load to automatic or operator-initiated shedding. In other words, load shedding in this instance is an interim action (effectively a band-aid) that would be used only until a permanent solution is implemented.

Q. Why isn't load shedding allowed as a preventive action to address the NERC Category ** [redacted] ** events?

A. These scenarios are a single event that results in the simultaneous outage of two or more system elements and there is simply no time available to perform automatic or manual load shedding. In these scenarios the event progresses at such a rapid rate that no time is available for preventive actions.

Q. What is the down-side to using Ameren Missouri directed customer load shedding?

A. Using load shedding to permanently address Category C3 N-1-1 events is effectively sacrificing service to some customers in a controlled manner in order to prevent a larger uncontrolled service outage from potentially occurring. Load shedding is appropriate for emergency conditions, but using it as a permanent alternative to improving the transmission system to adequately address N-1-1 events is inconsistent with the Ameren Transmission Planning Criteria and Guidelines and inconsistent with the proper operation of a reliable transmission system.

Q. Does Mr. Powers state that controlled load shedding could be used to fully address the low-voltage events in Northeast Missouri?

A. Based upon his testimony, I am unable to determine with certainty if that is his allegation. In several sections of his testimony, he makes mention of demand response

actions using residential air conditioners to reduce peak loads, however as I explained previously in this testimony, his estimates of load in the Northeast Missouri area are inaccurate and erroneous. Therefore, his assumptions regarding using residential air conditioners to reduce peak loads are suspect, as Mr. Michels' surrebuttal testimony confirms.

G. ALTERNATIVES TO THE PROJECT TO ADDRESS THE LOW-VOLTAGE PROBLEMS CONSIDERED.

Q. Did Ameren Services consider various alternatives to address the low-voltage events that could occur in Northeast Missouri?

A. Yes. When Ameren Services performed its annual analysis of the transmission system in 2011, it identified system configurations caused by NERC Category C events in Northeast Missouri that would result in low voltage and place Ameren Missouri and cooperative load at risk for loss. During subsequent discussions, various high level solution options were discussed which included a new 345 kV line to supply the Adair substation, as well as possible installation of voltage support devices such as static Var compensators to help address the problem. When these discussions were occurring within Ameren Services, the MISO Candidate MVP Portfolio was under development and including a wind zone in Northeast Missouri in the analysis had been agreed upon by the stakeholders, including the Organization of MISO States, of which the Commission is a member.

The existence and location of the Northeast Missouri wind zone and its ability to provide renewable energy to assist in meeting state RES requirements subsequently helped drive MISO's decision to include in the final MVP portfolio a 345 kV transmission line from Ottumwa to Palmyra with a possible connection at Adair substation to the existing 161 kV transmission system in Northeast Missouri. Ameren Services considered a new additional

supply to the Adair substation as a potential solution to address the low-voltage events in Northeast Missouri. Ameren Services, in keeping with the concept of Multi Value Projects providing multiple benefits and addressing multiple needs, worked with MISO to ensure that a connection to the Adair substation was included in the approved MVP Portfolio. When it became clear that the MVP Portfolio was going to include a new additional supply to Adair substation that would address the low-voltage events, there was no need for Ameren Services to continue consideration of other potential solutions to the low-voltage events. Therefore, Ameren Services stopped consideration of alternative solutions to the low voltages that are caused by the NERC Category C contingency events because an appropriate solution had already been identified and approved by the MISO Board of Directors.

Q. How could Ameren Missouri be sure that the MVP Portfolio, and the Mark Twain Project, would actually be constructed and provide a new additional supply to the Adair substation and thereby address the low-voltage events caused by the Category C contingencies?

A. The Transmission Owners Agreement governing all transmission owning members' participation in MISO requires the transmission owners to construct projects that have been approved by the MISO Board of Directors.

Q. Can the transmission owner refuse to construct the assigned project?

A. Yes, but only under specific circumstances described in the Transmission Owners Agreement. The circumstances are if the Transmission Owner is financially unable to construct the project or if constructing the project would cause financial harm to the constructing Transmission Owner. Neither criteria apply in this matter

Q. If these circumstances occurred would the project be cancelled?

A. No. The Transmission Owners' agreement includes actions that MISO would undertake to ensure the Project would be constructed, including having other MISO Transmission Owners construct the Project or having a third party construct the project.

Q. Would you say that Ameren Services had adequate assurance to expect that the MVP Portfolio and the Mark Twain project would be built when it decided to stop spending time and resources considering alternative solutions to these low-voltage events?

A. Yes.

Q. One alternative that Mr. Powers suggests and that you just mentioned is adding static Var compensators at the Adair substation to address the low-voltage conditions that will exist if certain low-voltage events occur during periods of peak demand. Is this the only action that Mr. Powers proposes is needed to address these low-voltage events?

A. Mr. Powers describes a lengthy list of potential actions that he proposes be taken in Northeast Missouri without specifying if he believes that all or some subset of the actions would adequately address the low-voltage events. Therefore, it is impossible to determine from Mr. Powers' testimony if he proposes that installation of static Var compensators is the only action that would be needed to address all of the low-voltage events caused by the NERC Category C contingencies.

Q. Assuming that Mr. Powers' alternative solution does include the installation of a static Var compensator at the Adair substation, does he explain how the static Var compensator he proposes would work, its capability, cost, etc.?

A. Yes. He attempts to calculate the amount of MVAR of reactive power that he believes would be needed to address the low-voltage events that places Ameren Missouri and cooperative load at risk for loss.

Q. Do you agree with his assumptions and the results of his analysis regarding the static VAR compensators he proposes as a solution?

A. No. I used Mr. Powers' analysis method to determine the size and cost of the static Var compensator that he included in his list of possible actions. I then used the correct values for the amount of customer load (both Ameren Missouri and cooperative) that should be used for transmission planning purposes that would be at risk of loss due to the most severe low-voltage event. Previously in this testimony I explained that the amount of customer load for transmission planning purposes that would be at risk of loss due to the scenario that causes the most severe low-voltage event is at least **[redacted]** MW, and there is a high probability it would be a greater amount. Using Mr. Powers' methodology and assumptions regarding a 1:1 ratio of real power in MVA to reactive power in MVAR (MVA Reactive), the amount of MVAR reactive power that would be required is not 64 as suggested by Mr. Powers, but actually at least **[redacted]**.

Q. What impact does this higher amount of required MVAR reactive power as indicated by Mr. Powers' methodology have on Mr. Powers' cost estimate?

A. He states on page 28, lines 17-18, "The cost of a 64 MVAR static VAR compensator would be about $5.5 million." He does not state what is included in his cost (purchase price, construction, operating cost, ongoing maintenance, etc.). Therefore, to be ultra conservative, I will assume that his cost estimate includes all costs although it may not have. Using his ratio of cost per MVAR, the cost of a **[redacted]** MVAR static VAR

compensator would be approximately $19.8 million. Assuming an economy of scale of a **[redacted]** reduction in total cost, the cost of a **[redacted]** MVAR static VAR compensator would be approximately $16.8 million. Since this alternative solution would not be part of the MVP Portfolio, the entire cost of Mr. Powers' proposed static VAR compensator would be paid by Ameren Missouri area customers. By comparison, Ameren Missouri area customers will only pay about 7-8% of the transmission charges arising from the Mark Twain Project, or approximately $18 million.

Q. Based upon the cost of an adequately sized static Var compensator calculated using Mr. Powers' own methodology, is installing a static Var compensator the preferred solution compared to the Project?

A. No. Based upon the analysis using Mr. Powers' methodology, for approximately the same cost of a static Var compensator (at least approximately $17 million) that Mr. Power proposes will address only the low-voltage events caused by the NERC Category C contingencies, the Ameren Missouri area customers can pay their 7-8% portion of the Project (approximately $18 million) and receive all of the MVP Portfolio benefits, including market benefits as described by MISO and ATXI witness Schatzki, as well as addressing the reliability issues in the Northeast Missouri area.

Using Mr. Powers' own methodology and assumptions, and very conservatively assuming that they capture all costs, the Ameren Missouri area customers will pay practically the same amount for a properly sized static VAR compensator at the Adair substation as they would for the entire Mark Twain Project. As documented by MISO, the Mark Twain Project, however, provides additional multiple benefits to Ameren Missouri customers that are at least 1.8 times larger than the cost they will pay.

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H. FUTURE WIND PROJECTS IN THE ADAIR WIND ZONE.

Q. How were the wind energy zones that were used to help site the MVP Portfolio identified?

A. The wind energy zones were identified during the MISO Regional Generation Outlet Study ("RGOS") process and through interaction with regulatory bodies such as the Upper Midwest Transmission Development Initiative ("UMTDI") and various state agencies within the MISO. These zones represent the preference of state governments to source some renewable energy locally while also using the higher wind potential areas within the MISO market footprint. Zone selection was based on a number of potential locations developed by MISO utilizing mesoscale wind data supplied by the National Renewable Energy Laboratory ("NREL") of the US Department of Energy. The analysis found that having wind zones distributed across the region was the best method to meet renewable energy requirements at the least delivered wholesale energy cost.

Q. He states that the prospects for the development of wind projects in the Adair Wind Zone that would tie in directly to the ATXI 345 kV transmission line are poor. Do you agree?

A. I am not a wind developer; however, Mr. Rob Freeman, CEO of TradeWind Energy, LLC, states in Mr. Powers' Exhibit PE-11 that the northern part of the state in particular has a robust wind resource that is comparable to surrounding states that are actively and successfully developing wind energy. Moreover, ATXI witness Robert M. Vosberg, who has extensive experience in the wind industry, also confirms in his surrebuttal testimony the significant wind potential in this area. Mr. Vosberg also explains why the new 345 kV line needs to be constructed to realize that potential.

Q. Does the fact that a wind developer (TradeWind Energy) cancelled a project in 2012 indicate that no developer will ever construct a wind project in the Northeast Missouri area?

A. No. I am not aware of the robust wind resource in Northeast Missouri ceasing to exist and Mr. Powers offers no evidence that it has disappeared. Mr. Vosberg confirms robust wind resources do exist and can be utilized, with the 345 kV line.

Q. Does the fact that wind developers exited MISO's generation queue indicate that the wind potential does not exist?

A. No, it does not. The wind did not go away.

Q. He makes reference to TradeWind Energy's decision to terminate the Shuteye Creek wind project. If the MVP Portfolio and specifically the Mark Twain Project were in service, could they have had impact on TradeWind's decision to terminate the project?

A. It is impossible to state for certain; however, the MVP Portfolio is designed to provide states with RES requirements and guidelines with a variety of options to use local as well as remote sources of energy to meet their needs. Mr. Powers states that the reason why the project was not built is a "Lack of interest on the part of any Missouri utility to contract for the wind power." The Project, as part of the MVP portfolio, will provide additional transfer capability for wind resources that may choose to construct in Northeast Missouri and allow them to provide energy to states throughout the Midwest and not be limited, as claimed by Mr. Powers, to just supplying Missouri utilities that have RES requirements.

Q. Why should the customers in Northeast Missouri care if wind resources are developed in their area?

A. Apparently it would provide local economic benefits. In Mr. Powers' Exhibit PE-11, which is an online news report from KTVO.com dated April 2012, State Representative Zachary Wyatt of Novinger states: "One of the things I like to talk about when I go around the state and talk about renewable energy is that this is one of the last hopes for rural economic development, and if we shut the door on this, what else do we have in small towns throughout the northern part of Missouri?" The article goes on to state that Wyatt was disappointed in TradeWind's decision because of the loss of tax revenue that the Shuteye Creek Wind Project would have generated in Adair, Sullivan and Putnam counties. The article also states that the wind farm would have provided millions of dollars in revenue to school districts in those counties.

Q. Will the Project and MVP portfolio provide benefits beyond those described in the testimony and various MISO documents?

A. Yes. The EPA recently issued the Clean Power Plan ("CPP"), which will have a transformational impact on the power grid by driving major changes in energy supply and significant additions and improvements to the transmission infrastructure. The MVP portfolio, of which the Project is a key component, provides greater access to a variety of additional sources of energy which provides additional optionality to the MISO states as they determine their method of compliance.

While much consideration was given to wind capacity factors when developing the energy zones used to establish the general routing of the MVPs, the zones were chosen with consideration of more factors than just wind capacity. Existing infrastructure, such as transmission and natural gas pipelines, also influenced the selection of the zones. Even though the energy zones were created to help address the renewable generation mandates,

1 they can be used to improve access for a variety of different generation types and to serve
2 various future generation policies, including the CPP.

3 **Q. Does this conclude your surrebuttal testimony?**

4 A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Ameren Transmission Company of Illinois for Other Relief or, in the Alternative, a Certificate of Public Convenience and Necessity Authorizing it to Construct, Install, Own, Operate, Maintain and Otherwise Control and Manage a 345,000-volt Electric Transmission Line from Palmyra, Missouri, to the Iowa Border and an Associated Substation Near Kirksville, Missouri.	)	File No. EA-2015-0146

AFFIDAVIT OF DENNIS D. KRAMER

STATE OF MISSOURI)
) ss
CITY OF ST. LOUIS)

Dennis D. Kramer, being first duly sworn on his oath, states:

1. My name is Dennis D. Kramer. I work in the City of St. Louis, Missouri, and I am employed by Ameren Services Company as Manager of Transmission Policy and Planning.

2. Attached hereto and made a part hereof for all purposes is my Surrebuttal Testimony on behalf of Ameren Transmission Company of Illinois consisting of 41 pages, and Schedule(s) DDK-SR1, DDK-SR2HC, DDK-SR2NP all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

Dennis D. Kramer

Subscribed and sworn to before me this 10 day of November, 2015.

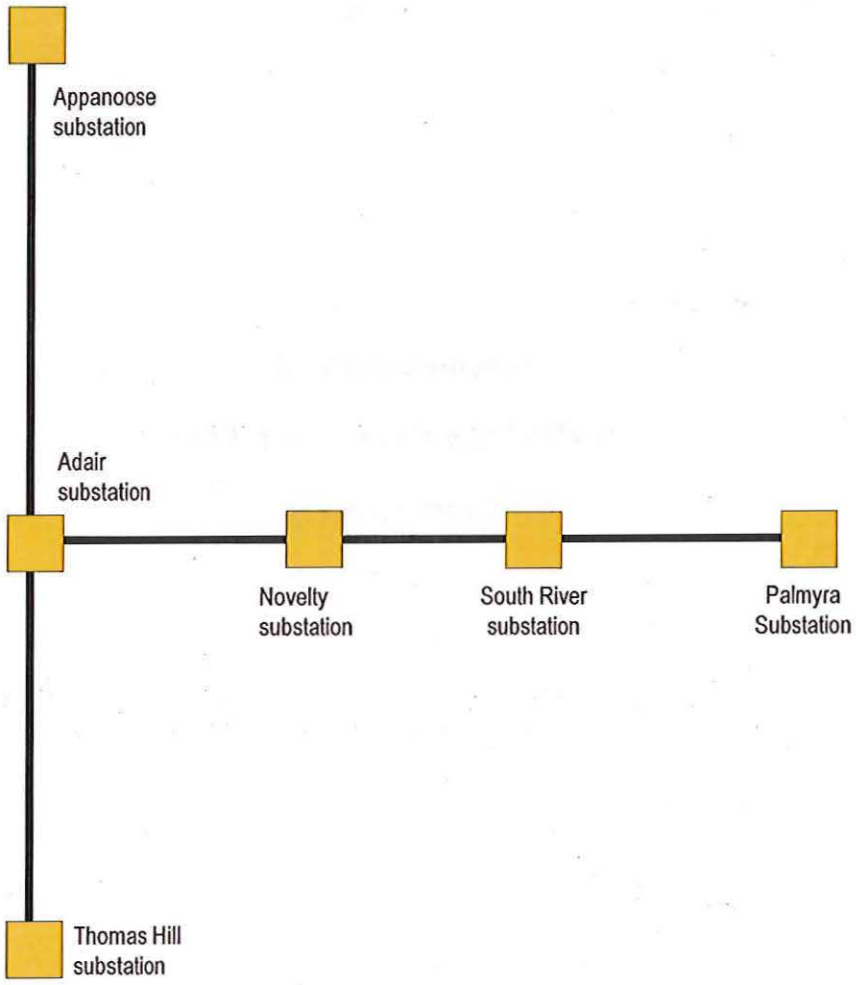
Notary Public

My commission expires:

1-30-2016

Stephanie Anne Gifford - Notary Public
Notary Seal, State of
Missouri - St. Charles County
Commission #11479771
My Commission Expires 1/30/2016

Northeast Missouri 161 kV supply system diagram



Schedule DDK-SR1

Schedule DDK-SR2

Is HIGHLY CONFIDENTIAL

in Its Entirety