PUBLIC MCPO Exhibit 1.0

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

AMEREN TRANSMISSION COMPANY OF ILLINOIS **Petition for a Certificate of Public Convenience and Necessity, pursuant to Section 8-406.1 of the Illinois Public Utilities Act, and an Order pursuant to Section 8-503 of the Public Utilities Act, to Construct, Operate and Maintain a New High Voltage Electric Service Line and Related Facilities in the Counties of Adams, Brown, Cass, Champaign, Christian, Clark, Coles, Edgar, Fulton, Macon, Montgomery, Morgan, Moultrie, Pike, Sangamon, Schuyler, Scott and Shelby, Illinois**	)	**Docket No. 12-0598**

PUBLIC VERSION

Direct Testimony and Exhibits of

James R. Dauphinais

On behalf of

Moultrie County Property Owners ("MCPO")

March 29, 2013

BRUBAKER & ASSOCIATES, INC.

Project 9700

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

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STATE OF ILLINOIS
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Direct Testimony of James R. Dauphinais

I. Introduction

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A James R. Dauphinais. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017.

Q WHAT IS YOUR OCCUPATION?

A I am a consultant in the field of public utility regulation and a Managing Principal of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory consultants.

Q PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A I earned a Bachelor of Science in Electrical Engineering from the University of Hartford and have completed a number of graduate level courses in electric power systems through the Engineering Outreach Program of the University of Idaho. In the

twelve and one-half years prior to the beginning of my current employment with BAI, I was employed in the Transmission Resource Planning Department of the Northeast Utilities Service Company. While employed in that function, I conducted numerous dynamic and load flow (a/k/a power flow) analyses related to thermal, voltage and stability issues that I studied in support of Northeast Utilities' planning and operation of its electric transmission system. This included examination of potential solutions to operational and planning problems including, but not limited to, transmission line solutions and routes that might be utilized by such transmission line solutions. My work also included participation in the New England Power Pool Stability Task Force and several technical working groups within the Northeast Power Coordinating Council ("NPCC").

During my 15 years of subsequent employment with BAI, I have been involved with, and testified before the Federal Energy Regulatory Commission ("FERC") and many state and provincial commissions with regard to, a wide variety of issues including, but not limited to, avoided cost calculations, certification of public convenience and necessity, fuel adjustment clauses, interruptible rates, market power, market structure, prudency, resource planning, standby rates, transmission rates, transmission losses, transmission planning and transmission line routing. This has included providing testimony before the Illinois Commerce Commission ("Commission" or "ICC"). I have also assisted end-use customers with power procurement and assisted a variety of clients in regard to transmission access issues. My background is further detailed in Appendix A to my testimony.

Q CAN YOU PLEASE BRIEFLY OUTLINE YOUR PARTICIPATION IN TRANSMISSION LINE CERTIFICATION CASES WITHIN THE PAST 10 YEARS?

A Yes. In the past 10 years, I have testified in 12 transmission line certification cases in Texas, one such case in Colorado, three such cases in Alberta and two such cases in Michigan. In Texas, I have filed testimony with and/or testified before the Public Utility Commission of Texas ("PUCT") with regard to transmission line need, reliability issues and/or transmission line routing issues in Docket Nos. 32707, 34440, 37464, 37778, 38140, 38230, 38290, 38324, 38354, 38517, 38597 and 40728. In Colorado, I have testified before the Colorado Public Utilities Commission in Docket No. 09A-324A/09-325E with regard to transmission line need, resource planning issues and reliability issues. In Alberta, I have testified before the Alberta Utilities Commission in Proceeding Nos. 979, 1069 and 1363 with regard to transmission line routing issues. Finally, in Michigan, I have filed testimony with the MPSC in Case Nos. U-16200 and U-17041 with regard to both transmission line need and routing issues.

Q ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A I am testifying on behalf of the Moultrie County Property Owners ("MCPO").

Q WHAT IS THE SUBJECT MATTER OF YOUR TESTIMONY?

A My testimony addresses the Pana to Kansas portion of the application to the Commission of Ameren Transmission Company of Illinois ("ATXI" or "Company") for a Certificate of Public Convenience and Necessity ("CPCN") pursuant to Section 8-406.1 of the Illinois Public Utilities Act ("Act"), 220 ILCS 5/8-406.1, for ATXI's

proposal to construct a series of single-circuit 345 kV transmission lines[1] and related facilities from the Missouri border near Ameren Missouri's Palmyra substation to the SE Quincy substation in eastern Adams County, from Quincy substation to Meredosia substation in northwest Morgan County, from Meredosia substation to Ipava substation in western Fulton County, from Meredosia substation to Pawnee substation in southern Sangamon County, from Pawnee substation to Pana substation in southeastern Christian County, from Pana substation to Mt. Zion substation in southeastern Macon County, from Mt. Zion substation to Kansas substation in northeastern Coles County, from Kansas substation to the Indiana border near Duke Energy Indiana's Sugar Creek substation and from Rising substation in northwestern Champaign County to Sidney substation in southeastern Champaign County.

In total, ATXI's proposed project, which ATXI refers to as the Illinois Rivers Project ("IRP"), consists of approximately 375 to 400 miles of new single-circuit 345 kV transmission lines, six new 345/138 kV transformers and construction or expansion of nine substations in Illinois. The IRP in itself is a subset of the portfolio of Multi-Value Projects ("MVP") the Midwest Independent Transmission System Operator, Inc. ("MISO") Board of Directors approved for construction in MISO's MTEP11 plan.[2]

The Pana to Kansas portion of ATXI's proposed project consists of approximately 102 to 107 miles of new single-circuit 345 kV transmission lines (one

[1]A "transmission circuit" is a system element that consists of a set of three physically-parallel overhead conductors or underground cables that are electronically protected by a common protection system. A "transmission line" (a/k/a "transmission tower line") consists of one or more "transmission circuits" supported on common structures between two locations. When a "transmission line" supports only one "transmission circuit," which is the case with a single-circuit transmission line, the terms "transmission circuit" and "transmission line" can be used interchangeably. Otherwise, the terms cannot be used interchangeably.

[2]"MTEP11" is shorthand for the 2011 MISO Transmission Expansion Plan report.

from Pana to Mt. Zion and another from Mt. Zion to Kansas), a new substation called Mt. Zion and a new 345/138 kV transformer that will be installed in the new ATXI Mt. Zion substation. ATXI's proposed Mt. Zion substation is to be connected to Ameren Illinois Company's ("AIC") existing 138 kV transmission facilities in the Decatur, Illinois area. This requires the construction of one or more new 138 kV transmission lines which will connect ATXI's proposed Mt. Zion substation with AIC's existing Mt. Zion PPG 138 kV substation. These new 138 kV transmission lines are not part of ATXI's application in this proceeding. (ATXI Exhibit 3.0 at pages 15 of 20 through 17 of 20, ATXI Exhibit 4.10 (Part 5 of 5) and ATXI Exhibit 8.0 at page 3 of 5).

I was engaged by MCPO to:

- Work with Mr. Rudolph K. "Rudi" Reinecke of Integrated Environmental Solutions, LLC ("IES") to expand the geographical diversity of the transmission line route options available to the Commission for the Pana to Kansas portion of the IRP transmission by adding:
  - A new alternative route segment from Mt. Zion to Kansas ("Route Segment MCPO MZK") located well to the north of ATXI's filed primary and alternative route segments from Mt. Zion to Kansas; and
  - A new alternative route segment from Pana directly to Kansas ("Route Segment MCPO PK") whose western portion is located well to the south of ATXI's filed primary and alternative route segments from Mt. Zion to Kansas.
- Perform a routing factor analysis to determine which of all of the filed routes for the Pana to Kansas portion of ATXI's proposed transmission project (including those using the new alternative route segments developed by Mr. Reinecke and myself for MCPO either alone or in conjunction with ATXI's filed primary and alternate route segments from Pana to Mt. Zion and Mt. Zion to Kansas) best minimizes the adverse impact to the public of the IRP.
- Determine whether it is necessary for the Pana to Kansas portion of ATXI's proposed transmission project in this proceeding to connect AIC's 138 kV transmission system in the Decatur, Illinois area via ATXI's proposed Mt. Zion substation.
- If it is determined it is necessary for the Pana to Kansas portion of ATXI's proposed transmission project to connect the AIC's 138 kV system in the Decatur area via ATXI's proposed Mt. Zion substation, determine whether it is necessary

that the interconnection be made with two 345 kV transmission lines (one from Pana and one from Kansas) or would it be sufficient to provide the interconnection via a single 345 kV transmission line from Pana.

Consistent with Section 8-406.1(f) of the Public Utilities Act ("Act"), my testimony addresses whether the Pana to Kansas portion of the IRP (as proposed by ATXI):

- Will promote the public convenience and necessity.
- Is necessary to provide adequate, reliable, and efficient service to the public utility's customers and is the least-cost means of satisfying the service needs of the public utility's customers or that IRP will promote the development of an effectively competitive electricity market that operates efficiently, is equitable to all customers, and is the least-cost means of satisfying those objectives (Section 8.406.1(f)(1) of the Act).

I do not address or take a position with regard to whether ATXI has satisfied Sections 8.406(f)(2) or 8.406(f)(3) of the Act.

My silence on any issue should not be taken as an endorsement of any position that ATXI or MISO[3] has taken in this proceeding.

Q CAN YOU PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS?

A My powerflow analysis shows that ATXI does not need ATXI's proposed Mt. Zion substation to resolve local reliability issues in the Decatur area. The Mt. Zion substation is not the only 345/138 kV Reinforcement that can, in conjunction with the remainder of the IRP, sufficiently resolve those issues and maintain the other estimated IRP benefits. Specifically, my analysis shows that all of the needs the IRP and the remainder of the MISO-approved MVP portfolio are intended to address can be met without ATXI's proposed Mt. Zion substation. This can be accomplished by

[3]MISO as an intervenor in this proceeding chose to file the direct testimony of its witness Mr. Jeffrey Webb on November 8, 2012.

routing the Pana to Kansas portion of the IRP directly from Pana to Kansas and utilizing a 345/138 kV Reinforcement consisting a 3rd Oreana 345/138 kV transformer and a 3rd Oreana to ADM North 138 kV transmission line in place of ATXI's proposed Mt. Zion substation (and its associated 345/138 kV transformer and 138 kV transmission lines).

As a result, the following nine route segment combinations, which are shown on the overview maps presented in MCPO Exhibit 1.1, are available for consideration by the Commission for the IRP from Pana to Kansas:

	Utilized Route Segments				
Route Abbreviation	**Pana to Mt. Zion**	**Mt. Zion to Kansas**	**Pana to Kansas**	**Estimated Route Cost (excluding Decatur Area Reinforcements) ($ millions)**	**Decatur Area 345/138 kV Reinforcements**
ATXI-P-P	ATXI Primary	ATXI Primary	------	222.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines[1]
ATXI-A-P	ATXI Alternative	ATXI Primary	------	233.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
ATXI-P-A	ATXI Primary	ATXI Alternative	------	225.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
ATXI-A-A	ATXI Alternative	ATXI Alternative	------	236.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-P-MZK	ATXI Primary	MCPO MZK	------	224.9	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-A-MZK	ATXI Alternative	MCPO MZK	------	236.0	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-P-PK	ATXI Primary	------	MCPO PK	241.9	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-A-PK	ATXI Alternative	------	MCPO PK	252.9	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-PK	------	------	MCPO PK	167.6	3rd Oreana 345/138 kV Transformer + 3rd Oreana-ADM 138 kV Transmission Line[2]

Key: P = Primary
A = Alternative
PR = Pana to Kansas
MZK = Mt. Zion to Kansas

[1]My estimate of the total cost of ATXI's proposed Mt. Zion substation is $21.8 million to $25.8 million including the 138 kV transmission lines associated with it.

[2]My estimate of the total cost of the Oreana 345/138 kV Reinforcement is approximately $34.4 million including the cost for a power flow control reactor.

In addition, my routing analysis, which draws on the routing factors developed by Mr. Reinecke and considers the ATXI-identified Phase I and Phase II high

sensitivity routing factors, estimated cost and opportunities to parallel existing linear features, shows that the Route MCPO-PK, with the 3rd Oreana 345/138 kV transformer and 3rd Oreana to ADM North 138 kV transmission line added in place of Mt. Zion substation in the Decatur area, has by far the lowest cost and lowest impact to the public of the nine alternative route combinations that I have presented above. As a result, I recommend the Commission select Route MCPO-PK for the Pana to Kansas portion of the IRP as any other choice would not promote public convenience and necessity and would not be the least-cost means of satisfying the objectives being sought to be accomplished.

If despite the findings of my powerflow analysis and recommendation above, the Commission decides the IRP should include ATXI's proposed Mt. Zion substation, I recommend the Commission, in place of Route MCPO-PK, select one of the following two route segment combinations from Pana to Kansas:

- Route MCPO-P-MZK; or
- Route MCPO-A-MZK.

These two route segments have the same electrical configuration as all of ATXI's filed route combinations for the Pana to Kansas portion of the IRP. However, as discussed in detail in my testimony which follows, Route MCPO-A-MZK and Route MCPO-P-MZK have significantly less adverse impact to the public than ATXI's four filed route segment combinations between Pana and Kansas as measured by a combination of their performance with regard to the ATXI-identified Phase I high sensitivity routing factors, the ATXI-identified Phase II high sensitivity routing factors, estimated cost and use of opportunities to parallel existing linear features. While it is a close call, of the two routes, I judge Route MCPO-P-MZK to be slightly better than Route MCPO-A-MZK. I make this judgment because Route MCPO-A-MZK's degree

of reduction in residence impacts in comparison to Route MCPO-P-MZK does not quite justify: (i) the additional cost of Route MCPO-A-MZK and (ii) the loss of the greater paralleling of significant existing linear features by Route MCPO-P-MZK.

II. MCPO's Two Alternative Route Segments Between Pana and Kansas

Q PLEASE DESCRIBE MCPO'S FIRST ALTERNATIVE ROUTE SEGMENT.

A MCPO's first alternative route segment, Route Segment MCPO MZK, is shown in MCPO Exhibit 1.2. It runs from ATXI's proposed Mt. Zion substation to Kansas substation using a route that generally runs some distance north of and roughly parallel to US Highway 36 until it nears the vicinity of Garrett, Illinois. From the vicinity of Garrett, it runs some distance south of and roughly parallel to US Highway 36 until it eventually turns south to begin to closely parallel an existing AIC 138 kV and then a 345 kV transmission line corridor to reach Kansas substation.

Route Segment MCPO MZK has a total length of 69.2 miles and a mean estimated cost of approximately $150.6 million. There are no residences within 75 feet of its centerline, only one (1) residence within 150 feet of its centerline and only a total of seven (7) residences within 500 feet of its centerline. Mr. Reinecke's MCPO Exhibit 2.2 provides detailed maps of Route Segment MCPO MZK. Mr. Reinecke's MCPO Exhibit 2.3 provides routing factor data for Route Segment MCPO MZK in the same format as that provided by ATXI for its filed route segments in ATXI Exhibit 4.5. In addition, routing factor data for the close paralleling of existing linear disturbances by Route Segment MCPO MZK is presented in Mr. Reinecke's MCPO Exhibit 2.6. In his direct testimony, Mr. Reinecke presents more detail on Route Segment MCPO MZK.

Route Segment MCPO MZK can be used in place of ATXI's primary and alternative route segments from Mt. Zion to Kansas. In conjunction with either ATXI's primary or alternative route segment from Pana to Mt. Zion, Route Segment MCPO MZK provides a complete route for the Pana to Kansas portion of the IRP. This would include an interconnection by two single-circuit 345 kV transmission lines to ATXI's proposed Mt. Zion substation, which would interconnect to AIC's 138 kV facilities in the Decatur area through a single 345/138 kV transformer and one or more new 138 kV transmission lines. As noted earlier, the new 138 kV transmission lines for Mt. Zion substation must be constructed and are not part of ATXI's CPCN in this proceeding.

Q PLEASE DESCRIBE MCPO'S SECOND ALTERNATIVE ROUTE SEGMENT.

A MCPO's second alternative route segment, Route Segment MCPO PK, is shown in MCPO Exhibit 1.3. It runs from Pana substation to Kansas substation using a route that runs south of Lake Shelbyville and then to the north and east to intersect with ATXI's primary route segment from Mt. Zion to Kansas. It then uses ATXI's primary route from that intersection point to Kansas substation.

Route Segment MCPO PK has a total length of 76.4 miles and an estimated cost of approximately $167.6 million. There are no residences within 75 feet of its centerline, only a total of three (3) residences within 150 feet of its centerline and only a total of 13 residences within 500 feet of its centerline. Mr. Reinecke's MCPO Exhibit 2.1 provides detailed maps of the Route Segment MCPO PK. Mr. Reinecke's MCPO Exhibit 2.3 provides routing factor data for Route Segment MCPO PK in the same format as that provided by ATXI for its filed route segments in ATXI Exhibit 4.5. In addition, routing factor data for the close paralleling of existing linear disturbances

by Route Segment MCPO PK is presented in Mr. Reinecke's Exhibit 2.6. As he does with Route Segment MCPO MZK, in his direct testimony, Mr. Reinecke provides more detail on Route Segment MCPO PK.

Route Segment MCPO PK can be used in place of any of ATXI's four filed primary and alternative route segment combinations from Mt. Zion to Kansas if it is determined that it is not necessary for the IRP to include the proposed Mt. Zion substation. Alternatively, Route Segment MCPO PK can be used in conjunction with either ATXI's primary or alternative route segment from Pana to Mt. Zion if it is determined that it is not necessary for ATXI's Mt. Zion substation to be interconnected to two 345 kV transmission lines such that a single 345 kV transmission line connection will suffice.

Q PLEASE EXPLAIN HOW MCPO'S TWO ALTERNATIVE ROUTE SEGMENTS WERE DEVELOPED.

A MCPO's two alternative route segments were developed in a two step process. First, these two route segments were each developed as two-mile wide corridors centered on an identified centerline. These two-mile wide corridor routes were filed in this proceeding by MCPO on December 31, 2012 (corrected on January 2, 2013) in accordance with the Administrative Law Judges ("ALJ") December 14, 2012 Case Management Order in this proceeding. Also, consistent with the ALJ's December 14, 2012 Case Management Order, MCPO in its December 31, 2012 and January 2, 2013 filings provided the names and addresses of the landowners affected by MCPO's two-mile wide alternative route corridors that were not already affected by ATXI's primary or alternative route.

In the second phase, the location of the two alternative route segments within the initial two-mile wide corridors was refined and the corridors narrowed to 500 feet with the 150 foot easement width proposed by ATXI for the IRP transmission line. In addition, routing factor data consistent with ATXI Exhibit 4.5 for a 500 foot corridor centered on the refined centerlines was developed for both alternative route segments.[4] The refined centerline and 500 foot routing factor data for the two MCPO alternative route segments was released as soon as it was available by MCPO to the Company, the Commission Staff and parties that had submitted data requests to MCPO inquiring with regard to MCPO's alternative route segments. Specifically, MCPO provided this information, along with cost estimate data for MCPO's alternative route segments, to the Company; Commission Staff; Shelby County Landowners Group; and Piatt, Douglas and Moultrie Landowners Coalition ("PDML") on March 20, 2013 in response to data requests previously sent by PDML to MCPO.

A. December 31, 2012 MCPO Potential Alternative Route Segments Filing

Q PLEASE DESCRIBE IN DETAIL HOW THE TWO-MILE CORRIDOR ROUTES WERE DEVELOPED FOR MCPO'S DECEMBER 31, 2012 FILING AS CORRECTED ON JANUARY 2, 2013.

A As I previously noted, the ALJs issued a Case Management Plan on December 14, 2012 that required Staff, MCPO and all other intervenors to identify alternative routes and provide the name and addresses of effective landowners that are not already affected by ATXI's primary and alternative route by December 31, 2012. This only allowed MCPO 18 calendar days during the Christmas and New Year holidays to both develop alternative routes and a complete list of names and addresses of

[4]As with MCPO Exhibit 4.5, the number of residences and non-residential structures was identified for corridors of 150 feet, 300 feet, 600 feet and 1,000 feet.

affected landowners not already affected by either ATXI's primary or alternative route. In response to this directive, Mr. Reinecke and I developed two new alternative route segments to increase the geographical diversity of the transmission line route segment choices available to the Commission for the Pana to Kansas portion of the IRP.

Mr. Reinecke and I conferred with regard to the best way to complete the task with the very limited time that was available. We decided Mr. Reinecke in consultation with myself would develop the two alternative routes for the December 31, 2012 filing using Google Earth by applying our collective experience with regard to weighing the factors that are, in our experience, considered in routing electric transmission lines. Specifically, we applied the factors and criteria that follow in the order of relative weight applied.

- Minimization of a number of apparent residences within 500 feet of the centerline of the right-of-way;
- Minimization of the cost by minimization of overall length and the number of required turning structures;
- Minimization of length not parallel to existing known transmission lines;
- Minimization of length not parallel to existing farm-two-market roads, state highways and US highways;
- Minimization of length not parallel to existing known pipeline right-of-way, existing unimproved two-track roads and existing trails;
- Minimization of length not paralleling section lines or other apparent property and/or cultivation boundaries;
- Minimization of length crossing known parks, recreation areas, wildlife refuges, etc.;
- Minimization of length crossing woodlands; and
- Minimization of length crossing known cultural resources.

In addition, distances were maintained between the potential alternative routes and known airports, airfields and private airstrips. The crossing of residential and non-residential structures was also avoided. Finally, as Mr. Reinecke indicates in his direct testimony, ATXI witness Ms. Donnell Murphy's direct testimony with regard to her routing study was also considered in developing the MCPO alternative routes.

After Mr. Reinecke developed initial centerlines for the two potential alternative route segments, he shared them with myself and MCPO's counsel. My colleagues at BAI (under my direction and supervision) and I reviewed the initial centerlines and provided comments on them by applying our transmission line routing experience. My understanding is that comments were also obtained from MCPO's members based on their first hand knowledge of the area. Based on all these comments, Mr. Reinecke modified the two initial potential alternative routes and then sought additional feedback from myself and MCPO members via MCPO's counsel. This back and forth iteration continued until the centerlines for the two potential alternative route segments settled on those filed by MCPO on December 31, 2012 and January 2, 2013.

Q MCPO'S POTENTIAL ALTERNATIVE ROUTE SEGMENTS ORIGINALLY HAD A CORRIDOR WIDTH OF TWO MILES. PLEASE EXPLAIN HOW THAT WIDTH WAS DETERMINED.

A The very limited time we had available to develop potential alternative roads for the December 31, 2012 filing and our need to rely on Google Earth and the first-hand knowledge of the area of the MCPO members meant that we could only reasonably define the location of the centerline and 150 foot right-of-way of the potential route segment alternatives within a certain band. We knew that, once we had time to

perform a more thorough development of the two potential route segment alternatives using a Geographic Information System ("GIS"), the exact location of the centerline and 150 foot right-of-way of the route segments within the band defined in the December 31, 2012 filing would be refined to better minimize the impact of the two alternative route segments on the public. As a result, Mr. Reinecke and I recommended that the two potential route alternatives to be filed on December 31, 2012 be filed as a centerline with a corridor that includes one mile on each side of the centerline. This would allow centerline adjustments of at least one quarter-section.

B. Refinement of MCPO's Alternative Route Segments

Q PLEASE EXPLAIN IN DETAIL HOW THE REFINED MCPO ALTERNATIVE ROUTE SEGMENTS THAT ARE BEING OFFERED BY MCPO WERE DEVELOPED.

A As Mr. Reinecke discusses in his direct testimony, he developed a detailed GIS database covering the two mile corridors filed by MCPO on December 31, 2012. This was constructed from the GIS database used by ATXI in this proceeding, confidential endangered species and cultural resource information obtained from the appropriate Illinois sources pursuant to the practices governing access to that information, and residence and other structural locations as determined by Mr. Reinecke. As he discusses in his direct testimony, once this database was constructed, Mr. Reinecke further optimized the two alternative route segments. Then, having defined revised alternative routes, Mr. Reinecke performed an aerial reconnaissance (by helicopter) of both revised MCPO alternative route segments. Based on this aerial reconnaissance, he updated his GIS database and made some additional

modifications to the two alternative route segments. Once this was completed, Mr. Reinecke provided Google Earth files for each of the two alternative route segments along with 500 foot corridor routing factors for each of them in the same format as ATXI Exhibit 4.5. My staff and I then checked the Google Earth files versus the routing factor tables produced by Mr. Reinecke and his staff. Confirmed errors were corrected by Mr. Reinecke until he and I had a high degree of confidence with regard to the accuracy of the routing factor tables for the refined version of the two MCPO alternative route segments.

Q DOES THE 500 FOOT CORRIDOR OF THE TWO REFINED MCPO ALTERNATIVE ROUTE SEGMENTS REMAIN WITHIN THE BOUNDS OF THE TWO-MILE WIDE CORRIDORS IDENTIFIED FOR THOSE TWO ALTERNATIVE ROUTES IN MCPO'S DECEMBER 31, 2012 FILINGS AS CORRECTED ON JANUARY 2, 2013?

A Yes, it does.

Q HAVE YOU OR MR. REINECKE PRODUCED ANY OTHER INFORMATION ON THE REFINED VERSION OF THE TWO MCPO ALTERNATIVE ROUTE SEGMENTS?

A Yes. As I previously indicated, Mr. Reinecke in the exhibits to his direct testimony provides detailed maps of the final version of the two MCPO alternative routes similar to those provided in ATXI's original filing in this proceeding for ATXI's filed routes (MCPO Exhibits 2.1 and 2.2). In addition, as I have noted, Mr. Reinecke developed a tabulation with regard to the degree of paralleling of existing linear disturbances both for ATXI's filed route segments for the Pana to Kansas portion of the IRP and the MCPO's two alternative route segments for the Pana to Kansas portion of the IRP

(MCPO Exhibit 2.6). Finally, my colleagues (under my direction and supervision) and I developed cost estimates for the refined version of the two MCPO route segment alternatives (MCPO Exhibit 1.4).

Q PLEASE EXPLAIN HOW YOU DEVELOPED YOUR COST ESTIMATES FOR THE REFINED VERSION OF MCPO'S TWO ALTERNATIVE ROUTE SEGMENTS (MCPO EXHIBIT 1.4).

A Using the filed cost and length estimates given in ATXI Exhibit 3.4 and ATXI's response to Data Request MCPO-ATXI 4.17, along with the turning structure counts and costs provided in ATXI's response to Data Request MCPO-ATXI 3.08, we determined: (i) the average values of percent increases from baseline costs to low, mean, and high costs, (ii) the cost per mile excluding structures, and (iii) the total number of structures per mile. Next, we applied the results of that analysis to the total estimated length and total estimated number of turning structures for the refined version of MCPO's two alternative route segments. This analysis yielded baseline, low, mean, and high cost estimates for both MCPO route alternatives as well as the cost estimates for all nine of the available route segment combinations from Pana to Kansas.

III. Route Selection Criteria

Q WHAT DOES ELECTRIC TRANSMISSION LINE ROUTE SELECTION BY THE COMMISSION IN THE CPCN PROCESS ENTAIL?

A It involves consideration of all aspects of all of the alternative routes that have been filed by the Company, the Commission Staff and intervenors and noticed to affected landowners by the Commission. This examination of the route of the proposed

transmission line project includes, but is not limited to, the examination of the proposed structures for the proposed transmission line, the proposed width of the right-of-way for the proposed transmission line, the proposed span between towers for the line and the areas to be crossed by the proposed transmission line. In addition, factors which reflect cost, public health, safety, reliability, environmental impact, historical and archeological impact, community values and aesthetics are typically considered for each of the alternative routes for the proposed transmission line project.

Q SHOULD GREATER WEIGHT BE PLACED ON CERTAIN FACTORS VERSUS OTHERS?

A Yes. While all factors should be considered, some factors should be given more weight than others. For example, when practicable, it is generally desirable to route new transmission lines very close to existing linear developments such as existing transmission lines, major highways, roads, non-electric transmission line utility corridors, fence lines, cultivation lines and section lines. However, if two hypothetical alternative routes only differed in that one entirely ran along section lines and the other entirely ran along an existing transmission line corridor, it could not be said that the two routes have similar impacts as the existing transmission line corridor route is already impacted by existing transmission line infrastructure while the section line route is much less likely to have been as significantly impacted by existing infrastructure. Thus, all else being equal and provided it does not introduce a valid reliability concern, the route running along the existing transmission line corridor would likely be a much better route for the proposed line than the one that just runs along section lines.

As another example, if two hypothetical routes differed only in that one introduced significant health and safety concerns, but the other introduced significant aesthetic concerns, if a choice had to be made between the two lines, it is likely the route with greater aesthetic impact would be the better choice.

Q WHEN APPLYING GREATER WEIGHT TO CERTAIN FACTORS VERSUS OTHERS, SHOULD THE VIEWS OF THE PUBLIC IN THE GENERAL AREA OF WHERE THE TRANSMISSION LINE PROJECT MAY BE LOCATED BE CONSIDERED?

A In general, yes. This is one of the reasons why transmission line CPCN applicants generally conduct surveys of participants in their public meetings with regard to the routing factors the participants feel are most important. However, when using such information, it is important to understand how the information was collected, assembled and utilized by the CPCN applicant.

Q WHEN WEIGHING THE FACTORS TO BE CONSIDERED, IS IT POSSIBLE THAT SUBSTANTIALLY BETTER PERFORMANCE WITH RESPECT TO ONE FACTOR CAN ULTIMATELY OUTWEIGH INFERIOR PERFORMANCE WITH RESPECT TO ANOTHER FACTOR?

A Yes. A hypothetical example of this would be when one route impacts a relatively small number of residences, but very little of its length runs very close to existing electric transmission line corridors. In such a circumstance, it may be appropriate to select the route that impacts more residences if that route also significantly outperforms the other route in terms of minimizing the portion of its length that does not run along existing transmission line corridors.

Q CAN YOU OFFER AN EXAMPLE OF WHERE THE COMMISSION IN THE CPCN PROCESS HAS SELECTED AN ALTERNATIVE ELECTRIC TRANSMISSION LINE ROUTE THAT WAS OFFERED BY THE COMMISSION STAFF OR AN INTERVENOR RATHER THAN THE CPCN APPLICANT?

A Yes. The Commission in its May 16, 2007 order in Docket No. 06-0179 ("06-0179 Order") selected an alternative route advanced by the Commission Staff and an intervenor in that proceeding over the filed alternative routes of the applicant (06-0179 Order at pages 16-17).

Q DOES THE 06-0179 ORDER OFFER A GOOD EXAMPLE OF ANYTHING ELSE WITH REGARD TO ELECTRIC TRANSMISSION LINE ROUTE SELECTION?

A Yes. The 06-0179 Order also provides a good example of when certain routing factors have been given a greater weight than other routing factors. Specifically, the Commission selected the aforementioned alternative route advanced by the Commission Staff and an intervenor over the alternative routes filed by the applicant in the proceeding because there was a fewer number of residential dwellings within 500 feet of the proposed transmission line when using the route advanced by the Commission Staff and the intervenor. In doing so, the Commission put more weight on minimizing the number of residential dwellings within 500 feet of the proposed transmission line route than minimizing the cost and length of the route for the proposed transmission line. (*Id.*).

Q CAN UNIQUE CIRCUMSTANCES NOT READILY CAPTURED IN ROUTING FACTORS MODIFY THE SELECTION OF A TRANSMISSION LINE ROUTE?

A Yes. I am aware of three examples of such unique circumstances from my experience in Texas. First, in Public Utility Commission of Texas ("PUCT") Docket No. 38290, the iconic beauty and engineering challenges of Palo Duro Canyon (in the Amarillo, Texas area), in conjunction with significantly higher habitable structure counts on another route that avoided Palo Duro Canyon, led to the selection by the PUCT of a significantly more expensive route for the transmission line proposed in that proceeding.

In PUCT Docket No. 38354, a well developed Interstate highway corridor was found to be a more compatible right-of-way for paralleling purposes than the alternative paralleling opportunities that were available. This led to the selection by the PUCT of a route that had significantly higher habitable structure counts within 500 feet than other routes that were available for the transmission line proposed in that proceeding.

Lastly, in PUCT Docket No. 38597, the adverse impact on community values of crossing the Greenbelt multi-use trail system (located in the Dallas-Fort Worth, Texas area), along with both the routing factor performance and the large size of the structures associated with the only crossing of the Greenbelt that would be allowed by the U.S. Army Corps of Engineers, led to the PUCT's selection of a route significantly longer in both total length and length not paralleling existing compatible right-of-way (including apparent property boundaries).

The relevance of these three examples is that they show it is important to consider not just routing factors, but also any significant unique circumstances that may not be captured within those routing factors.

IV. Analysis of Route Alternatives for the Pana to Kansas Portion of the Illinois Rivers Project

A. Available Route Alternatives for Pana to Kansas

Q WHAT ROUTING ALTERNATIVES ARE AVAILABLE TO THE COMMISSION IN THIS PROCEEDING FOR THE PANA TO KANSAS PORTION OF THE IRP?

A As shown on the map presented in MCPO Exhibit 1.1, there are nine practical combinations of filed ATXI and MCPO route segment combinations available. Routing factors and paralleling information for all nine of the route combinations is provided in Mr. Reinecke's MCPO Exhibits 2.4 and 2.6.

The first four of these routes (Routes ATXI-P-P, ATXI-A-P, ATXI-P-A and ATX-A-A) combine either ATXI's primary and alternative route segment from Pana to Mt. Zion with either ATXI's primary or alternative route segment from Mt. Zion to Kansas.

The next two of these routes (Routes MCPO-P-MZK and MCPO-A-MZK) combine either ATXI's primary or alternative route segment from Pana to Mt. Zion with MCPO's alternative route segment from Mt. Zion to Kansas. The electrical configuration of these two route segment combinations is the same as that for the four ATXI route segment combinations.

These are followed by two routes (Routes MCPO-P-PK and MCPO-A-PK) that combine either ATXI's primary or alternative route segment from Pana to Mt. Zion with MCPO's alternative route segment from Pana to Kansas. The electrical configuration of these two route segment combinations is different than that of the four ATXI route segment combinations. Specifically, Route MCPO-P-MZK and Route MCPO-A-MZK use only one, rather than two, 345 kV transmission lines to supply ATXI's proposed Mt. Zion substation. These two route combinations are available to

the Commission because, as I will discuss in detail later in this testimony, ATXI has not reasonably demonstrated there is a need to have two 345 kV transmission lines interconnect with ATXI's proposed Mt. Zion substation.

The last of the nine available route segments combinations (Route MCPO-PK) consists only of MCPO's alternative route segment from Pana to Kansas. This route combination is electrically different than all of the other eight route combinations in that it provides no 345 kV connection to Mt. Zion and replaces ATXI's proposed Mt. Zion substation, Mt. Zion 345/138 kV transformer and one or more Mt. Zion 138 kV lines with either of two other Decatur area 345/138 kV Reinforcements. As I explain latter in detail in this testimony, this route alternative is available for the Pana to Kansas portion of the IRP because ATXI has not reasonably shown the IRP needs to take a large detour to supply Mt. Zion substation on its way from Pana to Kansas. In other words, ATXI has not shown the Mt. Zion substation portion of IRP is necessary.

Q PLEASE EXPLAIN WHY COMBINATIONS USING ATXI'S PRIMARY OR ALTERNATIVE ROUTE SEGMENT FROM MT. ZION TO KANSAS WITH MCPO'S ROUTE SEGMENT FROM PANA TO KANSAS ARE NOT AMONG THE PRACTICAL ROUTE COMBINATION ALTERNATIVES AVAILABLE FOR THE PANA TO KANSAS PORTION OF THE IRP.

A While such combinations would provide a single 345 kV transmission line connection to ATXI's proposed Mt. Zion substation like Routes MCPO-P-PK and MCPO-A-PK, they would backtrack from Kansas to connect to ATXI's proposed Mt. Zion substation. Due to this backtracking and the routing factors for ATXI's filed Mt. Zion to Kansas route segments relative to that of ATXI's filed Pana to Mt. Zion route segments, these two route combinations inherently have significantly poorer routing factors than

Routes MCPO-P-PK and MCPO-A-PK. As a result, Mr. Reinecke and I have not offered them as practical route combination alternatives.

Q HAVE YOU PERFORMED AN ANALYSIS OF THE ROUTING FACTOR CHARACTERISTICS OF THE NINE ROUTE COMBINATIONS THAT ARE AVAILABLE FOR THE PANA TO KANSAS PORTION OF THE IRP?

A Yes. I have done so by examining for each of the nine routes the high sensitivity factors identified by ATXI in its Phase I public meetings, the high sensitivity factors identified by ATXI in its Phase II public meetings, and the paralleling of existing linear features. As a final step, I also reviewed all of the routing factors compiled by Mr. Reinecke in MCPO Exhibits 2.4 and 2.6 for the nine route combinations for the Pana to Kansas portion of the IRP to ensure that the performance of each of the routes in relation to these other routing factors would not cause me to change my initial conclusions that were based on only examining high sensitivity routing factors, estimated cost and the paralleling of existing linear features.

B. Analysis of Phase I High Sensitivity Routing Factors

Q WHAT ARE THE PHASE I HIGH SENSITIVITY ROUTING FACTORS?

A These are six environmental criteria that Ms. Donnell indicates a majority of the attendees to the ATXI Phase I public meetings identified as highly sensitive (ATXI Exhibit 4.0 at 17). They include cemeteries, churches, existing drainage features, prime farmland, residential use areas and schools (*Id.*).

Q DOES MS. DONNELL EXPLAIN IN DETAIL HOW THESE SIX HIGH SENSITIVITY ROUTING FACTORS WERE IDENTIFIED AND WHETHER ANY OF THEM WERE IDENTIFIED TO BE A GREATER IMPORTANT THAN OTHERS TO THE ATTENDEES?

A No. Ms. Donnell describes a process where the attendees were given three colored stickers and asked to place their dots alongside the three criteria they felt were most sensitive to them, as listed on a large display board (*Id.*). She also indicates focused content forms were distributed at both meeting forums and a web-based survey replicating the hard copy comment form was also available (*Id.*). Finally, she indicates attendees had the opportunity to view specific areas within the project area and provide comments at interactive geographic information system stations (*Id.*). However, it is not clear from her testimony whether just the dot placement exercise was relied upon to identify the Phase I High Sensitivity routing factors, or whether that determination was made by combining the results of that exercise with other feedback obtained by ATXI during the Phase I public meetings. Furthermore, it is not clear that whether the dot placement exercise allowed participants to specify which of their three choices was the most sensitive to them. As a result, the Phase I High Sensitivity Routing Factors have to be considered with these limitations in mind.

Q PLEASE EXPLAIN HOW YOU ANALYZED THE NINE AVAILABLE ROUTE COMBINATIONS FOR THE PANA TO KANSAS PORTION OF THE IRP WITH REGARD TO THE PHASE I HIGH SENSITIVITY ROUTING FACTORS.

A I created MCPO Exhibit 1.5 based on the routing factor data Mr. Reinecke presents in MCPO Exhibit 2.4 along with the mean (i.e., average) cost estimates I present in MCPO Exhibit 1.4. MCPO Exhibit 1.5 provides the data for cost and the six Phase I

High Sensitivity routing factors for all nine available route segment combinations for the Pana to Kansas portion of the IRP. Also, while I do not believe route analysis can be reduced to a mathematical exercise, scoring or other mathematical techniques can be useful for initial screening and evaluation. To this end, MCPO Exhibit 1.5 also scores each of the six Phase I high sensitivity routing factors for the nine route combinations.

The scoring was performed by first identifying whether the performance for a routing factor is relatively inferior, relatively average or relatively superior. To do so, the difference for a factor between the best performing route combination and the worst performing route combination is determined. If the performance for that factor for a particular route combination falls between the worst performance and one-third of the difference between the worst and best performance, the performance for that factor for that particular route combination is rated as relatively inferior. If the performance for that factor for a particular route combination falls between one-third of the difference between the worst and best performance and two-thirds of the difference between the worst and best performance, the performance for that factor for that particular route combination is rated as relatively average. Finally, if the performance for that factor for a particular route combination falls between two-thirds of the difference between the worst and best performance and the best performance, the performance for that factor for that particular route combination is rated as relatively superior. Relatively superior performance scores a 1.0. Relatively average performance scores a 2.0. Relatively inferior performance scores a 3.0.

Due to the lack of definitive information from ATXI with regard to whether public meeting attendees favored one of the six highly sensitive routing factors over another, I also performed a simple average of the six high sensitivity factors for each

of the nine routes. I then applied the scores to produce a hypothetical ranking of each route from 1 to 100 where the 1st Rank route segment combination had the lowest (least adverse) average score for the six high sensitivity factors and the 100th Rank route segment combination had the highest (most adverse) average score. This allowed the ranking of the nine routing combinations to reflect just not their relative merit to one another, but also the degree of superiority one route combination has over the others.

Q WHAT ARE YOUR CONCLUSIONS WITH REGARD TO YOUR REVIEW OF THE NINE ROUTE COMBINATIONS IN RELATION TO THE SIX PHASE I ROUTING FACTORS PLUS COST?

A It is clear from MCPO Exhibit 1.5 that Route MCPO-PK is by far the top performer with regard to both the six Phase I high sensitivity routing factors and cost. Only with regard to cemeteries did Route MCPO-PK not have relatively superior performance versus the other eight route segment combinations for the Pana to Kansas portion of the IRP.

How the other eight route combinations fare is bit more difficult to judge at first. In particular, there is a problem with weighing the numbers of streams crossed (as a proxy for adverse impact on existing drainage features) the same as the number of residences impacted. The practical reality is that streams are typically spanned by a transmission line (i.e., the structures supporting the transmission line are typically not placed in the stream or near the banks of the stream) and, as a result, the adverse impact associated with stream crossings is typically limited to any vegetation clearing that might be required at the crossing. This contrasts with

residence impacts which have obvious adverse visual and property value impacts, and may still require vegetation clearing.

To address this situation, I reduced the weighting applied to stream crossings in the average of the six Phase I high sensitivity routing factors by half (i.e., the weighting applied to stream crossings was reduced to half of the weight applied to any of the other five factors). This introduced clarity in that Route MCPO-P-MZK bubbled to the top of the revised average score (at a rank of 51) after Route MCPO-PK (which remained at a rank of 1). However, Route MCPO-P-MZK was closely followed by Routes ATXI-P-A, MCPO-A-MZK and MCPO-A-PK, which all tied at a rank of 60. Upon closer examination of the routing factors themselves, of the four routes (Routes MCPO-P-MZK, ATXI-P-A, MCPO-A-MZK and MCPO-AP-K), I judged Routes ATXI-P-A and MCPO-A-PK to be inferior to Routes MCPO-P-MZK and MCPO-A-MZK.

Q PLEASE EXPLAIN WHY YOU JUDGE ROUTE ATXI-P-A TO BE INFERIOR TO ROUTES MCPO-P-MZK AND MCPO-A-MZK.

A Based on the Phase I high sensitivity routing factors and estimated cost, I judge Route ATXI-P-A to be inferior to Routes MCPO-P-MZK and MCPO-A-MZK for the following reasons:

- Route ATXI-P-A has 18 residences within 150 feet versus 2 to 3 residences for Routes MCPO-P-MZK and MCPO-A-MZK;
- Route ATXI-P-A has 64 residences within 500 feet versus 22 to 33 residences for Routes MCPO-P-MZK and MCPO-A-MZK;
- Route ATXI-P-A impact approximately 110 to 144 (4% to 5%) more acres of Prime Farmland than Routes MCPO-P-MZK and MCPO-A-MZK; and

- The estimated cost of Route ATXI-P-A is approximately $0.9 million (0.4%) greater than that for Route MCPO-P-MZK and is only approximately $10.2 million (4.5%) less than that for Route MCPO-A-PZK.

The only routing factor for which Route ATXI-P-A performs remarkably better than Routes MCPO-P-MZK and MCPO-A-MZK is that for stream crossings (as a proxy for existing drainage features). Specifically, Route ATXI-P-A crosses 12 to 17 (approximately 14% to 19%) fewer streams than Routes MCPO-P-MZK and MCPO-A-MZK. However, Route ATXI-P-A can only accomplish this by introducing much worse adverse impacts on residences. Thus, on a whole, I judge it inferior to Routes MCPO-P-MZK and MCPO-A-MZK with regard to the six Phase I high sensitivity routing factors and estimated cost.

Q PLEASE EXPLAIN WHY YOU JUDGE ROUTE MCPO-A-PK TO BE INFERIOR TO ROUTES MCPO-P-MZK AND MCPO-A-MZK.

A Based on the Phase I high sensitivity routing factors and estimated cost, I judge Route MCPO-A-PK to be inferior to Routes MCPO-P-MZK and MCPO-A-MZK for the following reasons:

- Route MCPO-A-PK has 5 residences within 150 feet versus 2 to 3 residences for Routes MCPO-P-MZK and MCPO-A-MZK;
- Route MCPO-A-PK has one more cemetery within 250 feet than Routes MCPO-P-MZK and MCPO-A-MZK;
- Route MCPO-A-PK crosses 14 to 19 (approximately 13.3% to 19.0%) more streams than Routes MCPO-P-MZK and MCPO-A-MZK; and
- The estimated cost of Route MCPO-A-PK is approximately $16.9 million to $28.0 million (approximately 7.2% to 12.4%) greater than that for Routes MCPO-P-MZK and MCPO-A-PZK.

Q PLEASE SUMMARIZE YOUR CONCLUSIONS FROM EXAMINING THE PHASE I HIGH SENSITIVITY ROUTING FACTORS AND ESTIMATED COST.

A In summary, my conclusion from examining the Phase I high sensitivity routing factors and estimated cost for the nine route combinations available for the Pana to Kansas portion of the IRP, is that Route MCPO-PK is by far the best route and it is followed by Routes MCPO-P-MZK and MCPO-A-MZK.

C. Analysis of Phase II High Sensitivity Routing Factors

Q WHAT ARE THE PHASE II HIGH SENSITIVITY ROUTING FACTORS?

A These are the eight environmental criteria that ATXI indicates the Phase II public meeting process identified as the most sensitive to attendees of those meetings (ATXI Exhibit 4.3 (Part 1 of 5), Page 8 of 12 and ATXI Exhibit 4.3, Appendix C (Part 8 of 9) at Page 5 of 6). They include Agricultural Use Areas (rated by 47% as most sensitive), Existing Residences (rated by 35% as most sensitive), Wooded Areas (rated by 6% as most sensitive), Protected Species Habitat/Location (rated by 3% as most sensitive), Wetlands and Waterways (rated by 2% as most sensitive), Cultural Resources (rated by 2% as most sensitive), Recreational Use Areas (rated by 1% as most sensitive), Sensitive Management Areas (rated by 1% as most sensitive) and Other Areas (rated by 3% as most sensitive) (*Id.*).

Q HOW DID ATXI USE THESE PHASE II SENSITIVE AREA RESULTS?

A ATXI used them in a strange manner. Specifically, ATXI appears to have made the judgment that the results only meant that Wooded Areas needed to be added to the Phase I high sensitivity routing factors (ATXI Exhibit 4.0 at Page 19 and ATXI Exhibit 4.3 (Part 1 of 5) at Pages 7 of 12 through 9 of 12). I say this is strange because the

aforementioned Phase II results do not support raising the minimization of the crossing of Wooded Areas to the same level importance as minimizing the impact on Prime Farmland and Residential Areas since Wooded Areas were only identified by 6% as being most sensitive while Agricultural Use Areas and Existing Residences were each rated by between 35% to 47% as being most sensitive (*Id.*). The real value from this information is that it provides important insight into what the public, in the general area of the IRP, believes should be given the greatest weight with regard to routing factors. This is how I used this information in my analysis.

Q PLEASE EXPLAIN HOW YOU ANALYZED THE NINE AVAILABLE ROUTE COMBINATIONS FOR THE PANA TO KANSAS PORTION OF THE IRP WITH REGARD TO THE PHASE II HIGH SENSITIVITY ROUTING FACTORS.

A I created MCPO Exhibit 1.6 based on the routing factor data Mr. Reinecke presents in MCPO Exhibit 2.4 along with the mean (i.e., average) cost estimates I present in MCPO Exhibit 1.4. MCPO Exhibit 1.6 provides the data for cost and seven of the eight Phase II high sensitivity routing factors for all nine available route segment combinations for the Pana to Kansas portion of the IRP. Sensitive Use Areas, the eighth Phase II high sensitivity routing factor, was not included because it was not clear which of the ATXI Exhibit 4.5 and MCPO Exhibit 2.4 routing factors fit into that category and Sensitive Use Areas were only rated by 1% as most sensitive. For the seven Phase II high sensitivity categories that I did use in my analysis I used the most appropriate ATXI Exhibit 4.5 and MCPO Exhibit 2.4 routing factors that fit the name of the category.

For initial screening and evaluation, like with my MCPO Exhibit 1.5, MCPO Exhibit 1.6 scores each of the seven included Phase II high sensitivity routing factors

for the nine route combinations. The scoring method is the same I used for MCPO Exhibit 1.5 except with regard to developing average scores for the seven included Phase II high sensitivity routing factors. Specifically, since the relative degree of sensitivity expressed for each of the Phase II High Sensitivity routing factors is known, I applied it as a weight in developing a weighted average score for the seven routing factors. Finally, I further averaged these scores based on three different approaches to Agricultural Use Areas.

Q PLEASE EXPLAIN WHY YOU USED THREE DIFFERENT APPROACHES TO AGRICULTURAL USE AREAS.

A I did so for three reasons. First, the term Agricultural Use Areas is vague. Second, Prime Farmland had been identified as the key indicator in this regard in the Phase I public meeting process. Lastly, as Mr. Reinecke notes in his direct testimony, ATXI's routing of the Pana to Kansas portion of the IRP does not appear to place any emphasis on avoiding cultivated fields (MCPO Exhibit 2.0 at Pages 5 through 6). It appears ATXI may largely be relying on its use of monopoles rather than lattice towers for the proposed transmission line to provide impact mitigation in Agricultural Use Areas. Ultimately, I calculated a simple average of the results of the three different methods to determine a final average score for each of the nine alternative routes.

Q WHAT ARE YOUR CONCLUSIONS BASED ON YOUR REVIEW OF THE NINE ROUTE COMBINATIONS WITH REGARD TO THE SEVEN INCLUDED PHASE II ROUTING FACTORS PLUS COST?

A As with my Phase I High Sensitivity routing factor analysis, it is clear from MCPO Exhibit 1.6 that Route MCPO-PK is by far the top performer on whole with regard to both the seven included Phase II high sensitivity routing factors and estimated cost. Only with regard to Wooded Areas and Wetlands/Waterways did Route MCPO-PK not have relatively superior performance versus the other eight route segment combinations for the Pana to Kansas portion of the IRP. Furthermore, even in these areas, the adverse impacts are still generally very small on an absolute basis. Only approximately 6.6%[5] of the acreage of the 500 foot corridor is through Wooded Areas and only approximately 1.2%[6] of the acreage of the 500 foot corridor is through Wetlands and Waterways.

Route MCPO-A-MZK scores next best with a rank of 40 (versus a rank of 1 for Route MCPO-PK). Route MCPO-A-MZK is next followed by Routes MCPO-A-PK (with a rank of 54), MCPO-P-MZK (with a Rank of 58), MCPO-P-PK (with a rank of 62) and ATXI-P-P (with a rank of 63). Interestingly, the scoring method I have used for the Phase II high sensitivity factors ranks Route ATXI-P-P (ATXI's primary route for the Pana to Kansas portion of the IRP) as the best of the four route segment combinations filed by ATXI for the Pana to Kansas portion of the IRP.

[5] 6.6% = 304.1 acres / 4,628.4 acres.
[6] 1.2% = 57.7 acres / 4,628.4 acres.

Q DID YOU REVIEW THE ACTUAL PHASE II ROUTING FACTOR VALUES AND COST ESTIMATE VALUES FOR THE LATTER FOUR ROUTES?

A Yes. In doing so, I found Route MCPO-A-PK to be inferior to Route MCPO-P-MZK despite MCPO-A-PK having a better rank from the scoring (54 versus 58). The cause of this is the difference is in the cost estimates. While Route MCPO-A-PK has only 26 residences within 500 feet versus 33 for Route MCPO-P-MZK, as I noted in the Phase I high sensitivity routing factor discussion, Route MCPO-A-PK has an estimated cost that is $28.0 million (approximately 12.4%) greater than Route MCPO-P-MZK – a premium of approximately $4 million per residence for the reduced number of residences within 500 feet. Beyond this, I found the Phase I high sensitivity routing factor scoring to be consistent with the actual Phase II high sensitivity routing factor values and the cost estimate values. For example, while Route MCPO-P-MZK has an estimated cost that is $2.1 million (approximately 0.9%) greater than poorer scoring Route ATXI-P-P, Route MCPO-P-MZK has 11 fewer residences within 150 feet and 15 fewer residences within 500 feet than Route ATXI-P-P.

Q PLEASE SUMMARIZE YOUR CONCLUSIONS FROM EXAMINING THE PHASE II HIGH SENSITIVITY ROUTING FACTORS AND ESTIMATED COST.

A In summary, my conclusion from examining the Phase II high sensitivity routing factors and estimated cost for the nine route combinations available for the Pana to Kansas portion of the IRP, is that Route MCPO-PK is by far the best route followed by Routes MCPO-A-MZK and then Route MCPO-P-MZK.

D. Analysis of Opportunities for Paralleling of Existing Linear Features

Q HAVE YOU COMPARED THE NINE ALTERNATIVE ROUTES WITH REGARD TO THEIR USE OF OPPORTUNITIES TO CLOSELY PARALLEL EXISTING LINEAR FEATURES?

A Yes. I did so by analyzing the length of each of the nine route combinations that does <u>not</u> closely parallel existing linear features and by working from the most significant type of existing linear features to the least significant type of existing linear features.

Q PLEASE EXPLAIN WHY YOU USE THE LENGTH OF A ROUTE <u>NOT</u> CLOSELY PARALLELING EXISTING LINEAR FEATURES TO MEASURE PERFORMANCE IN REGARD TO THE USE OF SUCH PARALLELING OPPORTUNITIES.

A Using the length of a route closely paralleling a particular type of linear feature or the percentage of the total length of a route closely paralleling a particular type of linear feature can be misleading because the alternative routes under consideration may be significantly different in regard to total length. For example, if we had a route of 200 miles that closely paralleled existing transmission lines for 50% of its length and another alternative route of 100 miles that closely paralleled existing transmission lines for only 25% of its length, it would not be appropriate to say the 200 mile line outperforms the 100 mile line in regard to paralleling existing transmission lines because the 200 mile route would have 100 miles of length that does not parallel existing transmission lines while the 100 mile route would only have 75 miles of length that does not parallel existing transmission lines. By measuring existing linear feature paralleling performance by miles that do not parallel that particular type of linear feature, total line length is removed from the measure and, instead, the focus is

appropriately placed on minimizing the total amount of new transmission line route miles that do not parallel the particular type of linear feature in question.

Q PLEASE EXPLAIN WHY YOU WORKED FROM THE MOST SIGNIFICANT TYPE OF EXISTING LINEAR FEATURE PARALLELING OPPORTUNITY TO THE LEAST SIGNIFICANT LINEAR FEATURE PARALLELING OPPORTUNITY.

A The primary purpose of routing closely parallel to existing linear features is to take advantage of existing significant visual impact, noise impact, environmental fragmentation and/or agricultural fragmentation in order to avoid the introduction of new such impacts where they do not already exist. A secondary purpose is to take advantage of collocation of the proposed transmission line with existing significant linear infrastructure, such as existing transmission lines, in order to mitigate the visual impact of the proposed transmission line.

Not all existing linear features are the same with regard to their degree of visual impact, noise impact, environmental fragmentation and/or agricultural fragmentation. For example, a section line may potentially reflect a cultivation boundary. While there is existing agricultural fragmentation present if the section line in fact reflects a cultivation boundary, that section line does necessarily have any significant existing visual impact, noise impact or environmental fragmentation unless there are other linear features also present where the section line is located. On the other hand, an existing transmission line of the same size or greater than the proposed transmission line provides very significant existing amount of visual impact (from the vertical size and horizontal length of the existing transmission line), noise impact (from corona) and environmental fragmentation (from vegetation management within the existing transmission line's easement). This makes it an ideal opportunity

for close paralleling provided it does not introduce a valid reliability issue. Furthermore, in the right circumstances, an existing transmission line may also provide an opportunity to collocate the transmission circuits of the new transmission line on the structures of the existing transmission line, or vice-versa, to mitigate the visual impact of the proposed transmission line by eliminating the need for two separate transmission lines.

For these reasons, not all linear feature paralleling provides the same benefits, and it is important to work from examining the most significant linear features to examining the least significant linear features when examining how well a proposed transmission line route takes advantage of opportunities to closely parallel existing linear features.

Q PLEASE EXPLAIN YOUR ANALYSIS OF OPPORTUNITIES TO CLOSELY PARALLEL EXISTING LINEAR FEATURES.

A In MCPO Exhibit 2.6, Mr. Reinecke compiled the length of paralleling of existing linear features that could be readily measured for each of the nine route segment combinations available for the Pana to Kansas portion of the IRP. In the compilation he assigned each mile of total route length to one of the following seven categories that are listed in order of significance: Transmission Line, Major Road, Railroad, Utility, Minor Road, Section Lines and Nothing. When a section of length of the route fell into more than one of these categories simultaneously, he assigned that section of length to the most significant category for which that segment of length qualified.

From Mr. Reinecke's MCPO Exhibit 2.6, I created MCPO Exhibit 1.7. In MCPO Exhibit 1.7, I tabulate the length of each route alternative that does <u>not</u> parallel the indicated categories of existing linear features. Then for each existing linear

feature column from left to right I rated each route's relative performance with regard to minimizing the total length of the route that did not closely parallel any of the indicated existing linear features types.

Q PLEASE EXPLAIN WHY YOUR ANALYSIS DID NOT GIVE PREFERENCE TO ROUTING ALONG ROADS AND ROUTING ALONG PROPERTY LINES / SECTION LINES PER THE ATXI PHASE II EXERCISE RESULTS WITH REGARD TO PREFERENCES FOR PARALLELING LINEAR FEATURES (ATXI EXHIBIT 4.3 (PART 1 OF 5) PAGE 8 OF 12 AND ATXI EXHIBIT 4.3 APPENDIX C (PART 8 OF 9) PAGE 6 OF 6).

A Something appears amiss with the paralleling preferences results from the Phase II public meeting exercise for closely paralleling existing linear features. Those results place large emphasis on paralleling roads despite the apparent discussion that took place with regard to the inherent conflict between paralleling existing roadways and minimizing the potential impact to residences since homes are more typically located along roads in rural areas. While existing roads in proportion to their level of development are a significant linear disturbance, they do not involve the same amount of existing impact as existing transmission lines. Furthermore, the Phase II paralleling preference exercise results do not differentiate between type of road. For these reasons, I put more weight on my transmission line routing experience with regard to utilizing paralleling opportunities rather than the results from the Phase II paralleling opportunity exercise.

Q WHAT ARE YOUR CONCLUSIONS WITH REGARD TO YOUR REVIEW OF THE NINE ROUTE COMBINATIONS WITH REGARD TO THEIR USE OF PARALLELING OPPORTUNITIES?

A My analysis of Phase I high sensitivity routing factors, Phase II high sensitivity routing factors, and cost estimates led me to conclude that Routes MCPO-PK, MCPO-A-MZK and MCPO-P-MZK are the best performing MCPO routes and Routes ATXI-P-P and ATXI-P-A are the best performing of the ATXI routes. As a result, I focused by examination of paralleling on these five routes. As shown in MCPO Exhibit 1.7, of these five routes, Routes MCPO-PK, MCPO-P-MZK, ATXI-P-P and ATXI-P-A all exhibit relatively superior performance with regard to minimizing the portion of their length that does not parallel existing transmission lines, Major Roads, Railroad, Minor Roads and utility right-of-way. The only major differentiation in these categories of more significant existing linear features is that Routes ATXI-P-P and ATXI-P-A have approximately 10 fewer miles paralleling existing transmission lines than Routes MCPO-PK and MCPO-P-MZK. Offsetting this to a degree is the greater paralleling of section lines by Routes ATXI-P-P and ATXI-P-A such that the total length of these two routes not paralleling identified existing linear features is approximately 13.8 to 17.4 miles less than for Routes MCPO-PK and MCPO-P-MZK. However, the additional total paralleling of existing linear features by Routes ATXI-P-P and ATXI-P-A that is facilitated by heavy additional paralleling of section lines comes at a heavy cost with regard to adverse residence impacts.

Specifically, as shown in MCPO Exhibits 1.5 and 1.6, Routes MCPO-PK and MCPO-P-MZK only each place 2 to 3 residences within 150 feet of the proposed transmission line. On the other hand, Routes ATXI-P-P and ATXI-P-A each place between 13 to 18 residences within 150 feet of the proposed transmission line.

Furthermore, this cost in residence impacts also holds true further away from the proposed transmission line. Routes ATXI-P-P and ATXI-P-A each place between 48 and 64 residences within 500 feet of the proposed transmission line while Routes MCPO-PK and MCPO-P-MZK each only place between 17 to 33 residences within 500 feet of the proposed transmission line.

Q IS THE ADDITIONAL PARALLELING OF SECTION LINES BY ROUTES ATXI-P-P AND ATXI-P-A WORTH THE COST IN RESIDENCE IMPACTS?

A No. At best, section lines by themselves represent property boundaries and/or cultivation boundaries. There is no significant existing visual impact, noise impact and/or environmental fragmentation associated with them. Thus, the significant additional adverse impact on residences is not justified by the additional paralleling of section lines by these two routes and the additional paralleling opportunity benefits by associated with the additional paralleling of section lines by these two transmission routes is on a net basis meaningless.

E. Final Routing Analysis Conclusions

Q PLEASE SUMMARIZE THE COMBINED RESULTS OF YOUR ANALYSIS OF PHASE I HIGH SENSITIVITY ROUTING FACTORS, PHASE II HIGH SENSITIVITY ROUTING FACTORS, COST ESTIMATES AND PARALLELING OPPORTUNITIES.

A The combined results of these analyses show that Route MCPO-PK is by far the least adverse impact route alternative available for the Pana to Kansas portion of the IRP. It has the best performance with regard to the Phase I high sensitivity factor routing factors, Phase II high sensitivity routing factors and estimated cost. With regard to opportunities to parallel existing linear features, it is comparable to any other route in

relation to minimizing the length of the route that does not parallel any existing transmission lines, major roads, railroads, minor roads or utility right-of-way. Furthermore, while Routes ATXI-P-P and ATXI-P-A make greater use of section line paralleling than Route MCPO-PK, they do so at a substantial cost in residence impacts. The only condition with regard to Route MCPO-PK is that it can only be used if it is determined that ATXI's proposed Mt. Zion substation and associated 345/138 kV transformer are not necessary. As I noted earlier, I will address this later in my testimony.

Q IN THE EVENT THE COMMISSION DETERMINES ATXI'S PROPOSED MT. ZION SUBSTATION AND ASSOCIATED 345/138 KV TRANSFORMER ARE NECESSARY, WHAT ARE THE NEXT BEST ROUTES?

A My analysis of Phase I high sensitivity routing factors, Phase II high sensitivity routing factors and estimated cost show that Routes MCPO-P-MZK and MCPO-A-MZK have the next least adverse impact of the nine route alternatives (including ATXI's four filed route alternatives) after Route MCPO-PK. Both of these routes provide the same electrical configuration for the Pana to Kansas portion of the IRP as ATXI's four filed routes, but have less adverse impact than ATXI's four filed routes. Like Route MCPO-PK, Route MCPO-P-MZK is comparable to any other route with regard to minimizing the length of the route that does not parallel existing any transmission lines, major roads, railroads, minor roads or utility right-of-way. Furthermore, while Routes ATXI-P-P and ATXI-P-A make greater use of section line paralleling than Route MCPO-P-MZK, they do so at a substantial increase in adverse residence impacts.

The choice between Route MCPO-P-MZK and Route MCPO-A-MZK is principally one of estimated cost and better use of significant paralleling opportunities versus lower residence impacts. Versus Route MCPO-A-MZK, Route MCPO-P-MZK has an estimated cost that is $11.1 million (approximately 4.7%) lower, 24.5 (approximately 26.3%) fewer miles not parallel existing transmission lines and 14.6 (approximately 19.5%) fewer miles not parallel to any existing transmission lines, major roads, railroads, minor roads or utility right-of-way. However, as shown in MCPO Exhibits 1.5 and 1.6, Route MCPO-A-MZK places five (5) (approximately 29.4%) fewer residences within 300 feet of the proposed transmission line and 11 (approximately 33.3%) fewer residences within 500 feet of the proposed transmission line. Either of these routes is a good selection after Route MCPO-PK. However, if I had to choose one, I would select Route MCPO-P-MZK over Route MCPO-A-MZK because in my opinion the residence impact benefit of MCPO-A-MZK over MCPO-P-MZK just falls short of the justifying the additional cost and loss of significant linear feature paralleling opportunities afforded by Route MCPO-P-MZK versus Route MCPO-A-MZK.

Q HAVE YOU REVIEWED ALL OF THE ROUTING FACTORS PRESENTED IN MCPO EXHIBIT 2.4 FOR THE NINE ROUTE ALTERNATIVE AVAILABLE FOR THE PANA TO KANSAS PORTION OF THE IRP?

A Yes.

Q DOES YOUR REVIEW OF THOSE ROUTING FACTORS GIVE YOU ANY REASON TO CHANGE THE CONCLUSIONS YOU HAVE JUST GIVEN?

A No. My review of all of the MCPO Exhibit 2.4 routing factors does not lead me to any different conclusions than the ones I have just given.

Q EARLIER YOU GENERICALLY TESTIFIED WITH REGARD TO UNIQUE CIRCUMSTANCES THAT MIGHT LEAD TO THE SELECTION OF A ROUTE DIFFERENT THAN MIGHT BE CONCLUDED FROM REVIEWING ROUTING FACTORS ALONE. ARE YOU AWARE OF ANY SUCH UNIQUE CIRCUMSTANCES IN THIS PROCEEDING WITH REGARD TO THE PANA TO KANSAS PORTION OF THE IRP THAT WOULD CHANGE THE CONCLUSIONS YOU HAVE JUST GIVEN?

A No.

V. Need for ATXI's Mt. Zion Substation

A. Relevance of the Need for ATXI's Proposed Mt. Zion Substation

Q PLEASE DESCRIBE THE MT. ZION PORTION OF THE IRP.

A The Mt. Zion portion of the IRP consists of ATXI's proposed Mt. Zion 345/138 kV substation and its associated 345/138 kV transformer. It would be located on the southeast edge of the Decatur, Illinois area and be interconnected with AIC's 138 kV facilities on the southeast side of the Decatur area by one or more new 138 kV transmission lines. These new 138 kV transmission lines are not part of the CPCN in this proceeding. The Mt. Zion 345/138 kV transformer and the new 138 kV transmission lines would provide a new source of power to the AIC 138 kV system in the Decatur area. However, the new source of power could instead be provided by

adding a 3rd 345/138 kV transformer at Oreana substation along with a 3rd Oreana to ADM North 138 kV single-circuit transmission line on the northeast side of the Decatur area.

Q PLEASE EXPLAIN THE RELEVANCE OF THE MT. ZION PORTION OF THE IRP TO THE OVERALL PANA TO KANSAS PORTION OF THE IRP.

A The relevance of the Mt. Zion portion of the IRP to the overall Pana to Kansas portion of the IRP is that it requires a very large detour to the north from the direct path from Pana to Kansas. This is best illustrated by examining the routing factor information, for the nine route segment combinations for the Pana to Kansas portion of the IRP in my MCPO Exhibit 1.6 and Mr. Reinecke's MCPO Exhibit 2.4.

As MCPO Exhibit 2.4 shows, all eight of the route segment combinations available for the Pana to Kansas portion of the IRP that include ATXI's proposed Mt. Zion substation are 25.4 miles (33.2%) to 38.6 miles (50.5%) longer in total length than the one route combination that does not include ATXI's proposed Mt. Zion substation (Route MCPO-PK). As a result, as shown in MCPO Exhibit 1.6, the route that does not include the proposed Mt. Zion substation (Route MCPO-PK) has an estimated cost that is $55.2 million (24.8%) to $85.3 million (33.7%) lower than the eight route combination alternatives that do include the Mt. Zion substation. In addition, as I have discussed earlier in my testimony, Route MCPO-PK is by far the best of the nine route segment combinations available for the Pana to Kansas portion of the IRP with regard to the Phase I and Phase II high sensitivity routing factors identified by ATXI. As a result, it is very important to determine in this proceeding whether ATXI's proposed Mt. Zion substation and its associated 345/138 kV transformer is needed. For if it is not, or it can be reasonably replaced by other

345/138 kV Reinforcements in the Decatur area, the Pana to Kansas portion of the IRP could be completed at a substantially lower cost and impact to the public by utilizing Route MCPO-PK, which does not include ATXI's proposed Mt. Zion substation.

Q ON WHAT BASIS IS ATXI JUSTIFYING THE NEED FOR ITS PROPOSED MT. ZION SUBSTATION AND ASSOCIATED 345/138 KV TRANSFORMER?

A ATXI witness Mr. Dennis Kramer indicates ATXI's Mt. Zion substation and associated 345/138 kV transformer will provide an additional source to serve load in the Decatur, Illinois area. ATXI asserts the new substation will relieve loading on existing transmission facilities and enhance reliability in the Decatur area by providing transmission support for certain multiple contingency events. ATXI also claims this will reduce exposure to dropping large amounts of customer load due to low voltage conditions (ATXI Exhibit 2.0 at page 23 of 29).

Q DID ATXI PRESENT ANY ANALYSIS OF THE DECATUR AREA TRANSMISSION RELIABILITY NEEDS THAT IT CLAIMS JUSTIFIES THE NEED FOR ATXI'S PROPOSED MT. ZION SUBSTATION?

A Yes. In his direct testimony, Mr. Kramer provided the results from some powerflow (a/k/a loadflow) analysis with and without the IRP. In response to Data Request MCPO-ATXI-1 a. and b., ATXI clarified the specific powerflow analysis and reliability concerns it believes justify the need for the Mt. Zion substation portion of the IRP. Specifically, ATXI identified one transmission circuit overload issue and two low voltage concerns which ATXI believes justifies the Mt. Zion substation part of the IRP.

B. Decatur Area 138 kV Overload Issue

Q PLEASE EXPLAIN THE TRANSMISSION CIRCUIT OVERLOAD ISSUE THAT ATXI BELIEVES JUSTIFIES THE MT. ZION SUBSTATION PART OF THE IRP.

A As documented in ATXI Exhibits 2.10 and 2.11, under forecasted 2021 summer peak load conditions, following the North American Electric Reliability Corporation ("NERC") Category C Event[7] of loss of the Clinton to Brokaw and Latham to Oreana 345 kV transmission circuits, ATXI found in its powerflow analysis that the following transmission elements were loaded above 100% of their emergency rating with none of the IRP in-service:

- Oreana 345/138 kV Transformer #1
- Oreana 345/138 kV Transformer #2
- Oreana to ADM North 138 kV Circuit
- ADM North to Caterpillar 138 kV Circuit
- Caterpillar to 27th Street 138 kV Circuit
- Rising 345/138 kV Transformer

(ATXI Exhibit 2.0 at page 28 of 29, ATXI Exhibit 2.10 and ATXI 2.11)

All of the overloaded transmission elements except the Rising 345/138 kV transformer are located in the Decatur area. The Rising 345/138 kV transformer is located in the Champaign, Illinois area.

When ATXI reran its powerflow analysis with all portions of the IRP in-service, all of the above overloads, except those for the ADM North to Caterpillar and Caterpillar to 27th Street 138 kV transmission circuits, were eliminated and the

[7] A NERC Category C Event is a multiple contingency event involving loss of two or more Bulk Electric System Elements. ATXI and AIC are required to design their integrated transmission system to withstand NERC Category C Events pursuant to the requirements Table 1 of NERC Reliability Standard TPL-003-0a (ATXI 2.2 at page 4 of 8).

overload of the two transmission circuits whose overloads were not eliminated were reduced to 105.1% or less of emergency rating.

Q DOES THIS ANALYSIS SHOW ATXI'S PROPOSED MT. ZION SUBSTATION IS NECESSARY TO ADDRESS THE IDENTIFIED POST-EVENT TRANSMISSION OVERLOADS?

A No. It shows the IRP as a whole reasonably addresses the identified post-Event transmission overloads. It does not show that ATXI's proposed Mt. Zion substation needs to be part of the IRP in order for the IRP to address the identified transmission element overloads.

Q HAVE YOU PERFORMED ANY POWERFLOW ANALYSIS OF YOUR OWN TO DETERMINE WHETHER ATXI'S PROPOSED MT. ZION SUBSTATION IS NECESSARY TO ADDRESS THE IDENTIFIED POST-EVENT TRANSMISSION ELEMENT OVERLOADS?

A Yes. In response to Data Requests MCPO-ATXI 1.03 and MCPO-ATXI 1.04, ATXI provided a copy of the Siemens PSS/E powerflow models that it used to perform the powerflow analysis presented in Mr. Kramer's direct testimony. Using the model for forecasted 2021 summer peak load conditions, I performed powerflow runs of the NERC Category C Event loss of the Clinton to Brokaw and Latham to Oreana 345 kV circuits: (i) without the IRP, (ii) with the IRP in-service with ATXI's proposed Mt. Zion substation and (iii) with the IRP in-service without ATXI's proposed Mt. Zion substation.

Q WHAT DID YOUR POWERFLOW ANALYSIS OF THE DECATUR AREA OVERLOAD ISSUE SHOW?

A As documented in MCPO Exhibits 1.8 and 1.9, I was able to reproduce ATXI's results without the IRP and with the IRP in-service with ATXI's proposed Mt. Zion substation. In addition, as documented in MCPO Exhibit 1.10, I found that with the IRP in-service <u>without</u> ATXI's proposed Mt. Zion substation, the transmission elements overloads were still fully resolved and, in fact, were lower than when ATXI's proposed Mt. Zion substation was included. This shows ATXI's proposed Mt. Zion substation is <u>not</u> needed to address the Decatur area overload issue. No 345/138 kV Reinforcements in the Decatur area are needed. The issue can be fully resolved with the non-Mt. Zion substation portions of the IRP alone.

Q YOUR CONCLUSION MAY SEEM COUNTERINTUITIVE TO SOME OBSERVERS. CAN YOU PLEASE EXPLAIN WHY YOUR RESULTS OCCUR?

A Yes. The cause of the results is related to the fact that the overloads in question are not primarily driven by the load in the Decatur area. As shown in ATXI Exhibit 2.11 at page 1 of 3, when the Clinton to Brokaw and Latham to Oreana 345 kV circuits are lost, two of the principal 345 kV transmission paths for the output of the Clinton nuclear generation plant are lost causing the output of the Clinton plant to automatically redistribute itself over the remaining transmission paths roughly in inverse proportion to the impedance of those paths. Without the non-Mt. Zion portion of the IRP in-service, two of the principal remaining transmission paths are the Oreana 345/138 kV transformers (along with the underlying 138 kV transmission circuits between Oreana and Latham in the Decatur area) and the Rising 345/138 kV transformer. The addition of Rising to Sidney 345 kV transmission line portion of the

IRP addresses the 345/138 kV and 138 kV parallel flow overload issue by adding an additional 345 kV transmission path for the output of the Clinton plant by connecting the Rising 345 kV substation directly to the Sidney 345 kV substation in the Champaign area. ATXI's Mt. Zion substation does nothing to address the line overload issue because it neither adds a significant additional transmission path for the output of the Clinton plant nor increases the impedance of the transmission path that runs down the Oreana 345/138 kV transformers and through the 138 kV transmission circuits in Decatur between Oreana and Latham substations. Thus, my results are not counterintuitive at all.

C. Decatur Area Low Voltage Issue

Q PLEASE EXPLAIN THE LOW VOLTAGE ISSUE THAT ATXI BELIEVES JUSTIFIES THE MT. ZION SUBSTATION PORTION OF THE IRP.

A As documented in ATXI Exhibits 2.13 and 2.14, under forecasted 2021 summer peak load conditions, following either the NERC Category C Event of loss of both Oreana 345/138 kV transformers or the NERC Category C Event loss of both Oreana to ADM North 138 kV transmission circuits, ATXI's powerflow analysis shows many substations on the Decatur area 138 kV system with post-Event voltages well below 95% (or 0.95 per unit) of nominal voltage (i.e., 138 kV)[8] with the IRP not in-service. As is also documented in ATXI Exhibits 2.13 and 2.14, with the IRP in-service (including ATXI's proposed Mt. Zion substation), ATXI's powerflow analysis shows the post-Event voltages at the Decatur area 138 kV substations are raised above 95% of

[8]ATXI and AIC consider post-Event voltages below 95% of nominal voltage to be an indication of a possible deficiency. They also consider conditions which result in 86% to 89% of nominal voltage in steady-state analysis to carry significant risk for voltage collapse. They also believe 85% of nominal is the level at which voltage collapse is essentially assured (ATXI Exhibit 2.0 at page 8 of 29).

nominal voltage. Thus, ATXI's powerflow analysis shows the IRP (including ATXI's proposed Mt. Zion substation) can address the low voltage issue.

Q DOES THIS SHOW ATXI'S PROPOSED SUBSTATION IS NECESSARY TO ADDRESS THE LOW VOLTAGE ISSUE IN THE DECATUR AREA?

A No. It only shows the IRP with ATXI's Mt. Zion substation can address the low voltage issue. It does not demonstrate that ATXI's proposed Mt. Zion substation is needed to address the issue.

Q HAVE YOU PERFORMED ANY POWERFLOW ANALYSIS OF YOUR OWN TO DETERMINE WHETHER ATXI'S PROPOSED MT. ZION SUBSTATION IS NECESSARY TO ADDRESS THE LOW VOLTAGE ISSUE IN THE DECATUR AREA?

A Yes. Using ATXI's powerflow models for forecasted 2021 summer peak load conditions, I performed powerflow runs for each of the two NERC Category C Events triggering the low voltage issue: (i) without the IRP in-service, (ii) with the IRP in-service with ATXI's proposed Mt. Zion substation and (iii) with IRP in-service <u>without</u> ATXI's proposed Mt. Zion substation.

Q WHAT DID YOUR POWERFLOW ANALYSIS OF THE LOW VOLTAGE ISSUE SHOW?

A As documented in MCPO Exhibits 1.11, 1.12, 1.13 and 1.14, I was able to reproduce ATXI's results both without the IRP and with the IRP in-service with ATXI's proposed Mt. Zion substation. In addition, as documented in MCPO Exhibits 1.15 and 1.16, I

found that, with the IRP in-service without ATXI's proposed Mt. Zion substation, the low voltage problem in the Decatur area could not be addressed.

Q DOES THIS SHOW THAT ATXI'S PROPOSED MT. ZION SUBSTATION IS NECESSARY IN ORDER FOR THE IRP TO BE ABLE TO ADDRESS THE LOW VOLTAGE ISSUE IN THE DECATUR AREA?

A No. It shows the non-Mt. Zion portions of the IRP cannot address the low voltage issue in the Decatur area unless 345 kV and/or 138 kV Reinforcements are also added that are sufficient to adequately address the low voltage problem. ATXI's proposed Mt. Zion substation is an example of such a possible 345 kV/138 kV Reinforcement. However, as I have discussed in my testimony above, the use of that option greatly increases the cost and adverse impact to the public of the Pana to Kansas portion of the IRP. This is because of the large detour from the direct path from Pana to Kansas that is necessary to serve ATXI's proposed Mt. Zion substation via 345 kV facilities from Pana and Kansas. Other 345 kV and/or 138 kV transmission Reinforcements in the Decatur area may be sufficient to adequately address the low voltage issue in place of ATXI's proposed Mt. Zion substation and do so, in conjunction with a direct transmission line route from Pana to Kansas such as Route MCPO-PK, at a substantially lower cost and adverse impact to the public.

D. Oreana 345/138 kV Reinforcement
Alternative to ATXI's Proposed Mt. Zion Substation

Q HAVE YOU BEEN ABLE TO IDENTIFY AN ALTERNATIVE 345/138 KV REINFORCEMENT IN THE DECATUR AREA THAT IS SUFFICIENT TO ADEQUATELY ADDRESS THE LOW VOLTAGE ISSUE IN PLACE OF ATXI'S PROPOSED MT. ZION SUBSTATION?

A Yes. I have identified the alternative of adding a 3rd Oreana 345/138 kV transformer and a 3rd Oreana to ADM North 138 kV single-circuit transmission line. Collectively, I will refer these two additions to the existing Decatur 138 kV system as the "Oreana 345/138 kV Reinforcement."

Q PLEASE EXPLAIN HOW YOU DEVELOPED THIS ALTERNATIVE TO ATXI'S PROPOSED MT. ZION SUBSTATION.

A I developed the alternative to directly attack the two NERC Category C Events which trigger the low voltage concern by adding a third path from the 345 kV system at Oreana to ADM North substation such that, if either both existing Oreana 345/138 kV transformers were lost or both existing 138 kV transmission lines from Oreana to ADM North were lost, there would still be a 345 kV source supplying ADM North 138 kV substation (and the rest of northeastern Decatur) from Oreana. The cost for the Oreana 345/138 kV Reinforcement should be readily covered by (i) the $55.2 million cost savings of using Route MCPO-PK in place of ATXI's primary route for the Pana to Kansas portion of the IRP (Route ATXI-P-P), (ii) the $17.8 million that would be avoided by not constructing Mt. Zion substation (and its associated 345/138 kV transformer) (ATXI Exhibit 3.4) and (iii) the $4 million to $8 million

avoided cost[9] of the one or more 138 kV transmission lines of approximately 2 miles in length that would be needed to connect ATXI's proposed Mt. Zion substation with AIC's existing 138 kV facilities at Mt. Zion PPG substation (ATXI Exhibit 4.10 (Part 5 of 5)).

Q HAVE YOU PERFORMED ANY POWERFLOW ANALYSIS TO CONFIRM YOUR PROPOSED OREANA 345/138 KV REINFORCEMENT ADEQUATELY ADDRESS THE LOW VOLTAGE ISSUE IN THE DECATUR AREA?

A Yes. Under ATXI's forecasted 2021 summer peak load conditions, with the IRP in-service without ATXI's proposed Mt. Zion substation, but with my proposed Oreana 345/138 kV Reinforcement in place, I performed powerflow runs for the two NERC Category C Events associated with the low voltage concern. These results are shown in MCPO Exhibits 1.17 and 1.18. Furthermore, as can be seen from MCPO Exhibits 1.19 and 1.20, not only does the Oreana 345/138 kV Reinforcement adequately address the low voltage concern, it actually yields higher post-Event 138 kV substation voltages in the Decatur area than ATXI's Mt. Zion substation alternative. Specifically, these exhibits show the IRP with ATXI's proposed Mt. Zion substation, the post-Event voltages at ADM North, 27th Street Caterpillar and Faries Parkway 138 kV substations were between 96.4% and 97.4% of nominal. These same exhibits show the powerflow runs with the IRP in-service, with the Oreana 345/138 kV Reinforcement in place of Mt. Zion substation, the post-Event voltages at these four substations are all above 97.5% of nominal. These are actually better results than are produced by ATXI's proposed Mt. Zion substation.

[9] Assuming $2 million per mile using 138 kV single-circuit steel monopoles.

Q PLEASE EXPLAIN WHY BETTER RESULTS ARE PRODUCED BY THE OREANA 345/138 KV REINFORCEMENT THAN ATXI'S PROPOSED MT. ZION SUBSTATION.

A The reason is post-Event voltage drops in the Decatur area are driven by reactive power needs and reactive power cannot be practically transmitted very far from its source. One of the largest reactive power needs in the Decatur area is in the substations located in northeastern Decatur. Adding a new source from a 345 kV transmission backbone on the southeast edge of Decatur, as proposed ATXI, does not provide reactive power support near where it is most needed. Adding another source of reactive power from the 345 kV transmission backbone on the northeast edge of Decatur, as the Oreana 345/138 kV Reinforcement would do, provides that support much closer to where it is needed.

Q DOES THE OREANA 345/138 KV REINFORCEMENT HAVE ANY DIFFERENT IMPACT ON ADDRESSING THE DECATUR AREA OVERLOAD ISSUE THAN ATXI'S MT. ZION SUBSTATION ALTERNATIVE?

A Yes, there is a small difference. In MCPO Exhibit 1.21, I present the results of a powerflow run I performed under forecasted 2021 summer peak load conditions for the NERC Category C Event of loss of the Clinton to Brokaw and Latham to Oreana 345 kV transmission circuits with the Oreana 345/138 kV Reinforcement in place along with the non-Mt. Zion substation portions of the IRP. When compared to the results with the IRP in-service with ATXI's proposed Mt. Zion substation (MCPO Exhibit 1.9), the post-Event power flows on the Oreana to Caterpillar and Caterpillar to 27th Street 138 kV transmission circuits with the non-Mt. Zion portions of the IRP in-service with together the Oreana 345/138 kV Reinforcement are a bit higher. This

can be attributed to the Oreana 345/138 kV Reinforcements reducing the impedance on the ADM North to Caterpillar to 27th Street 138 kV transmission path in the Decatur area between the Oreana 345 kV substation and the Latham 345 kV substation.

Q IS THE INCREASE IN POST-EVENT POWER FLOWS ON THE DECATUR AREA 138 KV TRANSMISSION CIRCUITS A SIGNIFICANT PROBLEM?

A No. It is readily resolved by adding a modest-sized device known as a power flow control reactor[10] in series with the ADM North to Caterpillar to 27th Street 138 kV transmission circuit path in either the 27th Street, Caterpillar or ADM North 138 kV substation. This device would increase the impedance of this 138 kV transmission path in the Decatur area between the Oreana and Latham 345 kV substations such that it lowers the post-Event power flows on this 138 kV path down to the same levels that would be expected from the IRP with ATXI's Mt. Zion substation.

Exhibit MCPO Exhibit 1.22 includes a copy of a brochure on air-core reactors from the Trench Group. The Trench Group is a manufacturer of air-core reactors that can be used for power flow control applications for transmission circuits up to 800 kV in rating. Exhibit MCPO Exhibit 1.23 is a Cigré White Paper from 2004 describing power flow control reactors and an application of them in Europe. In MCPO Exhibit 1.24, I present the results of a revised powerflow run with the Oreana 345/138 kV Reinforcement along with the non-Mt. Zion substation portions of the IRP and a 0.825 Ohm (at 60 Hertz) power flow control reactor installed in series with the Caterpillar to 27th Street 138 kV transmission circuit either in Caterpillar or 27th Street substation. The results show the same or lower post-Event powerflows on the

[10]Power Flow Control Reactors are large air-core wound inductors (essentially large coils of conductors) that are placed in substations in series with transmission circuits in order to rebalance powerflows between those transmission circuits and other parallel transmission circuits.

Oreana to Caterpillar to 27th Street 138 kV transmission path as those that result from the IRP with ATXI's proposed Mt. Zion substation in MCPO Exhibit 1.9. The installed cost of such a power flow control reactor would likely be less than $10 million and should be readily accommodated by the $55.2 million savings provided by using Route MCPO-PK instead of ATXI's preferred route (Route ATXI-P-P).

Q WOULD THE POWER FLOW REACTOR ADDITION ADVERSELY AFFECT THE ABILITY OF THE OREANA 345/138 KV REINFORCEMENT TO ADDRESS THE LOW VOLTAGE ISSUE IN THE DECATUR AREA?

A No. In MCPO Exhibits 1.25 and 1.26, the results of powerflow runs I performed with the Oreana 345/138 kV Reinforcement, the non-Mt. Zion portion of the IRP and the power flow control reactor in-service for the loss of both existing Oreana 345/128 kV transformers event and loss of both Oreana to ADM North 138 kV transmission circuits event are presented. The exhibits show the Decatur area post-Event voltages remain above 97.5% of nominal with the power flow control reactor in series with the ADM North to Caterpillar to 27th Street 138 kV transmission path.

Q IS IT FEASIBLE TO PLACE A 3RD 345/138 KV TRANSFORMER IN OREANA SUBSTATION?

A Yes. In its supplemental response to Data Request MCPO-ATXI 8.06 (identified by ATXI as its response to MCPO-ATXI 8.06S), ATXI indicated analysis would be needed to determine whether it would introduce any transmission element overloads or fault duty issues on the existing transmission system. It also claimed previous studies showed a 345/138 kV transformer at Oreana substation will not raise the post-contingency voltages to acceptable levels in the Decatur area. However, ATXI

did not cite any other constraints that preclude such a transformer addition. Furthermore, between the additional powerflow analysis I performed with the Oreana 345/138 kV Reinforcement for the Decatur area 138 kV overload issue and the additional powerflow analysis I will present later in this testimony, I have found no evidence of transmission element overload issues being introduced by adding the Oreana 345/138 kV Reinforcement that cannot be resolved by installing a power flow control reactor in series with the ADM North to Caterpillar to 27th Street 138 kV transmission path.

Q WHAT ABOUT THE FAULT DUTY ISSUES ATXI MENTIONED?

A With regard to fault duty, while the addition of a 3rd Oreana 345/138 kV transformer would increase short circuit current in the Oreana 138 kV switchyard, that does not mean it will necessarily exceed the fault duty of the existing 138 kV circuit breakers in that switchyard. In addition, even if it did exceed the fault duty of some of the existing 138 kV circuit breakers, the $55.2 million savings from using Route MCPO-PK versus the cheapest route alternative available to support ATXI's proposed Mt. Zion substation (Route ATXI-P-P) provides plenty of headroom in cost savings to fund new 138 kV circuit breakers or other equipment where needed due to the greater amount of fault duty that may be required.

Q WHAT ABOUT ATXI'S CLAIMS THAT ITS PREVIOUS STUDIES SHOW A 3RD OREANA 345/138 KV TRANSFORMER IS NOT SUFFICIENT TO ADDRESS LOW VOLTAGE ISSUES IN THE DECATUR AREA?

A With regard to ATXI's claims regarding previous studies, those results may be correct for just adding a 3rd Oreana 345/138 kV transformer at Oreana (due to it not resolving

the NERC Category C Event of loss of both existing Oreana to ADM North 138 kV circuits), but that is not what I am proposing. I am proposing both a 3rd Oreana 345/138 kV transformer and a 3rd Oreana to ADM North 138 kV single-circuit transmission line. As I have shown in my testimony above, this combination, the "Oreana 345/138 kV Reinforcement," will fully resolve the Decatur area low voltage issue. Therefore, considering all of the above, the addition of a 3rd Oreana 345/138 kV transformer is feasible.

Q PLEASE DESCRIBE HOW A 3RD SINGLE-CIRCUIT 138 KV TRANSMISSION LINE COULD BE ADDED BETWEEN OREANA AND ADM NORTH SUBSTATION.

A It could potentially be added closely in parallel to the existing east or west single-circuit 138 kV transmission lines between Oreana and ADM North substation. Exhibit MCPO Exhibit 1.27 provides a Google Earth map showing the two existing 138 kV lines. As can be seen in that exhibit, there is generally space in the existing adjacent fields to accommodate the new line on the east side of the existing east 138 kV line provided the required easements are acquired.

Regardless, consistent with ATXI's and AIC's approach with respect to the one or more 2-mile long 138 kV transmission lines that would be needed to connect ATXI's proposed Mt. Zion substation to AIC's existing 138 kV transmission facilities near the Mt. Zion PPG substation, ATXI and AIC can pursue the specific routing and approvals for a new Oreana to ADM North 138 kV line after the Commission selects the routes for the IRP in this proceeding.

Q WHAT MIGHT SUCH A NEW TRANSMISSION LINE FROM OREANA COST?

A Conservatively assuming approximately $2 million per mile for construction on steel single-circuit monopoles, the 2.9 to 3.3 mile long line would likely cost $6.6 million or less to complete. However, the comparable $4 million to $8 million cost for 138 kV transmission lines needed at ATXI's proposed Mt. Zion substation would be avoided. Furthermore, as I have noted, the $55.2 million savings from using Route MCPO-PK versus Route ATXI-P-P provides plenty of cost savings headroom to support any portion cost of this 138 kV transmission line near Oreana that exceeds the cost avoided for the 138 kV transmission lines needed for ATXI's proposed Mt. Zion substation.

Q DOES THIS PROPOSED 138 KV TRANSMISSION LINE HAVE TO RUN FROM OREANA TO ADM NORTH?

A No. The new 138 kV transmission line would likely provide similar relief of the low voltage issue if it ran from Oreana substation to Caterpillar substation or from Oreana substation to 27th Street substation.[11] Those alternative routings could be explored later when specific routing and approvals for the 138 kV line are sought by ATXI and AIC.

[11]The exact size and location of the power flow control reactor might have to be changed to accommodate this, but these potential 138 kV transmission line routings are still feasible alternatives to a routing from Oreana to ADM North.

Q DID YOU IDENTIFY ANY OTHER POSSIBLE DECATUR AREA 345/128 KV ALTERNATIVES TO ATXI'S PROPOSED MT. ZION SUBSTATION AND YOUR PROPOSED OREANA 345/138 KV REINFORCEMENT?

A I preliminarily identified an alternative involving the addition of a 2nd Latham 345/138 kV transformer, high-side tap setting changes to the Lantham 345/138 kV transformers and 138 kV capacitor banks in the northeastern Decatur area. However, this additional alternative exhibited a significant drop from pre-Event voltage levels to post-Event voltage levels in the powerflow runs I performed. Furthermore, when ATXI revealed the ADM load may grow by as much as 100 MW over the next few years (ATXI's response to Data Request MCPO-ATXI 10.2), it became clear that this additional alternative would be impractical. Therefore, I am only offering the alternative of the Oreana 345/138 kV Reinforcement.

Q YOU NOTED EARLIER IN YOUR TESTIMONY YOU HAVE PERFORMED SOME ADDITIONAL POWERFLOW ANALYSIS TO EXAMINE WHETHER THE OREANA 345/138 KV REINFORCEMENT (WITH THE PREVIOUSLY DISCUSSED POWER FLOW CONTROL REACTOR IN-SERVICE) INTRODUCES ANY NEW TRANSMISSION ELEMENT OVERLOADS. CAN YOU PLEASE NOW EXPLAIN YOUR ADDITIONAL POWERFLOW ANALYSIS?

A Yes. For ATXI's forecasted 2021 summer peak and shoulder peak load conditions, I used the Siemens PSS/E ACCC automated powerflow contingency checker function to run powerflow cases for several hundred single and double contingency events in and around the Decatur area. I did this for both the IRP with ATXI's proposed Mt. Zion substation and the IRP with the proposed Mt. Zion substation replaced by the Oreana 345/138 kV Reinforcement (including the power flow control reactor).

My detailed results are provided in MCPO Exhibits 1.28, 1.29, 1.30 and 1.31. Out of an abundance of caution, MCPO has designated these four MCPO Exhibits as Critical Energy Infrastructure Information ("CEII") Confidential.

Q PLEASE SUMMARIZE YOUR RESULTS FOR FORECASTED 2021 SUMMER PEAK LOAD CONDITIONS.

A For forecasted summer peak load conditions, my results did not uncover any pre-Event or post-Event transmission element overloads that are different between ATXI's Mt. Zion substation proposal and my Oreana 345/138 kV Reinforcement proposal outside of those differences that have already been discussed earlier in my testimony. However, some low voltage issues did appear in the runs for the Oreana 345/138 kV Reinforcement that did not appear in the runs with ATXI's proposed Mt. Zion substation.

Q DOES THIS PRESENT A PROBLEM FOR YOUR OREANA 345/138 KV REINFORCEMENT PROPOSAL?

A No. The low voltage conditions appear in the power flow runs in question because ATXI's powerflow models do not reflect a major change to the configuration of the transmission facilities serving ADM's substations that was identified in detail in the CEII Confidential version of MISO's February 28, 2013 filing of a construction agreement with the Federal Energy Regulatory Commission ("FERC") in Docket No. ER13-1008-000. ATXI provided a copy of a detailed one-line diagram for the new configuration in its CEII Confidential response to Data Request MCPO-ATXI 10.2. I have included a copy of it in my MCPO Exhibit 1.32. This MCPO Exhibit is also labeled CEII Confidential. The configuration change will eliminate the post-Event low

voltage concerns I identified in my ACCC run results presented in MCPO Exhibit 1.29 that are not present in the ACCC run results for ATXI's proposed Mt. Zion substation.

Q PLEASE EXPLAIN WHY THIS IS SO.

A *Begin CEII Confidential*

End CEII Confidential

Thus, the results in MCPO Exhibit 1.29 do not present a problem for the Oreana 345/138 kV Reinforcement alternative to ATXI's Mt. Zion 345/138 kV substation.

Q PLEASE SUMMARIZE YOUR ADDITIONAL POWERFLOW RESULTS FOR FORECASTED 2021 SHOULDER PEAK LOAD CONDITIONS.

A In the forecasted 2021 shoulder peak load condition results, there were no transmission system element overload differences between ATXI's proposed Mt. Zion

alternative and the Oreana 345/138 kV Reinforcement alternative. The voltage results were similar as well except for one event that was similar to those I have just discussed that occur under forecasted 2021 summer peak load conditions. It too is addressed by the forthcoming transmission reconfiguration for the substations serving ADM. As a result, it is not an issue for the Oreana 345/138 kV Reinforcement alternative to ATXI's proposed Mt. Zion substation.

Q PLEASE SUMMARIZE YOUR FINDINGS WITH REGARD TO USING THE OREANA 345/138 KV REINFORCEMENT ALTERNATIVE IN PLACE OF ATXI'S PROPOSED MT. ZION SUBSTATION TO ADDRESS LOCAL RELIABILITY ISSUES IN THE DECATUR AREA.

A The Oreana 345/138 kV Reinforcement (with the power flow control reactor) will better address the low voltage issue in the Decatur area, identified by ATXI, than ATXI's proposed Mt. Zion substation. Furthermore, the Oreana 345/138 kV Reinforcement in place of the Mt. Zion substation will allow the Commission to select Route MCPO-PK for the Pana to Kansas portion of the IRP at a substantially lower cost and lower adverse impact than any of the other route alternatives available for this portion of the IRP. Finally, my additional powerflow analysis has shown that the Oreana 345/138 kV Reinforcement will not introduce any new reliability issues.

E. Need of ATXI's Proposed Mt. Zion Substation to Support the Broader Estimated Benefits of the IRP and the Remainder of the MISO MVP Portfolio

Q MR. KRAMER, ATXI WITNESS MR. RODNEY FRAME AND MISO WITNESS MR. JEFFREY WEBB EACH PRESENT TESTIMONY ON THE BROADER ESTIMATED ILLINOIS-WIDE AND REGIONAL BENEFITS OF THE IRP AND THE REMAINDER OF THE MISO MVP PORTFOLIO. IS ATXI'S MT. ZION SUBSTATION NECESSARY TO ACHIEVE THOSE ESTIMATED BENEFITS?

A No. The broader benefits they speak of fall into the following categories:

- Reliability issues identified by MISO that are addressed by the IRP and the remainder of the MISO MVP portfolio;
- Reduction in transmission losses;
- Reduction in transmission congestion; and
- Greater access to sources of renewable power (wind generation in particular).

I have examined each of these areas and concluded replacing the ATXI's proposed Mt. Zion substation with the Oreana 345/138 kV Reinforcement will not adversely affect the achievement of any of these estimated benefits. As a result, ATXI's Mt. Zion substation is not needed to achieve these broader estimated benefits.

Q PLEASE EXPLAIN WHY THE MISO IDENTIFIED RELIABILITY BENEFITS WILL CONTINUE TO BE ACHIEVED.

A Section 5 of MISO MVP Report ("Multi Value Project Portfolio Results and Analysis January 10, 2012") identifies various reliability issues that MISO has identified as being addressed by the IRP in conjunction with the rest of the MISO MVP Portfolio. Most of those issues are far away from the Decatur area and as a result will in no way be affected by replacing the ATXI Mt. Zion substation with the Oreana 345/138 kV Reinforcement. In Section 5.10 of the MVP Report (MISO MVP Report at pages

34 through 35), MISO identifies at a high level a number of specific reliability issues associated with NERC Category B and C Events that MISO indicates are resolved by the Pawnee to Pana to Mt. Zion to Kansas to Sugar Creek portion of the IRP. In response to Data Requests MCPO-MISO-1-3, MCPO-MISO-1-4, MCPO-MISO-2-1, MCPO-MISO-2-2 and MCPO-MISO-2-3, MISO provided much more detail with regard to the specific NERC Category B and C Events of concern and the overload concern associated with each event.

I have reviewed each of these carefully and concluded none of them will be affected by replacing ATXI's proposed Mt. Zion substation with the Oreana 345/138 kV Reinforcement. I have come to the conclusion by examining the location of each of the events and constraints with relation to the location of the Decatur area and how the network would be changed by replacing ATXI's proposed Mt. Zion substation with the Oreana 345/138 kV Reinforcement. This included a review of the CEII one-line diagrams of the AIC and ATXI transmission system provided by ATXI in discovery and other information provided by ATXI in discovery. I concluded the events and constraints affect locations outside of the Decatur area and that the replacement of the Mt. Zion substation with Oreana 345/138 kV Reinforcement will not change the ability of the IRP to address those events and constraints.

Q HOW DOES THE REPLACEMENT OF ATXI'S MT. ZION SUBSTATION WITH THE OREANA 345/138 KV REINFORCEMENT AFFECT TRANSMISSION LOSSES?

A The replacement of ATXI's proposed Mt. Zion substation with the Oreana 345/138 kV Reinforcement reduces transmission losses further. Specifically, transmission losses in the powerflow models are approximately 1.1 MW lower for the combined AIC and ATXI transmission system under forecasted 2021 summer peak load conditions and

approximately 0.6 MW lower under forecasted 2021 shoulder peak load conditions. As a result, the estimated transmission loss benefits of the IRP actually increase slightly if ATXI's proposed Mt. Zion substation is replaced by the Oreana 345/138 kV Reinforcement.

Q PLEASE EXPLAIN WHY THE TRANSMISSION CONGESTION AND RENEWABLE POWER ACCESS BENEFITS ESTIMATED BY MISO IN ITS MVP RELATED STUDIES AND MR. FRAME IN HIS STUDIES WOULD NOT BE AFFECTED BY REPLACEMENT OF ATXI'S PROPOSED MT. ZION SUBSTATION WITH THE OREANA 345/138 KV REINFORCEMENT.

A There are two reasons. First from a Decatur area perspective, my powerflow analysis shows the replacement is feasible and does not introduce any new transmission constraints. Second, the replacement does not change the overall 345 kV configuration of the IRP and the remainder of MISO MVP Portfolio. As a result, it is extremely unlikely the increase in transmission import capability into Illinois from the northwestern portions of MISO or the increase in transmission transfer capability from the northwestern portions of MISO to areas east and south of Illinois will be affected by replacing ATXI's proposed Mt. Zion substation with the Oreana 345/138 kV Reinforcement. The relevance of this is that the increase in import capability into Illinois and transfer capability to areas west and south of Illinois is the driver of the estimated transmission congestion and renewable power access benefits of the IRP and the remainder of the MISO MVP Portfolio. As a result, it is extremely unlikely the replacement of ATXI's Mt. Zion substation with the Oreana 345/138 kV Reinforcement would in any significant way adversely affect the estimated

transmission congestion and renewable power benefits of the IRP and the remainder of the MISO MVP Portfolio.

Q PLEASE SUMMARIZE YOUR CONCLUSIONS WITH REGARD TO THE BROADER ESTIMATED BENEFITS OF THE IRP AND THE REMAINDER OF THE MISO MVP PORTFOLIO.

A My conclusion is that ATXI's Mt. Zion substation is not necessary to achieve those benefits. Those benefits are equally achievable by using the lower cost option of the Oreana 345/138 kV Reinforcement in conjunction with Route MCPO-PK.

F. Need for Two 345 kV Transmission Lines to Serve ATXI's Proposed Mt. Zion Substation

Q YOU HAVE PRESENTED WHY YOU BELIEVE ATXI'S PROPOSED MT. ZION SUBSTATION IS NOT NEEDED. ASSUMING ATXI'S MT. ZION SUBSTATION WAS CONSTRUCTED, WOULD TWO 345 KV TRANSMISSION LINES BE NEEDED TO SERVE THAT SUBSTATION AS PROPOSED BY ATXI?

A No. Since ATXI is proposing to only install one 345/138 kV transformer at its proposed Mt. Zion substation, it is unnecessary for two 345 kV transmission lines to serve it. Whether there is one or two 345 kV lines serving it, it will still be interrupted on the NERC Category B single contingency event of its loss. As a result, Routes MCPO-P-PK and MCPO-A-PK, as presented earlier in my testimony, are valid routes even though they only serve ATXI's proposed Mt. Zion substation from a single 345 kV line from Pana.

VI. Conclusions and Recommendations

Q CAN YOU PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS?

A My powerflow analysis shows that ATXI does not need ATXI's proposed Mt. Zion substation to resolve local reliability issues in the Decatur area. The Mt. Zion substation is not the only 345/138 kV Reinforcement that can, in conjunction with the remainder of the IRP, sufficiently resolve those issues and maintain the other estimated IRP benefits. Specifically, my analysis shows that all of the needs the IRP and the remainder of the MISO-approved MVP portfolio intended to address can be met without ATXI's proposed Mt. Zion substation. This can be accomplished by routing the Pana to Kansas portion of the IRP directly from Pana to Kansas and utilizing a 345/138 kV Reinforcement consisting a 3rd Oreana 345/138 kV transformer and a 3rd Oreana to ADM North 138 kV transmission line in place of ATXI's proposed Mt. Zion substation (and its associated 345/138 kV transformer and 138 kV transmission lines).

As a result, the following nine route segment combinations, which are shown on the overview maps presented in MCPO Exhibit 1.1, are available for consideration by the Commission for the IRP from Pana to Kansas:

	Utilized Route Segments				
Route Abbreviation	**Pana to Mt. Zion**	**Mt. Zion to Kansas**	**Pana to Kansas**	**Estimated Route Cost (excluding Decatur Area Reinforcements) ($ millions)**	**Decatur Area 345/138 kV Reinforcements**
ATXI-P-P	ATXI Primary	ATXI Primary	------	222.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines[1]
ATXI-A-P	ATXI Alternative	ATXI Primary	------	233.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
ATXI-P-A	ATXI Primary	ATXI Alternative	------	225.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
ATXI-A-A	ATXI Alternative	ATXI Alternative	------	236.8	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-P-MZK	ATXI Primary	MCPO MZK	------	224.9	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-A-MZK	ATXI Alternative	MCPO MZK	------	236.0	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-P-PK	ATXI Primary	------	MCPO PK	241.9	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-A-PK	ATXI Alternative	------	MCPO PK	252.9	Mt. Zion 345/138 kV Transformer and one or more 138 kV Mt. Zion Transmission Lines
MCPO-PK	------	------	MCPO PK	167.6	3rd Oreana 345/138 kV Transformer + 3rd Oreana-ADM 138 kV Transmission Line[2]

Key: P = Primary
A = Alternative
PR = Pana to Kansas
MZK = Mt. Zion to Kansas

[1]My estimate of the total cost of ATXI's proposed Mt. Zion substation is $21.8 million to $25.8 million including the 138 kV transmission lines associated with it.

[2]My estimate of the total cost of the Oreana 345/138 kV Reinforcement is approximately $34.4 million including the cost for a power flow control reactor.

In addition, my routing analysis, which draws on the routing factors developed by Mr. Reinecke and considers the ATXI-identified Phase I and Phase II high

sensitivity routing factors, estimated cost and opportunities to parallel existing linear features, shows that the Route MCPO-PK, with the 3rd Oreana 345/138 kV transformer and 3rd Oreana to ADM North 138 kV transmission line added in place of ATXI's proposed Mt. Zion substation in the Decatur area, has <u>by far</u> the lowest cost and lowest impact to the public of the nine alternative route combinations that I have presented above. As a result, I recommend the Commission select Route MCPO-PK for the Pana to Kansas portion of the IRP as any other choice would not promote public convenience and necessity and would not be the least-cost means of satisfying the objections being sought to be accomplished.

If despite the findings of my powerflow analysis and recommendation above, the Commission decides the IRP should include ATXI's proposed Mt. Zion substation, I recommend the Commission, in place of Route MCPO-PK, select one of the following two route segment combinations from Pana to Kansas:

- Route MCPO-P-MZK; or
- Route MCPO-A-MZK.

These two route segments have the same electrical configuration as all of ATXI's filed route combinations for the Pana to Kansas portion of the IRP. However, as discussed in detail in my testimony which follows, Route MCPO-A-MZK and Route MCPO-P-MZK have significantly less adverse impact to the public than ATXI's four filed route segment combinations between Pana and Kansas as measured by a combination of their performance with regard to the ATXI-identified Phase I high sensitivity routing factors, the ATXI-identified Phase II high sensitivity routing factors, estimated cost and use of opportunities to parallel existing linear features. While it is a close call, of the two routes, I judge Route MCPO-P-MZK to be slightly better than Route MCPO-A-MZK. I make this judgment because Route MCPO-A-MZK's degree

of reduction in residence impacts in comparison to Route MCPO-P-MZK does not quite justify: (i) the additional cost of Route MCPO-A-MZK and (ii) the loss of the greater paralleling of significant existing linear features by Route MCPO-P-MZK.

Q DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A Yes, it does.

Qualifications of James R. Dauphinais

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A James R. Dauphinais. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017, USA.

Q PLEASE STATE YOUR OCCUPATION.

A I am a consultant in the field of public utility regulation and a Managing Principal with the firm of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory consultants.

Q PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A I graduated from Hartford State Technical College in 1983 with an Associate's Degree in Electrical Engineering Technology. Subsequent to graduation I was employed by the Transmission Planning Department of the Northeast Utilities Service Company as an Engineering Technician.

While employed as an Engineering Technician, I completed undergraduate studies at the University of Hartford. I graduated in 1990 with a Bachelor's Degree in Electrical Engineering. Subsequent to graduation, I was promoted to the position of Associate Engineer. Between 1993 and 1994, I completed graduate level courses in the study of power system transients and power system protection through the Engineering Outreach Program of the University of Idaho. By 1996 I had been promoted to the position of Senior Engineer.

In the employment of the Northeast Utilities Service Company, I was

responsible for conducting thermal, voltage and stability analyses of the Northeast Utilities' transmission system to support planning and operating decisions. This involved the use of load flow, power system stability and production cost computer simulations. It also involved examination of potential solutions to operational and planning problems including, but not limited to, transmission line solutions and the routes that might be utilized by such transmission line solutions. Among the most notable achievements I had in this area include the solution of a transient stability problem near Millstone Nuclear Power Station, and the solution of a small signal (or dynamic) stability problem near Seabrook Nuclear Power Station. In 1993 I was awarded the Chairman's Award, Northeast Utilities' highest employee award, for my work involving stability analysis in the vicinity of Millstone Nuclear Power Station.

From 1990 to 1996, I represented Northeast Utilities on the New England Power Pool Stability Task Force. I also represented Northeast Utilities on several other technical working groups within the New England Power Pool ("NEPOOL") and the Northeast Power Coordinating Council ("NPCC"), including the 1992-1996 New York-New England Transmission Working Group, the Southeastern Massachusetts/Rhode Island Transmission Working Group, the NPCC CPSS-2 Working Group on Extreme Disturbances and the NPCC SS-38 Working Group on Interarea Dynamic Analysis. This latter working group also included participation from a number of ECAR, PJM and VACAR utilities.

From 1990 to 1995, I also acted as an internal consultant to the Nuclear Electrical Engineering Department of Northeast Utilities. This included interactions with the electrical engineering personnel of the Connecticut Yankee, Millstone and Seabrook nuclear generation stations and inspectors from the Nuclear Regulatory Commission ("NRC").

In addition to my technical responsibilities, from 1995 to 1997, I was also responsible for oversight of the day-to-day administration of Northeast Utilities' Open Access Transmission Tariff. This included the creation of Northeast Utilities' pre-FERC Order No. 889 transmission electronic bulletin board and the coordination of Northeast Utilities' transmission tariff filings prior to and after the issuance of Federal Energy Regulatory Commission (“FERC” or “Commission”) FERC Order No. 888. I was also responsible for spearheading the implementation of Northeast Utilities' Open Access Same-Time Information System and Northeast Utilities’ Standard of Conduct under FERC Order No. 889. During this time I represented Northeast Utilities on the Federal Energy Regulatory Commission's "What" Working Group on Real-Time Information Networks. Later I served as Vice Chairman of the NEPOOL OASIS Working Group and Co-Chair of the Joint Transmission Services Information Network Functional Process Committee. I also served for a brief time on the Electric Power Research Institute facilitated "How" Working Group on OASIS and the North American Electric Reliability Council facilitated Commercial Practices Working Group.

In 1997 I joined the firm of Brubaker & Associates, Inc. The firm includes consultants with backgrounds in accounting, engineering, economics, mathematics, computer science and business. Since my employment with the firm, I have filed or presented testimony before the Federal Energy Regulatory Commission in Consumers Energy Company, Docket No. OA96-77-000, Midwest Independent Transmission System Operator, Inc., Docket No. ER98-1438-000, Montana Power Company, Docket No. ER98-2382-000, Inquiry Concerning the Commission’s Policy on Independent System Operators, Docket No. PL98-5-003, SkyGen Energy LLC v. Southern Company Services, Inc., Docket No. EL00-77-000, Alliance Companies, et al., Docket No. EL02-65-000, et al., Entergy Services, Inc., Docket No.

ER01-2201-000, and Remedying Undue Discrimination through Open Access Transmission Service, Standard Electricity Market Design, Docket No. RM01-12-000, Midwest Independent Transmission System Operator, Inc., Docket No. ER10-1791-000 and NorthWestern Corporation, Docket No. ER10-1138-001, et al. I have also filed or presented testimony before the Alberta Utilities Commission, Colorado Public Utilities Commission, Connecticut Department of Public Utility Control, Illinois Commerce Commission, the Indiana Utility Regulatory Commission, the Iowa Utilities Board, the Kentucky Public Service Commission, the Louisiana Public Service Commission, the Michigan Public Service Commission, the Missouri Public Service Commission, the Montana Public Service Commission, the Council of the City of New Orleans, the Public Utility Commission of Texas, the Wisconsin Public Service Commission and various committees of the Missouri State Legislature. This testimony has been given regarding a wide variety of issues including, but not limited to, ancillary service rates, avoided cost calculations, certification of public convenience and necessity, cost allocation, fuel adjustment clauses, fuel costs, generation interconnection, interruptible rates, market power, market structure, off-system sales, prudency, purchased power costs, resource planning, rate design, retail open access, standby rates, transmission losses, transmission planning and transmission line routing.

I have also participated on behalf of clients in the Southwest Power Pool Congestion Management System Working Group, the Alliance Market Development Advisory Group and several working groups of the Midwest Independent Transmission System Operator, Inc. ("MISO"), including the Congestion Management Working Group and Supply Adequacy Working Group. I am currently an alternate member of the MISO Advisory Committee in the end-use customer sector on behalf

of a group of industrial end-use customers in Illinois. I am also the past Chairman of the Issues/Solutions Subgroup of the MISO Revenue Sufficiency Guarantee ("RSG") Task Force.

In 2009, I completed the University of Wisconsin-Madison High Voltage Direct Current ("HVDC") Transmission course for Planners that was sponsored by MISO. I am a member of the Power and Energy Society ("PES") of the Institute of Electrical and Electronics Engineers ("IEEE").

In addition to our main office in St. Louis, the firm also has branch offices in Phoenix, Arizona and Corpus Christi, Texas.

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