Exhibit No.:	
Issue:	Revenue Requirement
Witness:	Nicholas L. Phillips
Type of Exhibit:	Direct Testimony
Sponsoring Party:	Missouri Industrial Energy Consumers
Case No.:	ER-2012-0166
Date Testimony Prepared:	July 6, 2012

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company, d/b/a Ameren Missouri's Tariff to Increase Its Annual Revenues for Electric Service	)))))	**Case No. ER-2012-0166** Tariff No. YE-2012-0370

Direct Testimony and Schedules of

Nicholas L. Phillips

Revenue Requirement

On behalf of

Missouri Industrial Energy Consumers

NON-PROPRIETARY VERSION

July 6, 2012

BRUBAKER & ASSOCIATES, INC.

Project 9553

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company, d/b/a Ameren Missouri's Tariff to Increase Its Annual Revenues for Electric Service	)	**Case No. ER-2012-0166** Tariff No. YE-2012-0370

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 are my direct testimony and schedules which were prepared in written form for introduction into evidence in Missouri Public Service Commission Case No. ER-2012-0166.

3. I hereby swear and affirm that the testimony and schedules are true and correct and that they show the matters and things that they purport to show.

Nicholas L. Phillips

Subscribed and sworn to before me this 5th day of July, 2012.

MARIA E. DECKER
Notary Public - Notary Seal
STATE OF MISSOURI
St. Louis City
My Commission Expires: May 5, 2013
Commission # 09706793

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company, d/b/a Ameren Missouri's Tariff to Increase Its Annual Revenues for Electric Service	)))))	**Case No. ER-2012-0166** Tariff No. YE-2012-0370

Table of Contents to the Direct Testimony of Nicholas L. Phillips

Page

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company, d/b/a Ameren Missouri's Tariff to Increase Its Annual Revenues for Electric Service	)))))	**Case No. ER-2012-0166** Tariff No. YE-2012-0370

Direct Testimony of Nicholas L. Phillips

I. INTRODUCTION

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 an Associate Consultant with the firm of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory consultants.

Q PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A This information is included in Appendix A.

Q ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A This testimony is presented on behalf of the Missouri Industrial Energy Consumers ("MIEC"). Member companies purchase substantial amounts of electric service from Union Electric Company ("Ameren Missouri" or "Company").

Q PLEASE DESCRIBE YOUR INVOLVEMENT WITH AMEREN MISSOURI'S PAST BASE RATE CASES.

A Under the direction and supervision of my colleague, James R. Dauphinais, in Case Nos. ER-2010-0036 and ER-2011-0028, I performed RealTime production cost simulations and other analyses in support of Mr. Dauphinais' testimony regarding Ameren Missouri's Net Base Fuel Cost. In this current proceeding, I will be directly sponsoring testimony on the *Net Fuel Cost* component of Ameren Missouri's Net Base Fuel Cost. Mr. Dauphinais will be separately sponsoring testimony on the *Other Fuel and Purchased Power Costs* and *Other Sales Revenues* components of Ameren Missouri's Net Base Fuel Cost.

Q WHAT IS THE SUBJECT OF YOUR TESTIMONY?

A My testimony addresses the Net Fuel Cost that Ameren Missouri proposes to include as a part of its Net Base Fuel Cost and ultimately include in its revenue requirement. Specifically, I address Ameren Missouri's assumptions for the minimum generation capability of its coal-fired generation facilities, the Callaway refueling outage duration and the startup fuel blend ratio at the Rush Island generation facility assumed in Ameren Missouri's normalized test year production cost modeling. In addition, I have updated the wholesale electric energy and fuel price input assumptions forecast by the Company to reflect historical data.

The fact that I do not address a particular issue should not be interpreted as approval of any position taken by Ameren Missouri.

Q PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS.

A I recommend that the Missouri Public Service Commission ("Commission") reduce Ameren Missouri's Net Fuel Cost (and, thus, its Net Base Fuel Cost) by not less than $7.7 million. This net $7.7 million reduction includes: (1) a $7.4 million decrease from updating fuel and wholesale electric energy prices; and (2) a $0.3 million reduction correcting the unreasonable minimum generator capability values assumed for the coal-fired generation facilities.

II. NET FUEL COST

Q PLEASE EXPLAIN THE TERM NET FUEL COST.

A Ameren Missouri's Net Fuel Cost consists of fuel and purchased power costs for native load and off-system energy sales less off-system energy sales revenues, as estimated using production cost modeling.

Q WHAT STANDARD SHOULD THE COMMISSION USE TO SET AMEREN MISSOURI'S NET FUEL COST COMPONENT OF AMEREN MISSOURI'S REVENUE REQUIREMENT?

A It should be set on the same standard as the remainder of Ameren Missouri's Net Base Fuel Cost and ultimately Ameren Missouri's revenue requirement. Specifically, it should be set in this proceeding based on Ameren Missouri's actual costs during the historic test year ending September 30, 2011 adjusted as necessary for known and measurable changes from the true-up period that ends July 31, 2012 and normalized to annualize periodic expenses and address abnormalities such as annual swings in weather and commodity market prices.

Q WHAT IS THE TOTAL ANNUAL NET FUEL COST THAT AMEREN MISSOURI PROPOSED IN ITS ORIGINAL FILING IN THIS PROCEEDING?

A Ameren Missouri, in its original filing, proposed a Net Fuel Cost of approximately $555 million. This consists of Fuel Costs of approximately $866 million plus Purchased Power Costs of approximately $30 million less Off-System Energy Sales Revenues of approximately $341 million (Direct Testimony of Mark Peters, page 3).

Q HAS AMEREN MISSOURI FILED ANY MODIFICATIONS TO ITS NORMALIZED TEST YEAR PRODUCTION COST RUN SINCE FILING ITS DIRECT CASE?

A Not at this time. However, in a June 27, 2012 e-mail to the parties in this proceeding, the Company notified the parties of an error in the Company's Net Fuel Cost production cost run resulting in an overstatement of the Company's Net Fuel Cost of $1.9 million. This e-mail is attached to my testimony as Schedule NLP-1. It is my understanding that the Company intends to make this correction when it files an updated Net Fuel production cost run. I would note that all adjustments I make to the Company's proposed Net Fuel Cost will be referenced against its original filed case.

Q IN ITS E-MAIL TO THE PARTIES, DID THE COMPANY EXPLAIN THE ERROR IN ITS NORMALIZED TEST YEAR PRODUCTION COST RUN?

A Yes. The Company explained that the error was in a file containing hourly wholesale electric energy prices input into the normalized test year production cost run.

Q PLEASE DESCRIBE YOUR REVIEW OF AMEREN MISSOURI'S PROPOSED NET FUEL COST AMOUNT.

A I reviewed the direct testimony and schedules of Ameren Missouri witnesses Peters and Haro in regard to Net Fuel Cost. I also reviewed Ameren Missouri's response to data requests in this proceeding that relate to the issue. As discussed in Appendix B of this testimony, Brubaker & Associates, Inc. ("BAI") developed a working version of a production cost model database for the Ameren Missouri system using the RealTime production cost software of The Emelar Group. The development of this production cost model allowed BAI to use the RealTime production cost software to calculate the estimated impact on Net Fuel Cost from updating and correcting the inputs Ameren Missouri used in its own PROSYM production cost modeling. Finally, I applied my experience to the information available in considering the reasonableness of Ameren Missouri's proposed Net Fuel Cost amount. As I have noted, I found issues with several of Ameren Missouri's production cost input assumptions.

II.A. Net Fuel Cost – Production Cost Modeling

Q PLEASE EXPLAIN WHAT PRODUCTION COST MODELING IS AND HOW IT IS BEING USED IN THIS PROCEEDING.

A As Mr. Peters indicated in his direct testimony, production cost modeling allows the simulation of an electric utility's generation system and load obligations. The costs for fuel, heat rate of generators, hourly market price, generation outage assumptions, hourly loads and many other items are inputs to the model. The model then performs a commitment and dispatch of generation to meet hourly load obligations. In addition, the model makes use of the hourly market prices and forward contracts that are inputs to the model to estimate hourly off-system energy purchases and sales. In this

proceeding, Ameren Missouri is using production cost modeling to estimate its Net Fuel Cost using normalized loads and market prices.

Q PLEASE DESCRIBE THE REALTIME PRODUCTION COST MODEL AND HOW YOU HAVE USED IT IN THIS PROCEEDING.

A RealTime is a production cost software package similar to the PROSYM production cost software package used by Ameren Missouri. It is a product of The Emelar Group. Both RealTime and PROSYM are competent models for estimating utility production cost. In Case No. ER-2008-0318, it was shown by the Commission Staff, and accepted by Ameren Missouri, that the RealTime software can produce substantially the same results for Ameren Missouri's Net Fuel Cost as the PROSYM software used by Ameren Missouri when inputs to both production cost models are similar.

The Commission Staff has been using the RealTime software for over 10 years with respect to electrical corporations over which the Commission has ratemaking jurisdiction. The Commission Staff used the RealTime software in Ameren Missouri's general electric rate proceedings (i.e., Case Nos. ER-2007-0002, ER-2008-0318, ER-2010-0036, and ER-2011-0028) in order to examine the reasonableness of Ameren Missouri's projections of its Net Fuel Cost. MIEC also utilized the RealTime software in Case Nos. ER-2010-0036 and ER-2011-0028 to examine the reasonableness of Ameren Missouri's projections of its Net Fuel Cost.

In this proceeding, I used the RealTime software to estimate how Ameren Missouri's proposed Net Fuel Cost will change when I update and correct certain assumptions made by Ameren Missouri. It is my understanding that the Commission

Staff is intending to use the RealTime software for a similar purpose in this proceeding.

Q HAS AMEREN MISSOURI PERFORMED A CALIBRATION RUN TO DEMONSTRATE THE ACCURACY OF THE MODEL TO ACTUAL HISTORICAL OPERATION?

A No. In response to MIEC Data Request 3.1, Mr. Peters states that while the Company did in fact perform calibrations in the previous three electric rate cases, it chose not to perform such a calibration run in this case. A copy of this data response is attached to my direct testimony as Schedule NLP-2.

Q WHAT HAS BEEN DONE IN THIS PROCEEDING TO ENSURE THE REALTIME MODEL PROVIDES RESULTS SIMILAR TO THOSE WHICH WOULD BE PROVIDED BY THE PROSYM MODEL?

A BAI, on behalf of MIEC, developed a RealTime model database for this proceeding using the inputs that Ameren Missouri used for its normalized test year Net Fuel Cost PROSYM model runs in this proceeding. This RealTime case, which I will refer to as the "BAI Benchmark Case," projected a Net Fuel Cost within $0.8 million of the Net Fuel Cost projected by Ameren Missouri through its corrected PROSYM run for the normalized test year in this proceeding. Appendix B to this testimony provides a more detailed discussion on the development of the BAI Benchmark Case and how its estimate of Net Fuel Cost compares to that of Ameren Missouri's corrected PROSYM run for the normalized test year.

Q AFTER BENCHMARKING TO AMEREN MISSOURI'S CORRECTED NORMALIZED TEST YEAR PRODUCTION COST RUN, DID YOU UPDATE ANY ASSUMPTIONS MADE BY THE COMPANY TO REFLECT MORE CURRENT INFORMATION?

A Yes. In particular, I updated the normalized wholesale electric energy prices as well as the fuel price assumptions used by the Company in its normalized test year production cost run. I intend to further monitor and update these known and measurable input assumptions as necessary with additional historic data through the end of the July 31, 2012 true-up period, as those inputs become available.

Q PLEASE DESCRIBE IN DETAIL HOW YOU UPDATED THE WHOLESALE ELECTRIC ENERGY PRICES USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN.

A As Mr. Haro indicates on pages 7 and 8 of his direct testimony, the normalized wholesale electric energy prices used in the normalized test year production cost run are developed using 36 months of actual day-ahead locational marginal prices ("LMPs") received by Ameren Missouri in the Midwest ISO energy market. At the time of its filing, the Company used 27 months of historical data, plus basis-adjusted forward energy prices for nine months. For the purposes of this update, I used the same methodology as Mr. Haro for aggregating the actual LMPs for each of Ameren Missouri's generating units into a single hourly LMP. This methodology uses a weighting system based on total energy production of all of Ameren Missouri's generating resources. I updated the actual LMPs through April 30, 2012.

I also updated the remaining three months of basis-adjusted forward energy prices to reflect forward energy prices for May, June and July of 2012 using forward prices from the last trading date in April. The forward energy prices used were

forward prices for Indiana Hub obtained from Platts ICE on April 27, 2012. A basis differential[1] was then applied to reflect the difference in delivery location.

The result of my update was an Around-the-Clock ("ATC") wholesale electric energy price of $27.96 per MWh, a reduction of $1.71 per MWh over what the Company calculated.

Q PLEASE DESCRIBE IN DETAIL HOW YOU UPDATED THE FUEL COMMODITY AND TRANSPORTATION PRICES USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN.

A Similar to the wholesale electric energy prices, the fuel commodity and transportation prices used by the Company in its normalized test year production cost run included both historical and forecasted prices.

For both fuel oil and natural gas, a single monthly price was used (each commodity), for both dispatch and accounting costs in the production cost model. The normalized prices used for these commodities will ultimately be based on historical spot prices for 36 months ending July 31, 2012.

The natural gas prices the Company used in its original normalized test year production cost run included nine months of basis adjusted forward prices for those months where historical spot prices were not yet available. Similar to the update of the wholesale electric energy prices, I updated the monthly natural gas prices with an average of actual spot prices through April 30, 2012.[2] I also updated the remaining three months of basis adjusted forward natural gas prices to reflect forward natural gas prices for May, June and July 2012 using forward prices for Henry Hub from the

[1]The basis differential is derived from the Company's response to MIEC Data Request 8.19.
[2]The daily spot prices used in the average were obtained from NYMEX for Henry Hub.

last trading day in April and applied a basis differential[3] to account for a difference in delivery location.

Fuel oil prices were updated using the prices provided in response to MPSC Data Request 106, found in the file "MPSC-MPSC_0106___Lisa_Ferguson-Att-MPSC 0106_Oil Prices_HC.xlsx".

The adjustment for coal prices is more complex than that for natural gas and fuel oil because there are two sets of coal prices used in the production cost model, dispatch prices and accounting prices.

Q PLEASE DESCRIBE THE DIFFERENCE BETWEEN A DISPATCH PRICE AND AN ACCOUNTING PRICE IN THE CONTEXT OF THE PRODUCTION COST MODEL?

A "Dispatch" fuel prices are used internally within production costing software to determine the economic dispatch of the generators and, in turn, the amount of coal burned at each generation facility. In this proceeding, dispatch coal prices are based on monthly spot prices for coal, as opposed to the actual or projected contracted coal prices.

Once the software calculates the volume of coal burned at each generation facility based on the dispatch coal prices, Ameren Missouri's true cost is calculated for coal by multiplying the accounting coal price (i.e., Ameren Missouri's actual or projected contract price for the coal) by the volume of coal burned.

[3]The basis differential is derived from Mr. Peters' workpaper "Ameren_1-UE_DIR_008-Att-3-Reference Table MPSC2011 ThruSep11 Rev1 upd 10-28-11 - HC.xlsx".

Q PLEASE DESCRIBE IN DETAIL HOW YOU UPDATED THE ACCOUNTING COAL COMMODITY AND TRANSPORTATION PRICES USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN.

A Using the data provided by the Company in response to MPSC Staff Data Request 90, MPSC Staff's response to MIEC Data Request 1.1, and after reviewing all of Ameren Missouri's current coal commodity and coal transportation contracts, I developed accounting coal prices that reflect the historical contracted costs incurred by Ameren Missouri for the 12-month period ending December 31, 2011. The prices include mine specific commodity costs, transportation costs (both rail and barge), an adjustment for All Inclusive Index Less Fuel ("AIILF") costs, diesel hedging costs, fuel surcharges, railcar costs and demurrage costs. The methodology I used was consistent with the methodology that has been used in the past by the MPSC Staff when performing the fuel runs used for purposes of stipulation in Case No. ER-2011-0028. The result is an annualized effective accounting price for coal at each of Ameren Missouri's coal-fired generating facilities.

Q PLEASE DESCRIBE IN DETAIL HOW YOU UPDATED THE DISPATCH COAL COMMODITY AND TRANSPORTATION PRICES USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN.

A The coal dispatch prices used in the normalized test year production cost run are based on 36 months of historical spot prices for coal commodity and current coal transportation costs. The coal dispatch prices the Company used in its original normalized test year production cost run included nine months of forward coal prices. Similar to the update of the wholesale electric energy prices and natural gas prices, I updated the forward coal prices through April 30, 2012 with the average of the

monthly spot prices provided by the Company in response to MIEC Data Request 8.28.[4] I also updated the remaining three months of forward coal prices to reflect forward coal prices for May, June and July 2012 using forward prices from the Coal Report published on April 30, 2012. I then converted all per ton costs into per MMBtu costs, added the current transportation component calculated for the accounting coal prices as well as the NO_x, SO_2 and limestone adders used by the Company in its calculation of dispatch coal costs found in Mr. Peters' workpaper "Ameren_1-UE_DIR_008-Att-3-Reference Table MPSC2011 ThruSep11 Rev1 upd 10-28-11 - HC.xlsx". I propose to monitor and update these prices as necessary as more current data becomes available.

Q HAVE YOU RERUN YOUR PRODUCTION COST MODEL FOR THE NORMALIZED TEST YEAR USING THE UPDATED WHOLESALE ELECTRIC ENERGY PRICES AND UPDATED FUEL COMMODITY AND TRANSPORTATION PRICES?

A Yes. Our RealTime production cost run of this update, which is summarized in Schedule NLP-3, reduced Ameren Missouri's original proposed Net Fuel Cost by approximately $7.4 million.

Q FROM YOUR REVIEW OF AMEREN MISSOURI'S INPUTS TO ITS PRODUCTION COST MODEL FOR ITS PROPOSED NET FUEL COST, HAVE YOU IDENTIFIED ANY INPUTS THAT YOU FOUND UNREASONABLE?

A Yes. I will continue my review of Ameren Missouri's production cost modeling (and will review the direct testimony of other parties concerning that modeling). However,

[4]Note that the Company did not provide spot prices for Illinois Basin coal in response to MIEC Data Request 8.28. My updated Illinois Basin coal prices are based on quarterly spot prices for Illinois Basin coal published in the SNL Energy Coal Report.

as of the date of this testimony, I found inputs that Ameren Missouri used that I consider to be unreasonable.

Q WHAT ARE THE INPUTS YOU CONSIDER TO BE UNREASONABLE?

A They are as follows:

- The minimum generation capability assumptions for Ameren Missouri's coal-fired generation facilities;
- The refueling outage duration assumed at the Callaway nuclear facility; and
- The startup fuel blend ratios assumed at the Rush Island generating facility.

II.A.1. Assumed Minimum Generating Capability of the Coal-Fired Generation Facilities

Q PLEASE EXPLAIN YOUR CONCERN WITH THE MINIMUM GENERATION CAPABILITY VALUES THAT AMEREN MISSOURI ASSUMED FOR ITS COAL-FIRED GENERATING FACILITIES.

A Ameren Missouri assumed minimum generating capabilities for its coal-fired generating facilities that are overly restrictive. These inputs into the PROSYM production cost model by Ameren Missouri do not reflect the normal unit minimums and, as such, are unreasonably high.

Q PLEASE EXPLAIN HOW YOU DETERMINED THAT THE ASSUMED MINIMUM CAPABILITIES USED BY AMEREN MISSOURI IN ITS NORMALIZED TEST YEAR PRODUCTION COST RUN WERE UNREASONABLE?

A As indicated by Mr. Haro at pages 7 and 8 of his direct testimony, the production cost model simulations used in this proceeding simulate the Midwest Independent Transmission System Operator, Inc. ("MISO") day-ahead market dispatch of Ameren

Missouri's generation fleet. This is appropriate because approximately 97% of Ameren Missouri's generation commitment and dispatch has historically occurred in the MISO day-ahead energy market.

To most accurately reflect the dispatch of Ameren Missouri's generation fleet in the MISO day-ahead energy market, the minimum generator capability assumed in production cost modeling should correspond to the minimum sized generation block that can normally be offered into the MISO day-ahead energy market for each generator. Table 1 below compares the minimum generator capabilities used in the normalized test year production cost run[5] to the unit minimums provided by Ameren Missouri in response to MIEC data requests.[6]

TABLE 1

Coal-Fired Generators

Unit	Assumed by Ameren Missouri (MW)	Ameren Missouri's Normal Unit Minimums (MIEC 9.1)
Labadie 1	** **	** **
Labadie 2	** **	** **
Labadie 3	** **	** **
Labadie 4	** **	** **
Meramec 1	** **	** **
Meramec 2	** **	** **
Meramec 3	** **	** **
Meramec 4	** **	** **
Rush Island 1	** **	** **
Rush Island 2	** **	** **
Sioux 1	** **	** **
Sioux 2	** **	** **

[5]Workpaper of Mark Peters, "Ameren_1-UE_DIR_008-Att-17-uebaseMarket.dat".
[6]Ameren Missouri Response to MIEC Data Request 9.1.

Q WHAT GENERATING UNIT CAPABILITIES DO YOU RECOMMEND BE USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN?

A I recommend using the minimum capabilities provided by Ameren Missouri in response to MIEC Data Request 9.1, presented above in Table 1.

Q HAVE YOU RERUN YOUR PRODUCTION COST MODEL FOR THE NORMALIZED TEST YEAR USING THE ADJUSTED MINIMUM GENERATION CAPABILITY VALUES OF AMEREN MISSOURI'S COAL GENERATION FACILITIES?

A Yes. Our rerun for this adjustment, which is summarized in Schedule NLP-3, reduced Ameren Missouri's proposed Net Fuel Cost by approximately $0.3 million. I recommend that this adjustment be made and that the adjusted capability levels be used for Ameren Missouri's coal-fired generating facilities in true-up production cost runs for the normalized test year in this proceeding.

II.A.2. Assumed Duration of the Normalized Callaway Refueling Outage

Q CAN YOU PLEASE EXPLAIN YOUR CONCERN WITH THE ASSUMED DURATION OF THE NORMALIZED CALLAWAY REFUELING OUTAGE?

A Yes, I have two concerns. First, in the Company's response to MIEC Data Request 3.11, Mr. Peters states that,

> **_____
> _____
> _____
> _____
> _____
> _____****

Second, I have a concern with the inclusion of the full duration of refueling outage 18 in the calculation of the normalized Callaway refueling outage.

Q CAN YOU PLEASE EXPLAIN YOUR CONCERN WITH INCLUDING THE FULL DURATION OF REFUELING OUTAGE 18 IN THE CALCULATION OF THE NORMALIZED CALLAWAY REFUELING OUTAGE?

A In the Company's response to MPSC Data Request 84,[7] the Company admits,

> "Callaway Plant struggled with schedule performance during Refuel 18. Total outage duration was scheduled for 30 days and completed at 41.1 days."

and continues,

> "Due to various issues in Refuel 18, the original schedule ended up extending by about 11 days (720 hours original duration, 988 hours final duration). Lack of Site preparation challenged Refuel performance by missing or jeopardizing numerous milestones prior to refuel start. A Common Cause Analysis was performed and revealed one prevalent common cause after breaker open: inadequate preparation, oversight, and contingency planning by the Reactor Service Organization."

Due to the Company's admission of mismanagement regarding the refueling 18 outage, I do not believe it is reasonable to include the full duration of this outage in the Callaway refueling outage normalization.

Q WHAT NORMALIZED REFUELING OUTAGE DURATION DO YOU RECOMMEND BE USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN?

A I am withholding a recommendation at this time for the reasons cited previously. However, I plan to have further discussions with the Company to better understand the reasonableness of its position regarding the inclusion of the entire duration related to refueling outage 18 in the calculation of the normalized Callaway refueling outage.

[7] A copy of the Company's response to MPSC Data Request 84 is attached to my colleague, Greg Meyer's, direct testimony as Schedule GRM-1.

II.A.3. Assumed Rush Island Start Fuel Blend Ratio

Q CAN YOU PLEASE EXPLAIN YOUR CONCERN WITH THE RUSH ISLAND START FUEL BLEND RATIO?

A Yes. The start fuel blend ratio modeled at the three coal-fired generating facilities (Labadie, Rush Island and Sioux), which burn fuel oil blended with coal as their startup fuel, was modified by the Company from the ratios presented in Case No. ER-2011-0028. This created a more oil-rich start fuel blend burned at each of these facilities. Upon review of the Company's first supplemental response to MIEC Data Request 4.3, I conclude that the adjusted Rush Island Start fuel blend ratio proposed by the Company overstates the amount of fuel oil burned during startup at the Rush Island generating facility.

Q HAS AMEREN MISSOURI PROVIDED ANY EXPLANATION FOR WHY IT ADJUSTED THE RUSH ISLAND START FUEL BLEND RATIO?

A Yes, in the Company's first supplemental response to MIEC Data Request 4.3, Mr. Peters states:

> ** _____
> _____
> _____
> _____
> _____
> _____
> _____ **
>
> * * *
>
> ** _____
> _____
> _____
> _____
> _____ **

Q PLEASE EXPLAIN IN DETAIL HOW YOU PRELIMINARILY DETERMINED THE STARTUP FUEL BLEND RATIO FOR THE RUSH ISLAND GENERATING FACILITY USED IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN OVERSTATES THE AMOUNT OF OIL BURNED DURING STARTUP.

A My preliminary determination was based on a workbook provided in the Company's first supplemental response to MIEC Data Request 4.3. The workbook details oil consumption, as well as hot and cold starts by plant, for the last five years. Preliminary analysis of this data suggested that the **___** oil to **___** coal ratio assumed by the Company may overstate the amount of oil burned per start at Rush Island.

Q WHAT RUSH ISLAND START FUEL BLEND RATIO DO YOU RECOMMEND FOR USE IN THE NORMALIZED TEST YEAR PRODUCTION COST RUN?

A I do not recommend adjusting the Rush Island startup fuel blend ratio at this time. However, I plan on having further discussions with the Company to ensure full understanding of its proposed methodology and the reasonableness of its results.

Q HAVE YOU RERUN YOUR PRODUCTION COST MODEL FOR THE NORMALIZED TEST YEAR USING THE ADJUSTED RUSH ISLAND START FUEL BLEND RATIO THAT YOU RECOMMEND?

A No, because I am withholding a recommendation at this time, pending further analysis and discussions with the Company.

III. CONCLUSIONS AND RECOMMENDATIONS

Q PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS.

A I recommend that the Commission reduce Ameren Missouri's Net Fuel Cost (and, thus, its Net Base Fuel Cost) by not less than $7.7 million. This net $7.7 million reduction includes: (1) a $7.4. million decrease from updating fuel and wholesale electric energy prices; and (2) a $0.3 million dollar reduction correcting the unreasonable minimum generator capability values assumed for the coal-fired generation facilities.

In total, I am recommending Ameren Missouri's proposed net fuel cost be lowered by $7.7 million.

Q DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A Yes, it does.

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 an Associate Consultant 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. 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. 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. I am currently working toward a Master of Engineering in Electrical Engineering (with an emphasis in Power Systems Engineering) through Iowa State University's Engineering Distance Education Program. At this time I have completed 80% of my

coursework. 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, and Linear System Theory.

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. I am a member of the Institute of Electrical and Electronics Engineers. 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 was formed in April 1995. 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.

Appendix B

Benchmarking RealTime to the Ameren Missouri PROSYM Production Cost Model

Q PLEASE EXPLAIN HOW BAI DEVELOPED ITS "BAI BENCHMARK CASE" THAT WAS USED TO COMPARE THE RESULTS OF THE EMELAR GROUP REALTIME PRODUCTION COST SIMULATION MODEL TO THE RESULTS OF THE PROSYM PRODUCTION COST SIMULATION MODEL.

A We started with the MIEC's Benchmark production cost model database for RealTime that was developed by the MIEC in Case No. ER-2011-0028. We then modified the inputs to that database to as closely as possible, within the bounds of the capability of the RealTime program, match the inputs that Ameren Missouri used in its direct testimony normalized test year PROSYM run based on our review of the workpapers of Mr. Peters, workpapers of Mr. Haro and Ameren Missouri's responses to data requests in this proceeding.

Q CAN YOU PLEASE DETAIL HOW THE RESULTS OF THE BAI BENCHMARK CASE COMPARE TO THAT OF THE DIRECT TESTIMONY NORMALIZED TEST YEAR PROSYM PRODUCTION COST MODEL RUN PERFORMED BY AMEREN MISSOURI?

A Yes. As detailed in Schedule NLP-5, the results of the BAI Benchmark Case yielded a Net Fuel Cost of $552.724 million versus the $553.530 million Net Fuel Cost yielded from the Ameren Missouri normalized test year PROSYM production cost simulation model run. Thus, in aggregate, the BAI Benchmark Case results are within approximately $806,000, or 0.15%, of the Ameren Missouri normalized test year

PROSYM run. In addition, as also detailed in Schedule NLP-4, the annual MWh of energy production at each of Ameren Missouri's nuclear, coal and hydroelectric stations in the BAI Benchmark Case is within ±2.7% of the level they are in Ameren Missouri's normalized test year PROSYM run. Furthermore, Ameren Missouri's annual off-system energy sales MWh in the BAI Benchmark Case are within ±1.25% of the level they are in Ameren Missouri's normalized test year PROSYM run. The only significant differences between the BAI Benchmark Case and Ameren Missouri normalized test year PROSYM run relate to combustion turbine generation and purchased power. The BAI Benchmark Case has **_____** or approximately 72% more combustion turbine energy production than the Ameren Missouri normalized test year PROSYM run and **_____** or approximately 25% less purchased power. However, this difference does not have a significant impact on predicting Net Fuel Cost since Net Fuel Cost in aggregate is within 0.15%; individual nuclear, coal and hydroelectric station MWh production is all within ±2.7%; and off-system energy sales and purchases are each within ±1.25%.

Q HAVE YOU ALSO BENCHMARKED THE REALTIME MODEL AGAINST AMEREN MISSOURI'S CALIBRATION PROSYM RUN?

A No. The Company did not provide such a run.

Q WHAT DO YOU CONCLUDE REGARDING THE BENCHMARKING ANALYSIS OF REALTIME PERFORMED BY BAI UNDER YOUR DIRECTION AND SUPERVISION?

A When utilizing the same inputs as Ameren Missouri, the RealTime program provides Net Fuel Cost results nearly identical to that of the PROSYM program used by

Ameren Missouri. As such, RealTime can be reasonably utilized to calculate the impact that changes to the input assumptions used by Ameren Missouri will have on Ameren Missouri's Net Fuel Cost.

\\Doc\Shares\ProlawDocs\TSK\9553\Testimony-BAI\221277.doc

Klossner, Tammy

From: Brubaker, Maurice [mbrubaker@consultbai.com]
Sent: Wednesday, June 27, 2012 9:13 AM
To: MEBMail
Subject: FW: ER-2012-0166

Categories: Workpapers, Notes

From: Jim Lowery
Sent: Wednesday, June 27, 2012 10:10:35 AM (UTC-05:00) Eastern Time (US & Canada)
To: 'Byrne, Thomas M'; Mills, Lewis; 'John Coffman (AARP CCM)'; llangeneckert@sandbergphoenix.com; 'roger.steiner@kcpl.com'; 'David Woodsmall'; Frazier, Jennny; Young, Mary Ann; Vuylsteke, Diana M.; tschwarz@blitzbardgett.com; 'Henry Robertson'; Dottheim, Steve
Cc: Byrne, Thomas M; Tatro, Wendy K; Peters, Mark J; Cheryl Lobb; Donohue, Julie E
Subject: ER-2012-0166

Good Morning:

We wanted to let you know that an error was found in an input file underlying the Company's fuel run on which its direct case was based. The error, which was in a file containing hourly energy prices, resulted in an over-statement of the Company's net fuel costs of approximately $1.9.

Corrected workpapers (for Ameren Missouri witness Mark Peters) have been uploaded to the Caseworks extranet site. Those parties engaged in fuel modeling work for this case (the Staff and MIEC, to the Company's knowledge) have previously been advised.

Ameren Missouri
Response to MIEC Data Request
MPSC Case No. ER-2012-0166
In the Matter of Union Electric Company d/b/a Ameren Missouri's Tariffs to Increase Its Revenues for Electric Service

Data Request No.: MIEC 3.1 - Diana Vuylsteke

The Company presented a "calibration" run to demonstrate the degree of accuracy of its ProSym production cost model versus actual historical operation of the Ameren Missouri system in Docket Nos. ER-2011-0028, ER-2010-0036, ER-2008-0318, ER-2007-0002. Please explain in detail why no "calibration" run was presented in this current proceeding to demonstrate the degree of accuracy expected from ProSym versus actual historical operation of the Ameren Missouri system during a known historical test period.

RESPONSE

Prepared By: Mark J. Peters
Title: Managing Supervisor
Date: 03/30/2012

Ameren Missouri believes that the consistent and very well calibrated results provided in these prior cases (within ½% and 1% respectively in the past two cases for example) have adequately demonstrated the validity of the model, and that such further testing in the face of such consistent results was unnecessary.

Non-Proprietary

Ameren Missouri

Case No. ER-2012-0166

Production Cost Modeling (Net Fuel Cost) Adjustments Proposed by MIEC

	Incremental Increase/(Decrease)	Net Fuel Cost	Gross Fuel Cost	OSS Revenues	Coal Fuel Cost	Nuclear Fuel Cost	Oil/Gas Fuel Cost	Spot Purchased Power	Wind Purchased Power
(ORIGINAL) Ameren Missouri ProSym Case-in-Chief		$ 555,428,954	$ 896,729,954	$341,301,000					
BAI Update	$ (7,395,451)	$ 548,033,503	$ 923,850,959	$375,817,456					
BAI Adjustment 1 - Minimum Capability Values	$ (331,596)	$ 547,701,907	$ 919,922,195	$372,220,288					

	Net MWh	Gross MWhs	Native Load MWhs	OSS MWhs	Coal MWh	Nuclear MWh	Oil/Gas MWh	Spot Purchased Power	Wind Purchased Power	Pumped Storage MWhs	Hydro MWhs
(ORIGINAL) Ameren Missouri ProSym Case-in-Chief											
BAI Update											
BAI Adjustment 1 - Minimum Capability Values											

Notes

Gross is a summation of all coal, nuclear, gas, oil, hydro, and purchased power (both spot purchases and wind)
Net is the difference of gross and off system sales
Native load is the summation of Net and pumped storage
Nuclear Fuel Cost Includes Spent Fuel Charge
BAI update includes updates to assumed prices for fuel oil, natural gas, coal, and wholesale electric energy prices

Non-Proprietary

Ameren Missouri

Case No. ER-2012-0166

Comparison of BAI Benchmark Case to Ameren Missouri Normalized Test Year Production Cost Run

All Numbers in MWh

		October	November	December	January	February	March	April	May	June	July	August	September	Total	Percent Difference BAI vs. ProSym
Callaway	ProSym														0.50%
	BAI														
	ProSym-BAI														
Rush	ProSym														-1.06%
	BAI														
	ProSym-BAI														
Labadie	ProSym														-1.01%
	BAI														
	ProSym-BAI														
Sioux	ProSym														-2.68%
	BAI														
	ProSym-BAI														
Meramec	ProSym														-2.18%
	BAI														
	ProSym-BAI														
Osage	ProSym														0.16%
	BAI														
	ProSym-BAI														
Keokuk	ProSym														0.00%
	BAI														
	ProSym-BAI														
CTG	ProSym														72.35%
	BAI														
	ProSym-BAI														
Purchases	ProSym														24.51%
	BAI														
	ProSym-BAI														
Sales	ProSym														1.25%
	BAI														
	ProSym-BAI														
Net	ProSym														0.06%
	BAI														
	ProSym-BAI														
Coal	ProSym														-1.45%
	BAI														
	ProSym-BAI														
Hydro	ProSym														0.07%
	BAI														
	ProSym-BAI														
Ameren Gen	ProSym														0.10%
	BAI														
	ProSym-BAI														

Non-Proprietary

Ameren Missouri

Case No. ER-2012-0166

Production Cost Modeling (Net Fuel Cost) Benchmark Comparison by MIEC

	Difference vs Ameren Missouri Corrected Case-in-Chief	Net Fuel Cost	Gross Fuel Cost	OSS Revenues	Coal Fuel Cost	Nuclear Fuel Cost	Oil/Gas Fuel Cost	Spot Purchased Power	Wind Purchased Power
(CORRECTED) Ameren Missouri ProSym Case-in-Chief		$ 553,530,339	$ 922,070,339	$368,540,000					
BAI Benchmark	$ (806,670)	$ 552,723,669	$ 943,051,024	$390,327,355					

	Net MWh	Gross MWhs	Native Load MWhs	OSS MWhs	Coal MWh	Nuclear MWh	Oil/Gas MWh	Spot Purchased Power	Wind Purchased Power	Pumped Storage MWhs	Hydro MWhs
(CORRECTED) Ameren Missouri ProSym Case-in-Chief											
BAI Benchmark											

Notes

Gross is a summation of all coal, nuclear, gas, oil, hydro, and purchased power (both spot purchases and wind)
Net is the difference of gross and off system sales
Native load is the summation of Net and pumped storage
Nuclear Fuel Cost Includes Spent Fuel Charge