Exhibit No.: 624NP
Issue(s): Fuel Cost Uncertainty and
Volatility; COLA
Witness: Ajay K. Arora
Sponsoring Party: Union Electric Company
Type of Exhibit: Surrebuttal Testimony
Case No.: ER-2008-0318
Date Testimony Prepared: November 5, 2008

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2008-0318

SURREBUTTAL TESTIMONY

OF

AJAY K. ARORA

ON

BEHALF OF

UNION ELECTRIC COMPANY
d/b/a AmerenUE

DENOTES HIGHLY CONFIDENTIAL INFORMATION

Exhibit No. 624NP
Case No(s). ER-2008-0318
Date 12/11/08   Rptr PF

St. Louis, Missouri
November, 2008

NP

TABLE OF CONTENTS

1   SURREBUTTAL TESTIMONY

2   OF

3   AJAY K. ARORA

4   CASE NO. ER-2008-0318

5   I.   INTRODUCTION AND SUMMARY

6   Q.   Please state your name.

7   A.   Ajay K. Arora.

8   Q.   Are you the same Ajay K. Arora who filed direct and rebuttal testimonies in

9   this case?

10   A.   Yes, I am.

11   Q.   What is the purpose of your surrebuttal testimony?

12   A.   My surrebuttal testimony responds to the rebuttal testimony of Staff Witness Dr.

13   Michael S. Proctor, in which he addresses the uncertainty and volatility analysis of Union

14   Electric Company d/b/a AmerenUE's (AmerenUE or Company) net fuel costs that was presented

15   in my direct testimony. I also respond to Office of Public Counsel witness Mr. Ryan Kind's

16   rebuttal testimony in regards to AmerenUE's recently-filed application for a Combined

17   Construction and Operating License (COLA) for a possible Unit 2 at the Callaway Plant site.

18   Q.   Please summarize the organization of your surrebuttal testimony?

19   A.   I first describe why the results of the Company's uncertainty and volatility

20   analysis are highly intuitive, given the real-world operation of AmerenUE's business, without

21   debating intricate technical points relating to the analysis. I will show there is significant

22   uncertainty in the components of net fuel costs (fuel and purchased power as well as off-system

1   sales) and why the uncertainties in these components will not be able to offset each other to

2   reduce uncertainty in net fuel costs.

3   Next I outline several areas of general agreement with Dr. Proctor, including his

4   agreement about:

5   • the appropriateness of my analytical approach;
6   • my interpretation of the obtained simulation results; and
7   • the fact that there is not significant correlation between AmerenUE's hedged fuel
8   costs and power market prices.

9   Given these above general areas of agreement, I will demonstrate why my analysis and

10   the corresponding results are in fact representative of real world, or actual operational

11   uncertainty and volatility in AmerenUE's net fuel costs.

12   Third, I identify areas where there are differences of opinion respecting the

13   implementation of the uncertainty analysis and address apparent misunderstandings of the

14   analysis on Dr. Proctor's part. I will describe how the analytical approach I took is in fact based

15   on the practical operational realities of AmerenUE's business and on established risk

16   management practices. I contrast the practical operational realities of AmerenUE's business and

17   the uncertainty and volatility faced by AmerenUE given these operational realities with

18   Dr. Proctor's largely theoretical approach to analyzing the same questions. I demonstrate that a

19   theoretical approach, that ignores these operational realities and real-world market conditions,

20   fails to account for the uncertainty and volatility AmerenUE faces in its net fuel costs.

21   Finally, I address Mr. Kind's contention that the Company has not shown that applying

22   for a COLA for a possible Callaway Unit 2 is prudent. To the contrary, given substantial tax

23   credits under 2005 federal legislation that would have been lost forever had AmerenUE not

24   applied for a COLA when it did, it would have been imprudent not to apply for the COLA.

1   **Q.**   **Please summarize the key conclusions presented in this surrebuttal testimony.**

2   A.   My key conclusions are as follows:

3   •   The existence of substantial uncertainty (volatility) in AmerenUE's net fuel costs
4   is highly intuitive and is borne out by observed historical uncertainty in the
5   components of net fuel costs and in the large variation in AmerenUE's actual,
6   historical forecasts of net fuel costs, even with substantial fuel hedges in place
7   going into each calendar year.
8

9   •   Off-system sales simply cannot be expected to offset AmerenUE's locked-in,
10   hedged coal cost increases, particularly given that AmerenUE generates
11   approximately four times as much electricity from coal-fired generation than it
12   sells in the off-system power market. This means that power prices would have to
13   increase by approximately four times as much as coal prices to offset the already
14   known coal cost increases.
15

16   •   Dr. Proctor agrees that AmerenUE's hedged coal costs and spot power prices lack
17   significant correlation. Given the operational reality that approximately **___**
18   of AmerenUE's off-system sales are made into daily spot power markets (at daily
19   spot power prices), while coal costs going into a particular year are 90-100%
20   hedged, means there is no correlation between AmerenUE's hedged coal costs
21   and spot power prices. Dr. Proctor's theoretical discussion of correlations
22   between spot coal prices and spot power prices is not reflective of AmerenUE's
23   actual operational risk exposure and does not address the analysis that is
24   necessary to quantify uncertainty in net fuel costs.
25

26   •   Dr. Proctor misunderstood that my analysis of net fuel cost uncertainty for the
27   "test year" was an analysis of uncertainty that existed at the beginning of – or
28   "going into" – the test year, not an after-the-fact look back at what happened
29   during the test year. This led Dr. Proctor to erroneously conclude that my
30   uncertainty analysis overstated uncertainty in AmerenUE's net fuel costs. In fact,
31   my analysis is quite consistent with actual observed historical uncertainty in net
32   fuel costs, thus validating my results.
33

34   •   Dr. Proctor also misunderstood the fact that the uncertainty of net fuel costs I
35   have quantified and summarized in Table 1 of my direct testimony is the modeled
36   uncertainty of average annual fuel costs across 250 simulations of potential
37   market outcomes. It is not, as Dr. Proctor seems to believe, the daily or monthly
38   net fuel cost uncertainty AmerenUE faces during a particular year. My Table 1
39   also shows that uncertainty in average annual net fuel costs is lowest for at the
40   beginning of a year (e.g., going into the test year) and higher (and increasing over
41   time) for future years, so it clearly passes the "sanity check" Dr. Proctor attempts
42   to apply.
43

NP

1   II.   THE RESULTS OF AMERENUE'S UNCERTAINTY ANALYSIS ARE HIGHLY
2   INTUITIVE AND CONSISTENT WITH AMERENUE'S
3   ACTUAL OPERATIONAL EXPERIENCE

4   Q.   What are the fundamental questions being determined by the uncertainty

5   analysis you presented in your testimonies?

6   A.   There are really only two questions that are being informed by the uncertainty

7   analysis performed by me and the alternative implementation approach suggested by Dr. Proctor

8   in this case: (1) is there uncertainty (volatility) in the components of net fuel costs – fuel costs,

9   purchased power costs and off-system sales revenues; and (2) can the uncertainty in one

10 component (i.e., off-system sales revenues) be expected to offset the fuel cost increases. While

11 Dr. Proctor does not directly address the second question in his current testimony, he generally

12 and theoretically addresses correlations between fuel and power prices that suggest he believes

13 that offsets exist, as he suggested in the Company's last rate case. However, these two questions

14 cannot be answered in a general theoretical setting, but rather, must be answered in the context of

15 the operational realities of AmerenUE's business practices given real-world market conditions

16 relating to fuel and purchased power costs, and power market conditions and uncertainties.

17 Q.   What is the intuitive answer to the first question – is there uncertainty

18 (volatility) in the individual components of net fuel costs – in fuel commodity costs,

19 purchased power costs and off-system sales revenues?

20 A.   My direct testimony clearly shows in Schedule AKA-E2 the actual observed

21 historical uncertainty in power prices (and therefore off-system sales revenues and purchased

22 power costs), coal prices, natural gas prices and heating oil prices (which can be used as a proxy

23 for diesel fuel prices). This is not some estimate or measure of uncertainty based upon a general

24 theoretical approach. Rather, these are actual results based upon the past nine years of history.

1   **Q.   But doesn't the Company hedge its fuel costs and thus remove this**

2   **uncertainty?**

3   A.   Yes, the Company hedges a substantial amount of its fuel costs going into any

4   particular year, but as I discuss later, even with these hedges in place, there remains substantial

5   uncertainty in AmerenUE's fuel costs and net fuel costs.

6   **Q.   Does Dr. Proctor disagree with the fact that there is historical uncertainty**

7   **(volatility) in the components of net fuel costs?**

8   A.   No. My understanding from reading Dr. Proctor's testimony is that while

9   Dr. Proctor's rebuttal testimony (p. 16, l. 3-11 and p. 18, l. 10-21) includes alternative

10   approaches for measuring uncertainty in some of the components of net fuel costs, he does not

11   disagree that there is uncertainty present in the prices for each of these components. Rather,

12   Dr. Proctor's main contention is that I overstated the volatility of these prices. Given that I used

13   data over a 9-year period, and given the events and the extreme volatility observed in the prices

14   of these commodities in the last eighteen months (some of which is not even captured in my

15   analysis of historical uncertainty from 1999 through 2007), it is difficult to see how anyone could

16   not intuitively expect these prices to be volatile (uncertain). This uncertainty is well-documented

17   in the rebuttal testimonies of AmerenUE witnesses Shawn Schukar (power prices), Robert Neff

18   (coal prices), and Scott Glaeser (gas prices).

19   **Q.   Given Dr. Proctor's testimony that spot prices for fuel and power are**

20   **correlated, wouldn't the uncertainty in off-system sales revenues be expected to offset the**

21   **fuel cost increases?**

22   A.   No. According to my analysis and the additional facts I present in this surrebuttal

23   testimony, it is quite clear and indeed it is highly intuitive that off-system sales revenues cannot

1   be expected to offset fuel cost increases for AmerenUE. Even if Dr. Proctor were correct about

2   his claim that spot prices for fuel and power are correlated, AmerenUE's off-system sales

3   margins cannot be expected to offset AmerenUE's fuel and purchased power costs for several

4   reasons, including: (1) AmerenUE can hedge much of its fuel costs but can hedge only a small

5   fraction of its off-system sales (even Dr. Proctor agrees that there is much less correlation

6   between AmerenUE's hedged coal costs and spot prices for power); and (2) even if there were a

7   correlation between AmerenUE hedged coal costs and power prices (which obviously there is

8   not), that correlation could not translate into enough additional off-system sales revenues to

9   offset the already known locked-in fuel cost increases given that AmerenUE generates

10   approximately four times as much power from coal-based generation than it sells in the off-

11   system power market.

12   **Q.   Can you provide an example of why it is intuitive that increases in off-system**

13   **sales revenues could not be large enough to offset locked-in native load fuel price increases**

14   **for AmerenUE?**

15   A.   Yes. I believe the following example unequivocally confirms the finding

16   presented in my direct testimony that off-system sales revenues cannot be expected to offset

17   increases in fuel costs for AmerenUE.

18   AmerenUE generates approximately 50 million MWh of electricity each year, about 39

19   million MWh of which are generated from coal-fired generation. The remaining approximately

20   11 million MWh are generated from nuclear, hydro and gas generation. AmerenUE has

21   approximately 10 million MWh of off-system sales each year, which are made mainly from its

22   coal-fired generation. While there are minor variations in these numbers, Staff's production cost

23   modeling essentially confirms the foregoing figures. As noted earlier, these numbers

1   demonstrate that AmerenUE generates about four times as much power from coal based

2   generation to meet both native load customer needs and off-system sales (approximately 40

3   million MWh for the purpose of this simple example) than it sells off-system (10 million MWh).

4   Mr. Neff's rebuttal testimony shows that the delivered coal costs are approximately

5   **____** million in 2009 for approximately 40 million MWh from coal-fired generation. This

6   results in an average delivered coal cost of approximately **_____**/MWh for coal-fired

7   generation. Mr. Neff also projects an approximately **____** increase in delivered coal costs in

8   2010 over 2009 (Neff rebuttal testimony, p. 4). This will increase the average delivered coal

9   costs for coal-fired generation by **_____**/MWh.

10   An increase of **_____**/MWh in average annual power prices does not seem

11   unreasonable, but assuming that a **_____**/MWh increase in power prices would offset a

12   **_____**/MWh increase in coal costs is erroneous. If one theoretically believed there were in

13   fact a correlation between AmerenUE's hedged coal commodity prices and daily spot market

14   power prices (based on a correlation analysis between annual average coal and power price

15   levels) one might jump to that conclusion. However, that theoretical conclusion would be wrong,

16   and would suffer from the following fatal flaw: The <u>operational reality</u> is that since AmerenUE

17   generates *four times more* power from coal-fired generation than it generates to make off-system

18   sales, power prices obtained for off-system sales made mainly in the daily spot power markets

19   would have to increase by a factor of *four times* more than the coal price increase, or

20   **_____**/MWh to offset the fuel cost increases.[1] An annual average price increase of this

21   magnitude is highly unlikely, and indeed has *never* been observed over the period 1999 to 2007.

---

[1] The **_____**/MWh increase in delivered coal costs applied to approximately 40 million MWhs of coal-fired generation will increase coal costs by **___** million in 2010 over 2009 (**_____** x 40,000,000

1   **Q.**   **Assuming electricity prices would in fact increase with AmerenUE's hedged**

2   **fuel costs, how does this magnitude of electricity price increase compare to the electricity**

3   **price uncertainty Dr. Proctor has calculated on page 16 of his rebuttal testimony?**

4   **A.**   Dr. Proctor suggests on page 16 (including Table 1) of his rebuttal testimony that

5   the uncertainties I calculated may be overstated (i.e., that power prices would not move around

6   as much as I have suggested). But even if one were to believe Dr. Proctor's contention that

7   annual average power prices demonstrate only about one-fifth the uncertainty I calculated

8   (standard deviation of \$1.62/MWh versus \$7.44/MWh) and one incorporated the "trend" Dr.

9   Proctor claims exists in power prices, it would require an extremely unlikely move in prices

10   (beyond six standard deviations) for any expected power price increases to offset AmerenUE

11   expected delivered coal cost increases.[2]

12   **Q.**   **Dr. Proctor suggests on page 32 (lines 17-23) of his rebuttal testimony that**

13   **your analysis framework "likely increased the variability in the 250 scenarios by a factor of**

14   **five times." Is there any clear evidence showing that the uncertainty range quantified in**

15   **your simulation is realistic compared to the uncertainties AmerenUE is actually facing with**

16   **respect to its net fuel costs?**

17   **A.**   Yes. Table AKA-SR1 below compares the uncertainty range I measured through

18   the market simulations presented in my direct testimony with the range of net fuel cost forecasts

19   that AmerenUE faced for 2007, 2008 and 2009 at various points in time as part of its regular

20   business practices. As this table shows, the net fuel cost forecast uncertainties AmerenUE

MWhs). To increase off-system sales revenues by **___** million would require power prices for 2010 to
have increased by **_____**/MWh (**_____** x 10,000,000 MWhs available for off-system sales).

[2] Even if one were to subtract from **_____**/MWh Dr. Proctor's trend of \$3.47/MWh power prices would
have to increase by an additional **_____**/MWh, which is more than three times Dr. Proctor's standard
deviation of \$1.62/MWh. The probability of this is almost *zero.*

NP

1   actually experienced are very much comparable to the net fuel cost uncertainties I have measured

2   through the simulation analysis presented in my direct testimony.

3   **   _____

4   **

5   As the table shows, 2007 net fuel costs were forecast to be **____** million as of

6   November 2006, just before the start of calendar year 2007. The 2007 net fuel cost forecast

7   increased to **____** million in January 2007 but dropped to **____** million in April 2007.

8   It ended up being **____** million for the year, which implied a swing of over **___** million

9   in just one year. Similarly, for 2008, net fuel costs were forecast at **____** million in August

10 2007 and **____** million in November 2007. That level dropped to **____** million by June

11 2008 but increased to **____** million by late July 2008, implying a total range of **___**

9

NP

1   million. For 2009, AmerenUE forecast **____** million for net fuel costs in September 2007.

2   That forecast dropped to **____** million in March 2008, only to rise back to **____** million

3   as of October 2008, showing a **____** million swing in net fuel cost forecasts for 2009. This

4   shows that the actual historically-experienced uncertainty range of net fuel cost forecasts going

5   into a year and within that year are very similar to the **___** million uncertainty range

6   between the 25th percentile and 75th percentile of net fuel costs going into the test year as shown

7   in Table 1 of my direct testimony. Because the *actual observed uncertainty* is quite comparable

8   to the simulated uncertainty in the analysis presented in my direct testimony, Dr. Proctor's claim

9   that I have overstated uncertainty is simply wrong.

10   **Q.   Given that AmerenUE's fuel costs going into a particular year are mostly**

11   **hedged, are these large changes in annual net fuel costs at the beginning and within a year**

12   **mostly a function of off-system sales uncertainty?**

13   A.   No. There is only slightly smaller variability in forecasts of gross fuel and

14   purchased power costs (ignoring off-system sales), as shown in Table AKA-SR2 below.

NP

1   ** _____

          _____

          _____

2   **

3   The table also shows that my simulation analysis likely understates these uncertainties,

4   particularly with respect to total fuel and purchased power costs (i.e., before off-system sales are

5   deducted to arrive at net fuel costs).

6   **Q.   But given that AmerenUE's fuel costs are mostly hedged going into a**

7   **particular year, why is the uncertainty range for total fuel and purchased power costs so**

8   **large?**

9   A.   The uncertainty range is large for a number of reasons. Some of it is caused by

10 outage schedules at AmerenUE's coal and nuclear plants which change during the year from the

11 outage schedule that was expected just before the year began, some of the uncertainty range

12 reflects the fact that natural gas and power purchases account for an increasing fraction of total

13 production costs, and some of it reflects the fact that hedges do not fully remove cost uncertainty.

14 For example, the **____** million swing in 2009 total fuel and power cost forecasts between

NP

1   November 2007 and September 2008 reflects changes in plant outages, plant utilization, gas

2   prices, gas generation forecasts, coal and power hedge cost changes and Midwest Independent

3   Transmission System Operator, Inc. (MISO) load forecasting uncertainty.

4   **III.   GENERAL AREAS OF AGREEMENT WITH DR. PROCTOR AND**
5   **IMPLICATIONS FOR NET FUEL COST UNCERTAINTY**

6   **Q.   You noted several areas of agreement with Dr. Proctor. Does he agree with**

7   **the basic structure of your risk assessment study of AmerenUE's net fuel expense?**

8   A.   Yes. Dr. Proctor states that "[t]he concept of the study is sound" (p. 32, l. 19).

9   **Q.   Does Dr. Proctor agree that you carried out the correct steps for such a risk**

10 **assessment study?**

11 A.   Yes. After laying out "five steps for a study that would incorporate evaluating the

12 impact of uncertainty on net fuel expense" (p. 6, l. 1-2), Dr. Proctor states that "AmerenUE's

13 study covered each of the five steps listed above" (p. 6, l. 17).

14 **Q.   Does Dr. Proctor agree that you correctly interpreted the results of your**

15 **analysis?**

16 A.   Yes. Dr. Proctor says that "[i]f faced with the same results, my analysis of those

17 results would be similar to that presented by Mr. Arora" (p. 32, l. 4-5).

18 **Q.   Does Dr. Proctor agree that there should not be any significant correlation**

19 **between AmerenUE's hedged delivered coal costs and fluctuating spot market daily power**

20 **prices?**

21 A.   Yes. This is a simple and highly intuitive point. My reading of Dr. Proctor's

22 rebuttal testimony (p. 22, l. 9-19) is that Dr. Proctor agrees with me that spot market prices for

23 power are not significantly correlated with AmerenUE's hedged delivered coal costs ("I do

1   agree that AmerenUE's hedged coal costs are not as highly correlated with spot market prices for

2   electricity, coal, or natural gas"). He also added that "one would not expect for there to be as

3   high a level of correlation between a hedged cost and spot market costs as between spot-market

4   prices themselves." This suggests that Dr. Proctor agrees with the portion of my analysis that

5   considers the fact that, at the beginning of any particular year, AmerenUE's fuel costs are largely

6   hedged while most of its off-system sales volumes are not. This difference between largely

7   hedged fuel costs at the beginning of a year and largely unhedged, thus uncertain, off-system

8   sales creates the significant uncertainty in the annual average of AmerenUE's *net* fuel costs even

9   when viewed from the beginning of any particular year that I documented through the "going

10   into the test year" simulation analyses presented in my direct testimony. As is also both intuitive

11   and shown in my direct testimony, these uncertainties are larger for subsequent years for which

12   less of AmerenUE fuel costs and very little of our off-system sales are hedged.

13   **Q.   Do actual operational results at AmerenUE confirm the lack of a correlation**

14   **between AmerenUE's delivered hedged coal costs and power prices?**

15   A.   Yes. I calculated the correlation between the hedged delivered coal costs and

16   power market prices for AmerenUE's largest coal plant, Labadie, and found the correlation to be

17   essentially zero.

18   **Q.   What is the significance of the fact that there is no correlation between**

19   **AmerenUE's hedged coal costs and spot power prices for 2009?**

20   A.   Figure AKA-SR1 below shows how the expected average spread (the difference

21   between power prices and coal commodity costs) for 2009 – based on annual forward prices for

22   2009 in comparison with AmerenUE's forward-looking hedged coal costs for 2009 – has

23   changed since early 2007. The figure also shows as green dots, for comparison purposes, the

1   historic level of the average annual spread between spot power prices and AmerenUE's actual

2   hedged coal commodity costs for 2007 and 2008[3] (which is commonly referred to in the industry

3   as the "dark spread").

4   The figure demonstrates that, based on forward prices for 2009 power and the

5   combination of known hedged and forward prices for unhedged coal costs, the average annual

6   dark spread for 2009 has increased from a low of **___**/MWh in early 2007 to a high of

7   **___**/MWh in June 2008. It also shows that since the **___**/MWh high in June, the 2009

8   average dark spread has now dropped to only **___**/MWh.

9   **_____
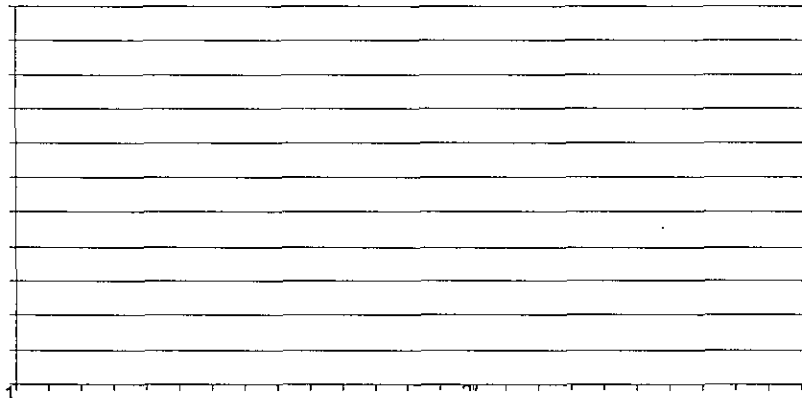
10   **

11   This shows that 2009 spreads will most likely be significantly below the spreads seen in

12   2008 and, based on most recent market conditions, may even be below average 2007 spreads.

---

[3] The spread for 2008 is calculated with data through October 20, 2008 and may overstate the average for all of
2008 given recent months where spreads have dropped to a level that is considerably below spreads earlier in

NP

1   This also means that – based on current 2009 forward power market prices and the now 100%

2   hedged coal costs for 2009 – the margin will be **___**/MWh *less* than the **___**/MWh

3   average 2008 margin through September. At approximately 10 million MWh in off-system sales,

4   this would mean the relative movement of power prices and AmerenUE coal costs, may actually

5   *reduce* (not increase!) off-system sales margins by up to **___** million (**___**/MWh * 10

6   million MWh) compared to 2008. The magnitude of this number not only documents the

7   significant uncertainties faced by AmerenUE, but it also shows that off-system sales cannot be

8   expected to offset coal cost increases.

9   **Q.   You noted that Dr. Proctor agrees with you that there should be no**

10   **significant correlation at least between spot power prices and AmerenUE's hedged fuel**

11   **costs. Why is this agreement between you and Dr. Proctor important for your uncertainty**

12   **analysis?**

13   A.   The fact that there is no significant correlation between spot power prices and

14   AmerenUE's hedged fuel costs is an important reason why my uncertainty analysis approach is

15   appropriate for AmerenUE and why Dr. Proctor's discussion of correlation between spot coal

16   and power prices misses the point. The operational reality is that AmerenUE makes

17   approximately 70% of its power sales in the *daily* spot power markets while its coal costs are

18   hedged, and the remaining 30% are hedged via forward sales with a duration ranging from one

19   month to one year.

20   The further operational reality is that AmerenUE's delivered coal costs are *substantially*

21   *hedged* at the beginning of any particular calendar year. It is also noteworthy, as Mr. Neff

---

2008. Note that coal commodity costs used to calculate the spread does not include coal transportation costs, diesel surcharges, etc.

NP

1 testified in his direct testimony, that approximately ** ____ ** of AmerenUE's delivered coal

2 costs are comprised of *transportation* costs, which have little to do with coal commodity markets

3 and vary depending on the location of the plant to which the coal is being delivered and certainly

4 vary across utilities depending on how far a particular utility is from a particular coal mine and

5 major coal transportation corridors. Consequently, the consensus that AmerenUE's delivered

6 hedged coal costs and power prices are not correlated means that it was not only appropriate, but

7 in fact essential, that I did not include any correlation between hedged coal costs and variable

8 daily power prices to estimate uncertainty relating to the ** ___ ** of the off-system sales that

9 AmerenUE makes in the daily spot power markets.

10 **IV.   AREAS OF DIFFERENCES AND POSSIBLE MISUNDERSTANDING IN**
11 **APPROACH IMPLEMENTATION**

12 **Q.   If Dr. Proctor agrees with the concept of your analysis, the steps you took to**

13 **carry out the analysis, and your interpretation of the results, what do you understand to be**

14 **Dr. Proctor's main issues with your analysis?**

15 A.   It is my understanding that Dr. Proctor believes I did not properly specify the key

16 elements of uncertainty in electricity, natural gas, and coal prices, as I carried out the steps of my

17 risk analysis. He expressed concerns about how I estimated forecast uncertainties for future

18 electricity, natural gas, and coal prices; he expressed concerns about how I estimated correlations

19 between these future prices; and he expressed concerns that the "Test Year" results do not meet a

20 "sanity check." I will address each of these issues and will show that his concerns are misplaced

21 and that each of these items were implemented in a manner that reflects the operational realities

22 of AmerenUE's business.

NP

16

1   **Q.   Are there any important considerations to consider in an evaluation of the**

2   **approach you used as compared to the approach that Dr. Proctor outlined in his rebuttal**

3   **testimony?**

4   A.   Yes. A critical factor to consider when evaluating the two approaches – the first

5   being the approach I used for the risk analysis in my direct testimony and the second being the

6   approach outlined by Dr. Proctor – is that any approach used for this analysis needs to be

7   evaluated to determine whether it matches the practical operational realities of AmerenUE's

8   business. A theoretically-based approach like Dr. Proctor's may not be able to determine

9   accurately the actual uncertainty that AmerenUE faces in its business every single day. In fact,

10   as I will show, Dr. Proctor's approach significantly understates the uncertainties actually faced

11   by AmerenUE.

12   ***A.   Daily and Monthly Versus Average Annual Uncertainties***

13   **Q.   What does Dr. Proctor say that he considers "the overriding issue in the**

14   **measure of statistical dispersion in the AmerenUE study" (p. 8, l. 25-26)?**

15   A.   Dr. Proctor critiques my analysis by claiming that I relied on "daily average

16   electricity prices" and that this "measure cannot be used to measure the dispersion associated

17   with changes in annual levels for electricity prices" (p. 13, l. 17-18). He raises similar concerns

18   about my analysis of gas price and coal price uncertainties. As he also rightly notes, "there is a

19   difference between the uncertainty for an annual average level of a variable compared to

20   uncertainty for a profile (monthly, daily or hourly)" (p. 8, l. 27-29). When answering what he

21   considered to be "the overriding issue in the measure of statistical dispersion in the AmerenUE

22   study" (p. 8, l. 25-26), Dr. Proctor stated that "AmerenUE's measures of uncertainty confuse

17

1   these concepts and therefore, incorrectly measures the uncertainty associated with each" (p. 9, l.

2   1-2).

3   **Q.   Did you confuse these differences between the uncertainty in annual averages**

4   **and the uncertainty in daily averages?**

5   A.   No, of course I did not. As I mentioned before, the actual uncertainty that

6   AmerenUE is subject to for the significant majority its off-system sales is daily power price

7   uncertainty, which is what I needed as an input for the market simulations I have employed to

8   model annual net fuel cost uncertainty. The net fuel cost results of my simulation analyses for

9   each of the 250 scenarios I simulated were then aggregated to the annual level, which resulted in

10   annual net fuel costs uncertainties that are not too different from the uncertainties we have

11   actually seen in historical annual price levels.

12   In other words, to address the difference between annual and daily levels of uncertainty, I

13   made sure that the net fuel cost uncertainty I presented in Table 1 on page 19 and in Schedule

14   AKA-E11 of my direct testimony showed the uncertainty range in *average annual net fuel costs*

15   across the 250 simulated years. Likewise, the uncertainty results I presented in Schedule AKA-

16   E1 to my direct testimony present the uncertainty in average annual power and natural gas prices

17   contained in my scenarios represented uncertainty across the 250 scenarios of the average annual

18   prices.

19   It is important to note, however, that my uncertainty analysis reflects the daily

20   uncertainty in power and natural gas prices that AmerenUE is actually subject to when it makes a

21   substantial majority of its off-system sales in the daily spot markets.

22   **Q.   Does your approach of using daily uncertainties as an input into your**

23   **simulation analyses match the operational reality of AmerenUE's business?**

18

1   A.   Yes. The operational reality that AmerenUE faces at the beginning of any

2   calendar year is that its delivered coal costs are essentially hedged while it will make

3   approximately **___** of its off-system sales in the daily spot power markets. Since

4   AmerenUE makes a substantial majority of its off-system sales in the <u>daily</u> spot power markets,

5   the uncertainty of power prices that it faces at the beginning of any given year is the uncertainty

6   of <u>daily</u> power price changes and not <u>annual</u> average price changes, as theorized by Dr. Proctor.

7   Also, as indicated in my direct testimony (p. 11, l. 14-18) and the direct testimony of Mr. Scott

8   Glaeser (p. 10, l. 19-23 and p. 11, l. 1-6), AmerenUE is not able to forecast with any degree of

9   certainty its gas burn for its gas generation, thus subjecting AmerenUE's gas purchases for its

10   gas generation to the uncertainty in the <u>daily</u> gas markets. Given this operational reality my

11   analysis correctly reflects the results of AmerenUE's actual net fuel cost uncertainty, as opposed

12   to the theoretical uncertainty calculation proposed by Dr. Proctor.

13   **Q.   Are there other reasons why Dr. Proctor believes your uncertainty analysis**

14   **may be overstating actual uncertainties?**

15   A.   Yes. Dr. Proctor suggests that my uncertainty analysis may be overstating the

16   uncertainty of annual average power prices and also conducts a "detrending" analysis to make

17   that conclusion. However, Dr. Proctor's "detrending" analysis is flawed in that it parses a small

18   number of data points into discrete time periods and seems to be imposing trends based on 20/20

19   hindsight. Not only does Dr. Proctor selectively use only five years of data out of nine years to

20   make his analysis, he also removes one year of data entirely, a year which just so happened to

21   reflect high coal and power prices and a lot of volatility.

22   In conducting this detrending analysis that drives his claim that I have overstated

23   uncertainty, Dr. Proctor identifies trends visually after-the-fact based on historic data, selectively

19

NP

1   cuts the historic data into periods within which he sees trends, subtracts these trends from the

2   observed prices and then looks at the variance of observed prices relative to his identified trends.

3   I believe this is highly inappropriate because it relies on the benefit of 20/20 hindsight to identify

4   specific periods and trends within these periods. While it is easy to assume away uncertainty by

5   finding trends based on after-the-fact analysis, such hindsight analysis is not available to

6   AmerenUE or any other market participants when they have to make decisions on how to

7   purchase fuel or how to hedge fuel and power.

8   If Dr. Proctor's approach made operational sense, one could simply look at recent trends

9   to get good forecasts. A simple examination of Dr. Proctor's own Figure 3 in his rebuttal

10 testimony shows that is not the case. Figure AKA-SR2 below includes the same historical data

11 for AmerenUE ATC power prices for 1999-2007 that Dr. Proctor has relied upon, but

12 supplements it with 1999 to 2002 and 2002 to 2005 trends. Dr. Proctor has relied on the data

13 points for 2003, 2004, 2006 and 2007 (note he selectively removed 2005 and retained 2002) to

14 identify his view of the trend in power prices. But as the chart shows, using Dr. Proctor's

15 approach a number of other trends would likely have been identified at various points in time.

16 The red line shows the past trend that likely would have been identified in early 2003. The green

17 line shows the past trend that likely would have been identified in early 2006. However, as the

18 dotted extensions of these lines clearly show, these historic trends have failed to produce reliable

19 forecasts. For example, the negative trend observed between 1999 and 2002 would have led to

20 severe under-predictions of prices for 2003, 2004 and 2005. In the opposite manner, the strong

21 positive trend from 2002 through 2005 would likely led to severely over-predicted prices for

22 2006 and 2007.

20

1   **Figure AKA-SR2**

Supplemented Proctor Figure 3
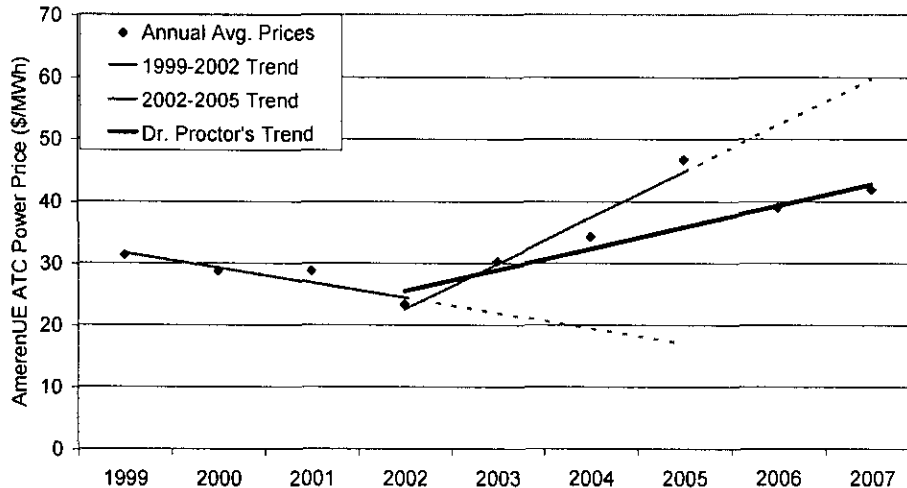
2

3   This simple illustration documents that one cannot rely on the apparent trends from the

4   last few years of data to even predict the next year or two of power prices with any degree of

5   certainty. The differences between the extension of trends and the actual market prices

6   document the true uncertainty created by Dr. Proctor's "detrending" analysis, which as can be

7   seen is even higher than the differences from historic averages.

8   Figure AKA-SR2 also shows the unreasonableness of Dr. Proctor's decision to simply

9   ignore 2005 because it is an "outlier." He presents no evidence supporting why the high year of

10   2005 should be removed, particularly given that he included the low year of 2002. By

11   selectively picking trends across some years and excluding other years based on an after-the-fact

12   judgment about whether a particular year presents an outlier, Dr. Proctor clearly fails to account

13   for uncertainty that AmerenUE actually is subject to when it sells into the spot market.

14   AmerenUE's retail rates cannot be adjusted to reflect the selective trends and exclusions

15   Dr. Proctor applies to mask uncertainty.

1   **B.**   *Test Year Uncertainty*

2   Q.   **Dr. Proctor states on page 30 of his rebuttal testimony that your results "do**

3   **not meet a sanity check" because the uncertainty you quantified inappropriately includes**

4   **forecast uncertainty in the "test year." Do you agree with Dr. Proctor's interpretation of**

5   **your analysis and approach?**

6   A.   No. Dr. Proctor appears to have misunderstood my analysis of "test year"

7   uncertainties, and apparently believes my test year analysis is an after-the-fact look back at the

8   test year. This misunderstanding is made clear by his statement that "in the test year, there is no

9   forecast uncertainty" (p. 30, l. 4). I agree – after the test year is over, there would be no forecast

10   uncertainty. Because my use of the term "test year" appears to have caused confusion for Dr.

11   Proctor, I would like to clarify.

12   As I stated on pages 4 and 5 and in other portions of my direct testimony: "RTSim was

13   used to model uncertainty existing at the beginning of the test year, considering AmerenUE's

14   substantially hedged fuel positions as of that time… To illustrate the risk mitigation achieved by

15   the Company's hedging and long-term contracting efforts, the uncertainty in net fuel costs that

16   the Company faced at the beginning of the test year was modeled, considering the "typical"

17   hedge ratios at the beginning of a year and the uncertainty parameters developed for this

18   simulation." (emphasis added)

19   Thus, my analysis is not an after-the-fact analysis of a test year as is done in the context

20   of determining a revenue requirement in a rate case. Rather, my analysis presented the

21   uncertainty that existed at the *beginning* of the 12-month period that was used to define the test

22   year. This uncertainty can then be judged as reflecting the uncertainty in net fuel costs that

23   AmerenUE is subject to at the beginning of any particular calendar year.

1   **Q.   What does examining uncertainty going into a particular calendar year**

2   **show?**

3   A.   It shows that despite the fact that AmerenUE is able to significantly reduce

4   uncertainty by hedging much of its fuel costs and a portion of its off-system sales, significant

5   "forecasting uncertainty" (to use Dr. Proctor's term) remains at the beginning of any year with

6   regards to AmerenUE's off-system sales revenues for that year and some uncertainty (though

7   less) exists with regards to AmerenUE's fuel costs themselves. This includes load forecasting

8   uncertainty, plant availability uncertainty, fuel price forecasting uncertainty for the unhedged

9   portions of AmerenUE's fuel costs, uncertainties related to the fact that hedges are not perfectly

10   eliminating all uncertainties and, perhaps most significantly, power market uncertainties with

11   respect to spot or short-term off-system sales and purchases, which are subject to various market-

12   wide variables like weather, transmission outages, generation outages, congestion, bidding

13   strategies, and speculation. My results show that significant uncertainty remains in AmerenUE's

14   net fuel costs at the beginning of each year (e.g., the current test year), and despite the significant

15   hedge position that AmerenUE has in place for its coal and nuclear costs going into a particular

16   year, for the very reason that the impact of these market variables on power prices are not known

17   and are out of AmerenUE's control.

18   **Q.   But doesn't Dr. Proctor claim that the only uncertainty is due to weather?**

19   A.   Yes, he makes that claim, but when he does so he is assuming that I was taking an

20   after-the-fact look back at the test year. If that had been true, then coal, gas, nuclear and power

21   prices for that then-ended year would have of course been known. But *going into the test year*

22   (or any particular year), they are *not* known, meaning that there are far more uncertainties faced

1   by AmerenUE going into any particular year than just those associated with variations from

2   normal weather.

3   **Q.   Does Dr. Proctor's misunderstanding of your test year analysis explain why**

4   **he criticizes your Schedule AKA-E1 as not meeting a "sanity check"?**

5   A.   Yes. Dr. Proctor indicates that he thinks there is a problem with having similar

6   annual uncertainty factors over time for modeled power prices and natural gas prices, particularly

7   having similar uncertainty factors for the "test year." However, this is explained by his

8   misunderstanding, described above, about the fact that I examined the "test year" going into the

9   test year, not on an after-the-fact basis. The uncertainty reflected in Schedule AKA-E1 is the

10   uncertainty that AmerenUE would expect at the beginning of any year. For the beginning of a

11   test year, the main drivers of uncertainty would be the off-system sales power prices and natural

12   gas prices, since AmerenUE's hedged coal costs cannot be expected to be correlated with spot

13   market power sales, and since AmerenUE does not hedge a significant portion of its gas usage

14   for generation because of the uncertainty in gas generation forecasts.

15   Since it is virtually impossible to predict with any certainty whether a given year's daily

16   power prices are going to be similar to any other year – as indicated by the historical annual

17   averages I show in schedule AKA-E2 and also as clearly evidenced by the extreme volatility of

18   prices in 2005 and 2008 – the uncertainty factor at the beginning of any given calendar year

19   should be similar with the appropriate associated probabilities, which is what my model indicates.

20   In fact, contrary to Dr. Proctor's claim, my analysis clearly shows that from a particular

21   point in time, my simulations did find that uncertainty grows over time, i.e., that higher

22   uncertainty exists further out. As shown in Table 1 on page 29 of my direct testimony, my

23   simulations showed that there is a 50% chance that the uncertainty range exceeds ** ___ **

NP

1   million going into the test year (i.e., that realized net fuel costs are below the 25th percentile or

2   above the 75th percentile of possible outcomes). As Table 1 also shows, this uncertainty range is

3   **___** million for 2009 and grows to **___** million by 2012. Table 1 also demonstrates

4   the same trend of increasing uncertainty for the uncertainty ranges defined by the difference

5   between the 10th and 90th percentiles. Thus, the uncertainty of my simulation-based net fuel cost

6   forecasts does in fact grow over time. Dr. Proctor is simply incorrect in his claim that my

7   analysis shows nearly the same uncertainty over time.

8   As I have discussed in the context of Table AKA-SR1 and Table AKA-SR2 above, the

9   uncertainty range shown in Table 1 of my direct testimony is also consistent with the range of

10   actual net fuel cost uncertainty AmerenUE actually experienced going into and within the years

11   2007, 2008 and now 2009.

12   *C.   Technical Points to be Included in the Uncertainty Analysis*

13   **Q.   Why is the fact that there may be no correlation expected between forward**

14   **coal prices and forward power prices important for your uncertainty analysis?**

15   A.   As I mentioned above, for **___** of AmerenUE's off-system sales made in the

16   daily spot power market Dr. Proctor and I agree that there should be no correlation expected with

17   AmerenUE's hedged fuel costs and daily spot power prices and hence would not be included in

18   the uncertainty analysis. This means that any debate about correlations between coal and power

19   at most only pertains to the approximately **___** of AmerenUE's off-system sales that

20   AmerenUE hedges in forward power markets, similar to how AmerenUE hedges fuel costs.

21   (Note, however, that the duration of forward power hedges is much shorter than the several years

22   over which AmerenUE hedges its coal costs. As a result, the **___** will still overstate the

23   extent to which forward power costs may be correlated with forward coal costs.) The question is

NP

1   whether any correlation should be included for this **____** of the off-system sales. As

2   indicated in my direct testimony, the correlation (or lack thereof) that matters for this **___**

3   of off-system sales is whether there is a correlation between coal price <u>changes</u> and power price

4   <u>changes</u>. The reason we must test for a correlation between price <u>changes</u> as opposed to price

5   <u>levels</u> is to test the hypothesis of whether the coal and power markets react similarly in terms of

6   percentage changes to the same information. As I showed in my direct testimony, comparing

7   levels of forward coal price changes with levels of forward off-peak prices would suggest a

8   correlation of over 60%, a correlation between forward coal and forward electricity prices that is

9   too high to be reasonable. However, performing the same correlation on changes in forward coal

10   and electricity prices yields the low correlation of 1.5% between the two series. Thus, even for

11   the remaining approximately **___** of the sales included in the uncertainty analysis, I would

12   not include any correlation between coal prices and power prices.

13   **Q.   Dr. Proctor indicates in his testimony that AmerenUE should have tested the**

14   **correlation between spot coal and spot power prices (p. 21) and that a test for these**

15   **correlations between forward price changes for coal and power is not appropriate. Do you**

16   **agree with this criticism?**

17   A.   No. There may be several correlations that can be tested for between coal price

18   and power prices. For example, I've already discussed that Dr. Proctor agrees there should be no

19   correlation expected between hedged fuel costs and off-system sales in the volatile daily power

20   markets. Thus, for approximately **____** of the off-system sales there should be no

21   correlation included – which is what I did.

22   I further explained above why the only relevant correlation for AmerenUE's operational

23   realities regarding its hedging policies is the correlation between forward coal and power price

26

NP

1   changes. The data analysis confirms that there is no significant correlation between coal and

2   power price changes.

3   Correlations between the levels of spot coal and power prices, while interesting, may lead

4   to a misunderstanding of the true uncertainty that AmerenUE faces for its operations, is not the

5   right correlation to test for and is largely irrelevant for the analysis required to measure net fuel

6   cost uncertainty.

7   **Q.   Is there any intuitive reason why it would make sense that your statistical**

8   **analysis found negligible correlation between coal and power prices? Wouldn't rising coal**

9   **prices necessarily lead to rising power prices?**

10   A.   While coal prices will have some effect on power markets, it is reasonable that the

11   actual "correlation" between coal and power prices is much lower than one might intuitively

12   anticipate. This is the case because future power prices are influenced by many parameters other

13   than the market prices for coal faced by AmerenUE, including: natural gas prices, load growth,

14   weather, unit outages, future unit additions or retirements, changes in environmental regulations,

15   price differences between regional coal markets (e.g., eastern vs. western coal), disruptions in

16   coal or natural gas transportation, changes in transmission congestion, interactions with

17   neighboring power markets, financial crises, speculation, the level of existing hedges by market

18   participants, changes in expected economic growth rates, etc.

19   In this context, it is important to understand that the coal-power price correlation

20   measures how much of the variance in future power price can be explained solely by the

21   uncertainty in future coal price. The correlation is not a measure of whether or not the power

22   price is influenced by coal prices – it clearly is, but only in part. With so many uncertain factors

23   influencing the outcomes of future power prices, it is not surprising to find that the correlation

1   between coal spot prices and power spot prices is too low to be estimated with any statistical

2   significance.

3   Also, in my direct testimony (pp. 15-18) I discussed the fact that it is unlikely that

4   delivered costs for the Powder River Basin coal supplies AmerenUE uses would directly

5   influence the power prices in the footprint of the MISO, within which utilities rely more heavily

6   on coal supplies from various other regions and under various transportation options that differ

7   from AmerenUE's. Hence, even if AmerenUE did not hedge any of its coal costs, the

8   relationship between *AmerenUE's* coal costs and the power prices AmerenUE receives is only

9   indirect (as, for example, described in the example presented by Dr. Proctor on pp. 24-25 of his

10   rebuttal testimony). This will further reduce the likelihood and magnitude of strong coal-power

11   correlations.

12   Finally, the above discussion related to the correlation of power prices with coal spot

13   prices. This does not factor in that AmerenUE hedges its coal commodity and transportation

14   costs. Thus, movements in the power prices that AmerenUE receives on its off-system sales will

15   almost certainly be independent from changes in AmerenUE's coal contract costs. Hence,

16   AmerenUE is exposed to hedged coal costs and not coal spot market prices. As noted by

17   Dr. Proctor, "one would not expect for there to be as high a level of correlation between a hedged

18   cost and spot-market costs as between spot-market prices themselves" (p. 22, l. 12-14). This

19   point has also been documented in my discussion of Figure AKA-SR1 above, showing that that

20   "dark spread" (i.e., the margin between power prices and AmerenUE's coal commodity cost) is

21   quite variable, even on an average annual basis.

22   **Q.   Dr. Proctor stated that "AmerenUE did not compare future price forecasts to**

23   **actual prices for purposes of estimating forecasting uncertainty" (p. 18, l. 1-2) but instead**

28

1   **used forward prices to estimate forecast uncertainty. He said that was improper because**

2   **"[d]aily changes in forward prices have little to do with forecast uncertainty" (p. 18, l. 4-5).**

3   **Is it correct that daily changes in forward prices have little to do with forecast uncertainty?**

4   A.   No, that is not correct. As Dr. Proctor says "[f]orward prices must converge to

5   spot-market prices as the period forward approaches real time" (p. 27, l. 18-19). This fact, which

6   is widely understood by risk management professionals, requires that price changes in forward

7   prices encapsulate information about forecast uncertainty.

8   If the current forward price for a future delivery date must eventually reach the uncertain

9   future spot price then the changes in that forward price over time <u>must</u> reflect the uncertainty in

10   the forecast. For example, in cases when the eventual spot outcomes end up higher than the

11   current forward price, the forward price has to increase over time between now and delivery.

12   Similarly, in cases where the eventual spot outcomes end up lower than the current forward

13   price, the forward price will need to decrease over time. Hence it is clear that changes over time

14   in forward prices are absolutely related to forecast uncertainty, and a very common approach to

15   estimating spot price forecast uncertainty is to quantify how much the forward price for the

16   forecast delivery date is likely to change between now and the delivery period. This is exactly

17   the type of analysis I have used and discussed in my direct testimony.

18   Although comparing DOE coal price forecasts with later observed prices as proposed for

19   coal by Dr. Proctor on p. 18 of his rebuttal testimony could potentially be carried out to estimate

20   spot price forecast uncertainty, this approach would not take advantage of the available market

21   information about forecast uncertainty. My approach for estimating spot price uncertainty using

22   historic data on forward price movements does consider the available market information and,

23   not surprisingly, is a standard approach used for commodity markets with active forward

1   markets. In contrast to Dr. Proctor's claim, my approach of estimating forecast uncertainty using

2   forward price changes clearly is proper and reasonable.

3   ***D.   Communication Issues***

4   **Q.   Dr. Proctor notes on page 6, line 12 of his rebuttal testimony that he "was not**

5   **contacted with respect to the implementation specifics." Is that a correct characterization**

6   **of the Company's communications with the Staff?**

7   A.   Absolutely not. My analysis was specifically designed around the framework

8   Dr. Proctor set out in his rebuttal testimony in AmerenUE's last rate case. He confirms this on

9   page 6 of his rebuttal testimony. More importantly, and what Dr. Proctor has not acknowledged,

10 is that at the Staff's request I spent more than one-half of a day meeting with six different

11 members of the Staff more than two months before Dr. Proctor filed his rebuttal testimony. I

12 explained my approach and analysis in detail, and answered detailed questions about it. Since

13 that July 22, 2008 meeting, I have not been asked a single data request about my analysis, and

14 have only been contacted one time by Dr. Proctor (just a few days before rebuttal testimony was

15 due). I had no idea that Dr. Proctor was involved in this case at all until the day I received a

16 question from him about my direct testimony just a few days before his rebuttal testimony.

17   **V.   COMBINED CONSTRUCTION AND OPERATING LICENSE (COLA)**

18   **Q.   Mr. Kind claims that AmerenUE has not shown that expenditures on the**

19 **COLA were prudent. How do you respond?**

20   A.   While a decision to construct a second nuclear unit at Callaway has not been

21 made yet, it may very well be an appropriate long term resource for AmerenUE, potentially even

22 in the 2018 to 2020 timeframe. Having a new nuclear baseload unit operational in this timeframe

23 would allow AmerenUE to capture significant tax savings (which AmerenUE customers would

1   benefit from) provided by the federal Energy Policy Act (EPAct). The value of those significant

2   tax savings based on the independent assessment of Black and Veatch could be on the order of a

3   total of $500 million over eight years in nominal dollars. The present value of these significant

4   benefits exceeded the potential cost of the COLA. Since the EPAct required that a COLA be

5   filed with and docketed by the NRC on or before the later of (i) December 31, 2008, or (ii) the

6   date on which the aggregate nameplate capacity of advanced nuclear facilities for which COLAs

7   have been filed with the NRC first equals or exceeds 6,000 megawatts, it is obvious that

8   preserving the potential for $500 million in tax savings that would ultimately benefit ratepayers

9   in the form of lower production costs was a prudent decision.

10   **Q.   Doesn't Mr. Kind also allege that including COLA costs in this rate case**

11   **violates Missouri law?**

12   A.   Yes, he makes that allegation. I am not an attorney and thus can't comment on

13   this aspect of Mr. Kind's criticism. It is my understanding that the Company's attorneys will

14   address that issue in the Company's brief or other filings in this case.

15   **VI.   CONCLUSION**

16   **Q.   Based on your understanding of Dr. Proctor's testimony, what is the**

17   **conclusion that you draw from his testimony?**

18   A.   The conclusion I draw from my understanding of Dr. Proctor's testimony is that

19   (1) we have several areas of agreement which, if explored further as I have done in this

20   surrebuttal testimony, indicate that the approach and results of my uncertainty analysis

21   accurately reflect the uncertainty faced by AmerenUE given the practical realities of operating its

22   business; (2) my results are highly intuitive and clearly pass the "sanity check" test Dr. Proctor

23   attempts to apply; (3) Dr. Proctor inappropriately applies hindsight to parse data and

31

1   misunderstands key aspects of my analysis and uncertainty results, which lead him to the clearly

2   erroneous conclusion that my analysis understates AmerenUE's net fuel uncertainty; and (4)

3   differences in Dr. Proctor's approach and mine with respect to correlations reflect the difference

4   in applying an analysis to reflect the operational reality of AmerenUE's business versus a more

5   theoretical approach that fails to take those operational realities into account. The reality is that

6   the uncertainty ranges for AmerenUE average annual net fuel costs I have identified through the

7   simulation analysis summarized in Table 1 on page 29 of my direct testimony are fully consistent

8   with the available evidence of actual net fuel cost forecast uncertainties that the Company has

9   observed.

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

11   A.   Yes, it does.

In the Matter of Union Electric	)	
Company d/b/a AmerenUE for	)	
Authority to File Tariffs Increasing	)	
Rates for Electric Service Provided	)	Case No. ER-2008-0318
To Customers in the Company's	)	
Missouri Service Area.	)	

AFFIDAVIT OF AJAY K. ARORA

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

Ajay K. Arora, being first duly sworn on his oath, states:

1. My name is Ajay K. Arora. I am employed by Ameren Services Company as Director of Corporate Planning.

2. Attached hereto and made a part hereof for all purposes is my Surrebuttal Testimony on behalf of Union Electric Company, d/b/a AmerenUE, consisting of _32_ pages, all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

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

_____
Ajay K. Arora

Subscribed and sworn to before me this 4th day of November, 2008.

_____
Notary Public

My commission expires: _____