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Issue:	Revenue Requirement
Witness:	Nicholas L. Phillips
Type of Exhibit:	Direct Testimony
Sponsoring Party:	Missouri Industrial Energy Consumers
Case Nos.:	ER-2016-0179
Date Testimony Prepared:	December 9, 2016

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase Its Revenues for Electric Service	**)))))**	**Case No. ER-2016-0179**

Direct Testimony of

Nicholas L. Phillips

On behalf of

Missouri Industrial Energy Consumers

December 9, 2016

Brubaker & Associates, Inc.

Project 10202

BEFORE THE PUBLIC SERVICE COMMISSION
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In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase Its Revenues for Electric Service	)))))	**Case No. ER-2016-0179**

STATE OF MISSOURI)
) **SS**
COUNTY OF ST. LOUIS)

Affidavit of Nicholas L. Phillips

Nicholas L Phillips, being first duly sworn, on his oath states:

1. My name is Nicholas L Phillips. I am a consultant with Brubaker & Associates, Inc., having its principal place of business at 16690 Swingley Ridge Road, Suite 140, Chesterfield, Missouri 63017. We have been retained by the Missouri Industrial Energy Consumers in this proceeding on their behalf.

2. Attached hereto and made a part hereof for all purposes is my direct testimony which was prepared in written form for introduction into evidence in Missouri Public Service Commission Case No. ER-2016-0179.

3. I hereby swear and affirm that the testimony is true and correct and that it shows the matters and things that it purports to show.

Nicholas L Phillips

Nicholas L. Phillips

Subscribed and sworn to before me this 9th day of December, 2016.

TAMMY S. KLOSSNER
Notary Public - Notary Seal
STATE OF MISSOURI
St. Charles County
My Commission Expires: Mar. 18, 2019
Commission # 15024862

Tammy S Klossner

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION
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In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase Its Revenues for Electric Service	**)))))**	**Case Nos. ER-2016-0179**

Direct Testimony of Nicholas L. Phillips

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A Nicholas L. Phillips. 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 an Associate of Brubaker & Associates, Inc., energy, economic and regulatory consultants.

Q PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A This information is included in Appendix A to this testimony.

Q ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A This testimony is presented on behalf of the Missouri Industrial Energy Consumers ("MIEC"), a non-profit company that represents the interests of industrial customers in Missouri utility matters. The industrial customers purchase substantial quantities of electricity from Ameren Missouri (or "Company").

Q WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A My testimony addresses the Company's proposal to establish a transmission tracking mechanism ("Transmission Tracker"), which would track certain transmission expenses and revenues on an actual cost basis relative to the base level used to set rates in this proceeding. Under the Company's proposal, any actual net transmission cost varying from the base level established in this case would become a regulatory asset or liability balance. In the Company's next base rate proceeding, the Company would amortize that balance over five years, and the unamortized balance would be included in rate base.

The fact that I do not address a particular issue in this testimony should not be interpreted as a tacit approval of a position taken by the Company on that issue.

Q PLEASE DESCRIBE THE COMPANY'S PROPOSAL TO ESTABLISH A TRANSMISSION TRACKER.

A The Company is proposing to establish a Transmission Tracker to track both the actual level of wholesale transmission expenses and revenues incurred and reflect the difference between the base level of net costs/revenues included within the Company's revenue requirement established in this case, excluding those transmission charges that the Company is already authorized to track through its Fuel Adjustment Clause ("FAC"). Included in its proposal is a base level set to reflect all actual wholesale transmission expenses and revenues for 2016 except for Midcontinent Independent System Operator, Inc. ("MISO") transmission charges under Schedule 26A, which recovers Multi-Value Projects ("MVP") costs.[1] The Company is proposing to determine that value using the 2017 MISO Schedule 26A

[1]Direct Testimony of Lynn Barnes at Page 19.

rate, which will be known as of January 1, 2017.[2] The Company seeks to include all transmission service charges appearing in Federal Energy Regulatory Commission ("FERC") account 565 as well as all transmission service revenues appearing in FERC account 456.1, with one exception. The exception, as explained by the Company, arises from current FERC proceedings dealing with past MISO charges and the associated return on equity ("ROE"). The Company recommends that while these proceedings could result in additional charges or refunds, it would not include them within its proposed Transmission Tracker as they would relate to prior periods before the tracker would be established and they would have been paid for entirely by the Company.[3] Finally, the Company also notes that it intends to exclude those revenues resulting from MISO Schedules 10 and 24.[4]

After its new base rates go into effect, the Company would track the difference between actual incurred net transmission cost/revenue and the base level included in its revenue requirement. Any difference above or below the base level would then result in a regulatory asset or liability balance, and in the next base rate proceeding, the balance would be amortized over five years and the unamortized balance included in rate base.

Q HOW DO YOU RESPOND TO THE COMPANY'S PROPOSAL TO ESTABLISH A TRANSMISSION TRACKER?

A I recommend that the Commission deny the Company's request to establish a Transmission Tracker. It has not reasonably demonstrated that it has a true need to track these costs and revenues. In general, the use of a tracker, be it a tracker that

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[2] *Id*.
[3] *Id.* at Pages 19-20.
[4] *Id.* at Page 19.

automatically adjusts rates between base rate cases or a tracker that only adjusts at the time of the next base rate case, should be avoided unless a true need has been demonstrated by the utility requesting it. There are two paramount reasons this is the case.

First, the use of a tracker allows a utility to pursue single-issue ratemaking. Under single-issue ratemaking, a utility can receive additional revenue in rates due to either an increase in a tracked expense or decrease in a tracked revenue without any consideration of whether that utility would simultaneously be receiving offsetting decreases in expenses or offsetting increases in revenues for those expenses and revenues that are not being tracked. To put it more simply, allowing a tracker can break the synchronism among revenues, expenses and rate base, leading to a utility over-recovering its costs. The use here is particularly unfair since the tracker is not tracking a cost that may both increase and decrease; the Company knows that this cost will only increase.

Second, the use of a tracker eliminates the inherent incentive a utility has to minimize expenses and maximize revenues between base rate proceedings, which over time works to keep electric rates lower than they otherwise would be. When a utility is allowed to track an expense, it can become indifferent, or less vigilant, with regard to minimizing that expense since it knows it will eventually recover those costs from customers. Similarly, when a utility is allowed to track a revenue, it can become indifferent with regard to maximizing that revenue since it knows that it will eventually recover any shortfall in that revenue from customers.

Q HAS THE COMMISSION EVER EXPRESSED CONCERNS REGARDING TRANSMISSION TRACKERS THAT ARE SIMILAR TO THE CONCERNS YOU HAVE STATED IN YOUR PREVIOUS ANSWER?

A Yes. In its Report and Order in Case No. ER-2014-0370 the Commission stated, "The broad use of trackers should be limited because they violate the matching principle, tend to unreasonably skew ratemaking results, and dull the incentives a utility has to operate efficiently and productively under the rate regulation approach employed in Missouri."[5] The Report and Order provided a definition of "extraordinary items" that may be eligible for deferral and later recovery under the Uniform System of Accounts prescribed by the FERC and recited in Kansas City Power and Light Company's ("KCPL") previous requests for a "transmission tracker" that were denied. In its conclusion on this issue, the Commission stated:

> The evidence presented in this case showed that KCPL's transmission costs, while having increased in recent years, are normal, ordinary and recurring operation costs. These recurring costs are not abnormal or significantly different from the ordinary and typical activities of the company, so they are not extraordinary and, therefore, not subject to deferral under the USoA. The Commission concludes that KCPL has not met its burden of proof to demonstrate that projected transmission cost increases are extraordinary, so its request for a transmission tracker will be denied.

The Commission also denied KCPL's request to add an additional revenue requirement amount of $5 million as an estimate of increased transmission costs, subject to refund in a future rate case, noting the KCPL's failure to adequately explain how the estimate was determined or how the Commission has the legal authority to grant such relief.[6]

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[5]Case No. ER-2014-0370, *Report and Order*, issued September 2, 2015, page 51 at 116.
[6]*Id.,* page 54.

Q SETTING ASIDE THE COMMISSION'S STATED PREDILECTION AGAINST TRACKERS, WHAT SHOULD BE REASONABLY DEMONSTRATED IN ORDER FOR A UTILITY TO SHOW IT HAS A TRUE NEED FOR A TRACKER?

A The utility needs to show that the expense or revenue in question is:

- Large enough to present a threat to the financial well-being of the utility;
- Volatile; <u>and</u>
- Cannot be reasonably managed by the utility.[7]

It is worth noting that this is the same three-prong test that was considered when authorizing the Company's FAC.[8]

Q HAS THE COMMISSION EVER PROVIDED ANY GUIDANCE ON HOW LARGE A COST MUST BE TO BE SIGNIFICANT ENOUGH TO BE TRACKED?

A Yes. In its Report and Order in Case No. ER-2008-0318 when authorizing the Company's FAC, the Commission found that the Company's fuel and purchased power costs were substantial, thus satisfying the first prong of the three-part test required.[9] The Commission reasoned that the Company's fuel and purchased power expense comprised roughly 25 percent of the Company's operations and maintenance expense and consequently was substantial.[10]

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[7]Direct Testimony of Lynn Barnes at Pages 15-16.
[8]Case No. ER-2008-0318, *Report and Order*, issued January 27, 2009, Page 61.
[9]*Id*., Page 62.
[10]*Id.*

Q HAS THE COMMISSION EVER PROVIDED ANY GUIDANCE ON ITS PERCEPTION OF VOLATILITY?

A Yes. When discussing volatility in the context of Ameren Missouri's fuel costs in Case No. ER-2007-0002, the Commission recognized these facts and reasoned (in the risk management sense) that rising costs alone cannot be said to be volatile. Rather, as the Commission has recognized previously, volatility involves costs that are increasing and decreasing in an unpredictable manner.

> Thus AmerenUE's fuel costs, while certainly rising, cannot be said to be volatile. Markets in which prices are volatile tend to go up and down in an unpredictable manner. When a utility's fuel and purchased power costs are swinging in that way, the time consuming ratemaking process cannot possibly keep up with the swings. As a result, in those circumstances, a fuel adjustment clause may be needed to protect both the utility and its ratepayers from inappropriately low or high rates. Because AmerenUE's costs are simply rising, that sort of protection is not needed.[11]

Subsequently, when the Commission authorized the Company's FAC in Case No. ER-2008-0318, the Commission did not provide a new understanding of volatility. Instead, the Commission explained that it was too narrowly focused on the cost of coal in its 2007 decision and needed to consider all the factors (such as the underlying price for commodities, market prices for off-system sales, generation availability and variability native load, etc.) used to determine the Company's net fuel cost and that the Company's witnesses were able to demonstrate that its net fuel costs were very uncertain.[12]

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[11]Case No. ER-2007-0002, *Report and Order*, issued May 22, 2007, Page 23.
[12]Case No. ER-2008-0318, *Report and Order*, issued January 27, 2009, Pages 63-64.

Q HAS THE COMMISSION EVER PROVIDED ANY GUIDANCE ON ITS UNDERSTANDING OF UNCONTROLLABLE COSTS?

A Yes. Again when authorizing the Company's FAC, the Commission discussed this issue. Paraphrasing, the Commission explained that most of the costs that would be tracked in the FAC are dictated by market forces, both domestic and international, as well as federal environmental regulations, all of which are clearly beyond the control of the Company.[13] There was some discussion as to whether the Company could influence its realized coal and coal transportation costs due to the volumes of coal it buys but the Commission was not satisfied by this argument because no party supported the argument with any study to actually measure any influence the Company might have.[14] Similarly, the Commission explained that the Company cannot control the price at which it is able to sell electricity into the wholesale market.[15]

Q IN CASE NO. ER-2012-0166, DIDN'T THE COMMISSION AUTHORIZE MISO TRANSMISSION CHARGES TO FLOW THROUGH AMEREN MISSOURI'S FAC AND DETERMINE MISO TRANSMISSION CHARGES TO BE VOLATILE?

A Yes. In its final Report and Order in ER-2012-0166, the Commission reasoned that:

> Ameren Corporation is a member of MISO, but it has little control over MISO transmission charges. MISO transmission charges are volatile because no one knows for sure how much those MVP projects will costs once construction is complete. All parties agree that Ameren Missouri must be able to recover the MISO transmission charges in some manner. If the charges are not flowed through the FAC, the Commission will need to allow the company to recover those charges in base rates. The only issue is whether Ameren Missouri should be allowed to flow those charges through the fuel adjustment clause.

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[13]*Id.,* Page 63.
[14]*Id*.
[15]*Id*.

> Since Ameren Missouri must be allowed to recover the MISO transmission charges in some manner, the continuation of the current practice of passing those costs through the fuel adjustment clause is the most logical manner of doing so. Those costs meet the Commission's past standards for inclusion in the fuel adjustment clause in that they are significant in amount, volatile in that they are not only rapidly rising, but are also uncertain in amount, and they are largely beyond the control of Ameren Missouri. The Commission finds that MISO transmission costs should continue to be flowed through Ameren Missouri's fuel adjustment clause.[16]

Q DO YOU AGREE THAT TRANSMISSION EXPENSES ARE VOLATILE?

A No. It is my opinion that the Commission reached a conclusion inconsistent with the definition of volatility applied when it authorized the FAC in ER-2008-0318 by stating that the MISO Schedule 26A transmission charges are volatile simply because "no one knows for sure how much those MVP projects will cost when construction is complete." This same reasoning could be applied to virtually any of the Company's operating expenses. No one knows exactly how much operation and maintenance expenses will be at any of its generation facilities but those costs are not tracked. No one knows for sure how much those costs may change due to future (and unknown) environmental regulations. In fact, virtually any cost is uncertain to some degree until it is contracted for, hedged, or otherwise becomes known and incurred. Yet no one is proposing, nor would it be prudent to propose, to track all of these "unknown" fluctuations in cost. This is simply one of the risks of business for the Company.

Based on the Commission's definition of volatility, that is founded in the principles of risk management (and for the reasons set forth later in this testimony), it is my opinion that MISO transmission charges are not volatile.

[16] Case No. ER-2012-0166, *Report and Order*, issued December 12, 2012, Pages 88-89.

Q DO ANY OF THE TRANSMISSION COSTS OR REVENUES THE COMPANY WOULD LIKE TO TRACK THROUGH ITS PROPOSED TRANSMISSION TRACKER MEET THE THREE PREREQUISITES THAT YOU SET FORTH ABOVE?

A No. To restate those prerequisites, they are: the costs must be large enough to present a threat to the financial well-being of the utility if not tracked; they must be volatile; and they must be costs that cannot be reasonably managed by the utility.

First, the Company's own data regarding its expectations of Transmission Costs recorded in FERC account 565, as filed by the Company, is merely 1.4% of its total requested revenue requirement. It expects this to grow to only 3% by 2020. In terms of Total Operating Expenses, these relationships become 2.0%-4.3%.[17] These relationships illustrate the fairly modest contribution of total transmission expenses to the Company's overall costs and revenues and demonstrate that the transmission charges alone are hardly enough to present a threat to the financial well-being of the Company, especially compared to the 25% referenced in the Order establishing the FAC.[18]

Furthermore, consider a hypothetical where we assume that the base level of transmission expense is set to the level of transmission expense as requested by the Company and that the Company does not file another rate case prior to 2021. Under this hypothetical and focusing upon only the year-over-year change in expected transmission expenses, the value at risk that the Company must manage through other portions of its operations is 2.2% or less of its total operating expenses and 1.5% or less of its revenue requirement. This is a manageable risk and hardly

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[17]Ranges based on estimates provided in Transmission Cost Table presented on Page 16 of the Direct Testimony of Lynn Barnes and Revenue Requirement and Operating Expenses from LMM-WP1, LMM-WP-3 and LMM-WP-4.

[18]Case No. ER-2008-0318, *Report and Order*, issued January 27, 2009, Page 62.

warrants exceptional ratemaking treatment. Furthermore, the percentages above are somewhat inflated as they do not exclude the portion of Transmission Charges the Company is already authorized to track via its FAC.

Second, contrary to the Company's testimony, these costs are not volatile. The Company claims that because its costs are rapidly rising, they are volatile and explains that these rapid increases are driven particularly by MISO Schedule 26A charges. While it is true that MISO Schedule 26A charges are forecasted to increase in the near future, claiming that an expected increase constitutes volatility is contrary to the definition or concept of volatility in the sense of risk management and ignores the Commission's own expressed understanding of what constitutes volatility.

Indeed, when seeking to understand volatility in the realm of risk management, as we are here, volatility is defined as the degree of variation around an expected value, typically, though not always, measured using standard deviation.[19,20,21] The expected value around which variability is measured could be constant, or contain a trend, either increasing or decreasing.[22,23] This is commonly referred to as the deterministic (non-random) quantity. Volatility, on the other hand, is concerned with the uncertain or stochastic (random) portion.[24,25] In the case of the MISO Schedule 26A charges, they are well forecasted by MISO and generally occur in stair steps much like the rate base of a utility increases as new major capital projects are brought into service. As shown in Table NLP-1 below, the MISO

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[19] "Quantitative Risk Management," McNeil, Frey and Embrechts, 2005 at Page 121.

[20] "Risk Management and Financial Institutions 3rd," John Hull, 2012 at Chapter 10.

[21] "A Practical Guide to Risk Management" Coleman – The Research Foundation of the CFA Institute, 2011 at Pages 6-8.

[22] "Quantitative Methods for Electricity Trading and Risk Management," Stefano Fiorenzani, 2006 at Page 21.

[23] "Stochastic Calculus for Finance II – Continuous Time Models" Steven Shreve, 2008, at Pages 153-154.

[24] *Id.*

[25] *Id.*

Schedule 26A forecasts may fluctuate slightly from year to year, but the major trend is known and the fluctuations are small, and thus not volatile.

Table NLP-1

MISO Schedule 26A Indicative Pricing Over Time

$/MWh

	Date of Forecast					
Year	**8/6/2013**	**2/26/2014**	**7/31/2014**	**8/3/2015**	**7/31/2016**	**8/29/2016**
2014	$0.37					
2015	$0.56	$0.57	$0.58			
2016	$0.78	$0.80	$0.80	$0.96		
2017	$1.14	$1.17	$1.15	$1.38	$1.44	$1.39
2018	$1.35	$1.39	$1.36	$1.64	$1.68	$1.63
2019	$1.58	$1.66	$1.60	$1.90	$1.90	$1.84
2020	$1.59	$1.68	$1.63	$1.93	$1.92	$1.86
2021	$1.56	$1.64	$1.65	$2.00	$1.96	$1.90
2022	$1.53	$1.61	$1.62	$1.97	$1.95	$1.89
2023	$1.50	$1.58	$1.59	$1.94	$1.94	$1.88
2024	$1.47	$1.55	$1.56	$1.90	$1.93	$1.87
2025	$1.44	$1.52	$1.53	$1.87	$1.90	$1.84
2026	$1.41	$1.49	$1.50	$1.84	$1.86	$1.81
2027	$1.38	$1.46	$1.47	$1.81	$1.83	$1.78
2028	$1.35	$1.43	$1.44	$1.78	$1.80	$1.75
2029	$1.32	$1.40	$1.41	$1.75	$1.77	$1.72
2030	$1.29	$1.38	$1.38	$1.72	$1.74	$1.69
2031	$1.27	$1.35	$1.36	$1.63	$1.71	$1.66
2032	$1.24	$1.32	$1.33	$1.66	$1.68	$1.63
2033	$1.21	$1.30	$1.30	$1.63	$1.65	$1.60
2034		$1.27	$1.28	$1.61	$1.62	$1.57
2035				$1.58	$1.59	$1.54
2036					$1.57	$1.52

Source: www.misoenergy.org

Note: This table does not include all forecasts produced by MISO but is illustrative of the magnitude of the changes in the forecasts over time.

Contrary to the Company's net fuel costs, which are driven by energy commodity costs, wholesale electric power prices, weather and electric demand, all of which are demonstrably volatile, the MISO Schedule 26A charges are far more known and predictable. Should the Company believe that these routinely and well forecasted costs present enough financial concern to the Company, it can file a rate case and have all of its costs considered, which it has done, roughly every 18 months since 2007.

MISO Schedule 26A costs are costs that can to a degree be managed by the Company since it and its affiliates are active in the MISO Transmission Expansion Planning ("MTEP") stakeholder process and, again, as necessary, at FERC. Allowing the Company to track this expense would eliminate the inherent incentive the Company otherwise would have to be vigilant in trying to contain these costs to reasonable levels in the MISO stakeholder process and, as necessary, at FERC.

Finally, I would like to reiterate my concern regarding the asynchronous effects and single-issue ratemaking surrounding the use of trackers to recover utility costs between rate cases. Review of utility costs and revenues in rate cases is comprehensive and encompasses all costs and revenues. While some costs may increase, other costs may decrease, or there could be additional revenues that offset increases to cost, which will become known and measured during the base rate proceedings. The same is not true for tracking mechanisms, to the detriment of ratepayers.

To conclude, for the reasons I have detailed, the Company's request for a Transmission Tracker should be denied.

Q PLEASE EXPLAIN FURTHER THE CONCEPT OF RISK MANAGEMENT.

A The Company is seeking to mitigate risk through the establishment of a tracker for a cost, which it believes is so unpredictable and uncontrollable, that it is requesting exceptional regulatory and ratemaking treatment for this cost. While I stand behind my stated disagreement with the Company's rationale, even if I were to agree with it, it has failed to demonstrate to the Commission that tracking these costs entirely eliminates these risks. Quite to the contrary, a tracking mechanism would shift these costs to ratepayers without compensating the ratepayers for assuming this risk.

Q PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS.

A For the reasons set forth in this testimony, I am recommending that the Commission deny the Company's request for a Transmission Tracker.

Q DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A Yes.

Qualifications of Nicholas L. Phillips

Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A Nicholas L. Phillips. My business address is 16690 Swingley Ridge Road, Suite 140, Chesterfield, MO 63017.

Q PLEASE STATE YOUR OCCUPATION.

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

Q PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EMPLOYMENT EXPERIENCE.

A I graduated from the Washington University in St. Louis/University of Missouri-St. Louis joint engineering program in 2010 where I received a Bachelor of Science degree in Electrical Engineering. In 2012 I received the degree of Master of Engineering in Electrical Engineering with a concentration in Electric Power and Energy Systems from Iowa State University of Science and Technology. In 2015 I received a Master of Science Degree in Computational Finance and Risk Management from the University of Washington Seattle. I am a member of the Power and Energy Society of the Institute of Electrical and Electronics Engineers.

I joined BAI as an intern in 2009 and upon graduation, I accepted a position with BAI as an Associate Engineer. In January of 2012, I was promoted to the position of Associate Consultant, in January of 2013 I was promoted to the position of Consultant at BAI, in January of 2014 I was promoted to my the position of Senior Consultant at BAI, and in January of 2016 I was promoted to my current position of

Associate at BAI. While at BAI, I have been involved with numerous regulated and competitive electric service issues. These have included transmission planning, resource planning, electric price forecasting, load forecasting, cost of service, combined heat and power steam costs and power procurement. This has involved the performance of power flow, production cost, transmission line routing, cost of service and other analysis to address these issues.

Prior to joining BAI, through the department of Electrical and Computer Engineering and the Medical School at Washington University in St. Louis, I aided in preliminary research focusing on the use of ultrasound as a mechanism for in vitro localized thermometry.

BAI and its predecessor firm have participated in more than 700 regulatory proceedings in 40 states and Canada.

BAI provides consulting services in the economic, technical, accounting, and financial aspects of public utility rates and in the acquisition of utility and energy services through RFPs and negotiations, in both regulated and unregulated markets. Our clients include large industrial and institutional customers, some utilities and, on occasion, state regulatory agencies. We also prepare special studies and reports, forecasts, surveys and siting studies, and present seminars on utility-related issues.

In general, we are engaged in energy and regulatory consulting, economic analysis and contract negotiation. In addition to our main office in St. Louis, the firm also has branch offices in Phoenix, Arizona and Corpus Christi, Texas.

Q WHAT ADDITIONAL EDUCATIONAL, PROFESSIONAL EXPERIENCE AND AFFILIATIONS HAVE YOU HAD?

A I have attended seminars concerned with rate design, cost of service, and wind integration. My completed coursework includes classes in Power & Energy System Planning, Power System Operation & Control (Steady State Analysis), Economic Systems for Electric Power Planning, Power System Dynamics, Electromechanical Wind Energy Conversion & Grid Integration, Nuclear Engineering & Radiation Theory, Reliability, Linear System Theory, System Engineering Analysis, Allocation Mechanisms, Capital Markets and Data for Computational Finance, Investment Science, R Programming for Quantitative Finance, Quantitative Risk Measurement, Portfolio Benchmarking & Analysis, Credit Risk Management, Options & Derivatives, Financial Risk Management, Fixed Income Analytics, Portfolio Optimization, Monte Carlo Methods, Energy Markets & Derivatives, and Optimization Methods.

Topics covered by these classes include but are not limited to Economic Dispatch, Unit Commitment, Production Cost Modeling, Capacity Expansion Planning, Transmission Planning, Power Flow Analysis, Security Constrained Optimal Power Flow, Transient and Dynamic Stability, Wholesale Electricity Markets, Nuclear Energy, Reliability Studies as well as experience with PLEXOS, an industry leading combined production cost and capacity/transmission expansion model. Additionally, MISO professionals presented a series of nine lectures discussing their approach to the planning process and use of production costing, capacity/transmission expansion planning, and other software including PSS/E, PROMOD IV, Strategist, MARS, and EGEAS.

Q HAVE YOU PREVIOUSLY FILED TESTIMONY WITH A REGULATORY COMMISSION?

A Yes. I have filed testimony with the Public Service Commissions of Kansas, Michigan, Missouri, Wisconsin, the New Mexico Public Regulation Commission and the Nevada Public Utilities Commission, in numerous proceedings concerning production cost modeling, net fuel costs, purchase power expense, off-system sales, coal commodity and transportation contracts, cost of service, rate base, unit costs, pro forma operating income, appropriate class rates of return, revenue requirements, integrated resource planning, power plant operations, fuel cost recovery, regulatory issues, environmental compliance, cost recovery, economic dispatch, and various other items.

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