MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

SURREBUTTAL TESTIMONY

OF

MICHAEL S. PROCTOR

UNION ELECTRIC COMPANY
d/b/a AMERENUE

CASE NO. ER-2007-0002

Jefferson City, Missouri
February 2007

Denotes Highly Confidential Information**

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BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company)
d/b/a AmerenUE for Authority to File)
Tariffs Increasing Rates for Electric)   Case No. ER-2007-0002
Service Provided to Customers in the)
Company's Missouri Service Area.)

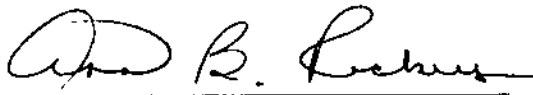## AFFIDAVIT OF MICHAEL S. PROCTOR

STATE OF MISSOURI   )
) ss
COUNTY OF COLE   )

      Michael S. Proctor, of lawful age, on his oath states: that he has participated in the preparation of the following Surrebuttal Testimony in question and answer form, consisting of _33_ pages of Surrebuttal Testimony to be presented in the above case, that the answers in the following Surrebuttal Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

                                          _____
                                             Michael S. Proctor

Subscribed and sworn to before me this _25_ day of February, 2007.
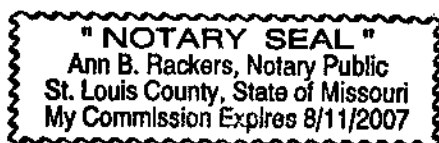
                                             _____
                                             Notary Public

My commission expires_____ 8/11/2007 _____

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Q.   **What is your name and business address?**

A.   My name is Michael S. Proctor. My business address is 9900 Page Avenue,
Suite 103, Overland, MO 63132.

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

A.   I am employed by the Missouri Public Service Commission (Commission) as
Chief Regulatory Economist in the Energy Department.

Q.   **Are you the same Michael S. Proctor who submitted direct and rebuttal**
testimony in this case?

A.   I am.

EXECUTIVE SUMMARY

Q.   **On what issues are you filing surrebuttal testimony in this proceeding?**

A.   My surrebuttal testimony will address the rebuttal testimony of AmerenUE
Witness Shawn E. Schukar and Timothy D. Finnell. The issues discussed in my surrebuttal
testimony will include the estimates of fuel dispatch prices and wholesale spot-market
electricity prices used by Staff in its determination of the variable production costs to be

1 included in its cost of service, and subsequently the impact that this has on Staff's estimate of

2 profit margins from off-system sales.

3   **Q.**   **Can you briefly summarize your Surrebuttal Testimony?**

4   A.   Yes. There are four parts to my surrebuttal testimony. The first part deals with

5 data issues raised by AmerenUE witness Mr. Shawn Schukar related to prices used by the

6 Staff in its direct testimony. The second part deals with Mr. Schukar's rebuttal of the

7 methodology used by the Staff in its direct testimony to establish a relationship between fuel

8 dispatch prices and wholesale spot-market electricity prices. The third part deals with the

9 impact that the fuel budget recently approved by AmerenUE has on Staff's recommendations.

10 The fourth part deals with specific recommendations made by AmerenUE witness Mr.

11 Timothy Finnell regarding fuel dispatch prices.

12   **Q.**   **What are the data issues related to prices used by the Staff in its direct**

13 **testimony?**

14   A.   Even though the data was supplied to Staff through AmerenUE work papers

15 and updated for 2006 through Staff data requests, Mr. Schukar criticized the data that I used

16 in my analysis as not including losses and congestion from the Midwest ISO spot-market for

17 electricity. As described in the following points, my surrebuttal testimony will discuss the

18 details surrounding the Staff's use of the data supplied by AmerenUE in the Staff's initial

19 analysis as well as the data that Mr. Schukar proposes as a better alternative.

     20   1. Mr. Schukar incorrectly describes the Staff as having "accidentally overlooked the
     21   fact" that the spot-market price data supplied by AmerenUE "did not include the
     22   congestion and loss components."

1   Further, the Staff does not agree that the revised data used by Mr. Schukar in his

2   rebuttal testimony is necessarily representative of the prices received by AmerenUE for off-

3   system sales.

4   2. Mr. Schukar uses the average price of AmerenUE's coal-fired generation as
5   representative of prices received by AmerenUE for off-system sales throughout the
6   year. At best, this represents a lower bound for prices received by AmerenUE for
7   off-system sales.

8   In addition, Mr. Schukar criticizes the Staff for having used the same natural gas

9   prices as were used by AmerenUE in its original filling on the basis that these prices only

10   represent a single day's spot-market price for each month. As an alternative, Mr. Schukar

11   proposes to use monthly averages of daily spot-market prices for natural gas that have

12   occurred on weekdays. Specifically,

13   3. Mr. Schukar uses daily spot-market prices from the Platts Gas Daily Midpoint for
14   Chicago Large End Users as the basis for natural gas dispatch prices for
15   AmerenUE.

16   **Q.   What concerns did Mr. Schukar raise concerning Staff's methodology for**

17   **relating fuel dispatch prices to wholesale spot-market prices for electricity?**

18   A.   Because Mr. Schukar failed to correctly understand the methodology I used to

19   correlate spot-market electricity prices to fuel dispatch prices, his rebuttal of my direct

20   testimony is based on a false premise that monthly spot-market prices are correlated with

21   monthly fuel prices. My surrebuttal will show that this is an incorrect assumption because

22   spot-market prices follow a cyclical pattern, but fuel dispatch prices do not follow that same

23   cyclical pattern. In my direct testimony, I correlated **average annual** spot-market prices to

24   **average annual** fuel prices and compared the results to the trends in the data to arrive at

1 normal levels for both spot-market prices and fuel prices. Moreover, Mr. Schukar's rebuttal

2 analysis is incorrect for the following reasons:

3 4. Mr. Schukar's rebuttal methodology for estimating the correlation between fuel
4 prices and spot-market prices for electricity is based on the false premise that
5 monthly fuel prices are correlated with monthly spot-market prices.

6 5. Applying Mr. Schukar's monthly regression analysis results in an underestimate of
7 the correlation in the annual levels of the fuel dispatch prices to the spot-market
8 electricity prices, and a biased estimate of their relationship.

9 6. Mr. Schukar criticizes the Staff's use of twelve-month moving averages by
10 incorrectly characterizing the Staff's regression model as applying to monthly
11 rather than annual prices.

12 7. Mr. Schukar incorrectly criticizes the Staff's use of a curved relationship between
13 coal dispatch prices and off-peak spot-market prices as being caused by a data
14 "outlier" in January 2006.

15 **Q. Have you made corrections to the monthly model proposed by Mr.**

16 **Schukar in his rebuttal testimony that take into account the lack of month-to-month**

17 **correlation between spot-market prices and fuel prices?**

18 A. Yes, I have. The results of these corrections are included in my surrebuttal

19 testimony.

20 **Q. What are the results of the 2007 fuel budget recently approved by the**

21 **Ameren Board for AmerenUE?**

22 A. AmerenUE's 2007 fuel budget results in higher off-system sales volumes, off-

23 system sales prices and off-system profit margins than Staff has calculated in its updated

24 production cost model, which still uses fuel prices and spot-market electricity prices proposed

25 by Staff in its direct testimony.

1	**Q.	Based on your review of Mr. Schukar's rebuttal testimony and the**

2	**approved fuel budget for 2007, has the Staff made any changes to its position on fuel**

3	**dispatch prices and spot-market electricity prices from those filed in its direct case?**

4	A.	No, it has not.	However, if the Missouri Commission decides that it is

5	necessary to adjust downward the Staff's recommendations on spot-prices because of the data

6	issue, the Staff recommends that no more than a two-percent downward adjustment be made

7	to its recommended spot-prices for electricity.

8	**Q.	Can you briefly summarize your Surrebuttal of Mr. Finnell?**

9	A.	Yes. In his direct testimony, Mr. Finnell used a set of dispatch prices

10	for natural gas that I then used to develop a normalized level for natural gas prices and,

11	through correlation to on-peak spot-market prices, a normalized level for on-peak spot-market

12	prices. In his rebuttal testimony, Mr. Finnell has changed his position to reflect actual natural

13	gas prices burned at the AmerenUE units during 2006. This recommendation results in higher

14	natural gas prices than filed by Staff in its direct testimony. It is my surrebuttal testimony that

15	the average price of \$7/MMBtu filed in the Staff's direct case is more representative of a

16	normal for natural gas dispatch and accounting prices. In any event, the Missouri

17	Commission should not adopt a lower set of natural gas prices for dispatch and a second set of

18	higher natural gas prices for accounting.

19	**A. PRICE DATA USED BY STAFF IN ITS DIRECT FILING**

20	**1.	Mr. Schukar incorrectly describes the Staff as having "accidentally**
21	**overlooked the fact" that the spot-market price data supplied by AmerenUE**
22	**"did not include the congestion and loss components."**

1   **Q.**   **Do you agree that the data you used for after the start of the Midwest ISO**

2   **energy market did not include the congestion and loss components?**

3   **A.**   Yes, that appears to be the case. AmerenUE claims that the data it used in its

4   direct filing for the period after the Midwest ISO market started market operations (April 1,

5   2005) did not include the congestion and loss components. This is the same data that the Staff

6   used in its direct filing.

7   **Q.**   **Did Mr. Schukar admit in his rebuttal testimony that by using the same**

8   **data he had made an error in his direct filing?**

9   **A.**   No, he did not indicate that he had made an error. Instead he only indicated

10   that had he used the correct data, it "would have tended to lower my overall average even

11   further and would not have been as conservative an approach" (Schukar Rebuttal at page 12,

12   lines 2-4). In other words, Mr. Schukar is now indicating that his use of the wrong data was

13   done intentionally to arrive at a higher three-year average (i.e., a "conservative approach").

14   However, there is no mention of this in Mr. Schukar's direct testimony or his work papers.

15   Thus, prior to Mr. Schukar's rebuttal testimony, the Staff had no indication that AmerenUE

16   was intentionally taking a "conservative approach." This also raises the following question:

17   If AmerenUE intentionally took a "conservative approach," how can it now criticize the Staff

18   for taking that same approach?

19   **Q.**   **Mr. Schukar indicates in his rebuttal testimony that it is likely that the**

20   **Staff "accidentally overlooked" the fact that the data supplied to it by AmerenUE did**

21   **not include the congestion and loss components. Do you agree?**

1   A.   I do not agree with this statement, as it appears to put the blame on the Staff

2 for using the wrong data. First, there was no indication in AmerenUE's direct testimony or

3 work papers that the data it was using did not include components for congestion and losses.

4 Second, to get an update of the data, Staff submitted Data Request 0269 (attached to my

5 surrebuttal testimony as Schedule 1) wherein the Staff requested "updating by month as

6 available, please provide the complete database of all hourly transaction prices for off-system

7 purchases and sales." In a follow up e-mail, Staff member Mr. John Cassidy indicated that

8 the Staff wanted to clarify that it was looking for the average hourly price data for purchases

9 and sales on a separate basis. In response to this data request, AmerenUE Engineer Mr. Tim

10 Finnell sent data along with a description of that data. For the updated data for 2006, Mr.

11 Finnell described the data as "MISO Day 2, Day Ahead market energy prices." At my

12 deposition, I was asked if I realized that this data did not include the congestion and loss

13 components. My response was that I did not recall seeing Mr. Finnell's data response, and

14 only after I was told that the wording in the data response of "MISO Day 2, Day Ahead

15 market energy prices" meant that congestion and losses were not included did I realize what

16 the data represented. Mr. Finnell's data response did not directly indicate that congestion and

17 losses were not included, and I would not have discerned that this was the case from the data

18 response without first being told that was what was meant by the use of the words "market

19 energy prices." I simply would have taken "market energy prices" to mean prices paid to

20 AmerenUE in the MISO Day 2 energy market. During the deposition, the questions were

21 framed in terms as the MISO Day 2 "energy only" prices, which are not the words used in Mr.

22 Finnell's data request response.

1   **Q.   Why would you have thought the data represented what AmerenUE was**

2   **actually receiving for its off-system sales?**

3   A.   First, this was the data the Staff requested. Second, this was the same data that

4   AmerenUE had used in its analysis of off-system sales. Before being made aware of what the

5   data represented at the deposition, I assumed that this was the same data the Company had

6   used in its direct filing, and stated in the deposition: "those are the prices that UE was using,

7   and I assumed that they were consistent" (Proctor Deposition at page 114, lines 24-25). In

8   further response to a question regarding my using the data in my analysis, I responded,

9   "That's right. I'm using the same price data that the company used in its three-year average to

10   perform my regression, yes" (Proctor Deposition at page 116, lines 4-6). As it turns out, I was

11   using the same data used by Mr. Schukar to develop normal prices for off-system sales in his

12   direct filing. And, again, this raises the question of, if this approach was okay for AmerenUE

13   to use, why is it now not okay for the Staff to use?

14   **Q.   Why did the Staff request and use the same spot-market price data used**

15   **by AmerenUE in its direct filing?**

16   A.   The Staff had discovered a problem with the historical off-system sales data

17   that it was receiving from AmerenUE on a monthly basis. Apparently, there was a problem

18   with the code written by AmerenUE to develop the data and it did not appear that there would

19   be an easy or timely fix for that problem. Even had the problem been fixed, the Staff would

20   have had to spend a significant amount of time in order to check out the validity of the new

21   data and then process that data for it to be useable. When I realized there was a problem with

22   the data on actual off-system sales, and realized we were not likely to get good data in a

1　timely fashion, I requested that AmerenUE send us the data it was using for spot-market

2　prices. At that time, I was totally unaware that AmerenUE believed there was some problem

3　with that data.

4　　　**2.　Mr. Schukar uses the average price of AmerenUE's coal-fired generation as**
5　　　**representative of prices received by AmerenUE for off-system sales. This**
6　　　**represents a lower bound for prices received by AmerenUE for off-system**
7　　　**sales.**

8　　　**Q.　Is the data used by Mr. Schukar the correct data?**

9　　　A.　No, it is not. Mr. Schukar simply used the average Locational Marginal Price

10　(LMP) at AmerenUE coal generation sources as representing the price that AmerenUE

11　received for off-system sales. It may be true that a majority of off-system sales were made

12　from AmerenUE coal plants, but the problem is that not all sales come proportionately from

13　all four plant locations and not all off-system sales, particularly during the on-peak period,

14　come from AmerenUE's coal-fired generation. The fact is that the higher cost coal plants are

15　more likely to make off-system sales. In addition, particularly during the on-peak periods, a

16　certain amount of sales come from gas-fired generation. Thus, Mr. Schukar's data for spot-

17　market prices likely represents a lower bound on prices actually received by AmerenUE for

18　off-system sales.

19　　　**3.　Mr. Schukar uses daily spot-market prices from the Platts Gas Daily**
20　　　**Midpoint for Chicago Large End Users as the basis for natural gas dispatch**
21　　　**prices for AmerenUE.**

22　　　**Q.　What other issues did Mr. Schukar raise concerning the data used by the**

23　**Staff?**

24　　　A.　A review of AmerenUE's work papers filed in its direct case indicates that it

25　used very specific natural gas price data for the dispatch of its gas-fired combustion turbines.

1 The Staff used this same data and applied it to the correlation between on-peak spot-market

2 electricity prices and natural gas dispatch prices, as well as for the determination of a normal

3 level for natural gas dispatch prices. At my deposition, AmerenUE raised this data as being

4 an issue because it represented only the first day of natural gas prices for each month. Mr.

5 Schukar has subsequently used the average of daily prices for on-peak days as providing a

6 better explanatory variable for on-peak spot-market electricity prices.

7 **Q.   Do you agree with Mr. Schukar's use of daily spot-market prices for**

8 **natural gas?**

9 A.   For purposes of correlating to on-peak spot market electricity prices, I found

10 that it really doesn't matter which of the two natural gas price series is used. Both do equally

11 well in predicting on-peak spot market electricity prices. However, Mr. Schukar believes that

12 the average of the daily natural gas price series for weekdays is more representative of natural

13 gas prices that AmerenUE faces. While this appears to be a logical conclusion, if this is

14 indeed the case, I don't understand why AmerenUE was using the other data as representative

15 of its natural gas dispatch prices prior to seeing my direct testimony.

16 **B. METHODOLOGY USED BY STAFF IN ITS DIRECT FILING**

17 **4. Mr. Schukar's rebuttal methodology for estimating the correlation between**
18 **fuel prices and spot-market prices for electricity is based on the false premise**
19 **that monthly fuel prices are correlated with monthly spot-market prices.**

20 **Q.   Does Mr. Schukar agree with Staff that off-peak spot-market electricity**

21 **prices are correlated with coal dispatch prices and that on-peak spot-market prices are**

22 **correlated with natural gas dispatch prices?**

1   A.   Yes, he does. At page 9, lines 4-7 and lines 9-11, Mr. Schukar agrees with

2   Staff, but he does not agree with the method that Staff used to estimate this correlation.

3   **Q.   Do you agree with Mr. Schukar with respect to the nature of the**

4   **correlation between spot-market electricity prices and fuel dispatch prices?**

5   A.   No, I do not. Mr. Schukar assumes by his regressions that there is a correlation

6   between monthly spot-market electricity prices and monthly fuel dispatch prices. This means

7   that Mr. Schukar is assuming that in the correct relationship between spot-market prices and

8   fuel dispatch prices, on a month-to-month basis, fuel dispatch prices can be used to predict

9   spot-market electricity prices. On the other hand, the Staff position is that only on an annual

10 basis can fuel dispatch prices be used to predict spot-market electricity prices. On a month-

11 to-month basis, spot-market electricity prices follow a cyclical monthly pattern, but fuel

12 dispatch prices do not follow that same pattern. Therefore, these prices are not highly

13 correlated on a month-to-month basis, and any attempt to measure a monthly correlation

14 results in a biased estimate of the relationship between spot-market prices and fuel dispatch

15 prices.

16   **Q.   What do you mean by the statement that spot-market electricity prices**

17 **follow a cyclical monthly pattern?**

18   A.   Spot-market electricity prices are determined by the interaction between supply

19 and demand on an hourly basis. Because both demand and supply change on a seasonal and

20 monthly basis, the resulting prices will also change on a seasonal or monthly basis.

21   For the demand side, loads change with weather, which in turn vary with seasons of

22 the year. There can also be monthly differences in loads within each season caused by

1   differences in thermostat settings (air conditioning on or off, space heating on or off) going

2   into cooling and heating seasons compared to coming out of those seasons. These changes in

3   weather and use of space conditioning devices results in a cyclical pattern of demand, and

4   therefore a cyclical pattern in spot-market electricity prices.

5   For the supply side, supply availability changes with scheduled outages of generation

6   units. During the summer season, there are few if any scheduled outages, with major base

7   load plants typically being scheduled out when demand is lower during the fall and spring

8   seasons. This scheduling of maintenance outages creates a cyclical pattern of supply, and

9   therefore a cyclical pattern in spot-market electricity prices.

10   **Q.   Have you performed an analysis of the cyclical behavior of spot-market**

11   **prices?**

12   A.   Yes, I have. In my direct testimony at page 11, line 17 through page 12, line

13   12, I discussed comparing the monthly cyclical pattern of off-peak prices. Also in my direct

14   testimony at page 16, line 11 through page 17, line 6, I discussed the monthly cyclical pattern

15   of on-peak prices. This analysis compared Cinergy Hub prices to the monthly cyclical pattern

16   used by AmerenUE in its estimate of normal prices, and the Staff adopted the monthly

17   cyclical pattern in spot-prices used by AmerenUE in its direct filing in this case.

18   In my rebuttal testimony at page 7, line 3 through page 8, line 3, I presented statistical

19   measures of the variability of price levels for on-peak and off-peak prices, showing that the

20   cyclical component accounted for approximately 10% of on-peak price variation and over

21   23% of off-peak price variation. This means that there is significant variation between the

22   high monthly summer spot-market prices for electricity and the low non-summer spot-market

1 prices for electricity. Thus, there is strong statistical evidence of a cyclical pattern in the

2 behavior of spot-market prices for electricity.

3 Subsequently, I have updated the analysis done for my direct and rebuttal testimony in

4 two ways. First, I have updated the spot-market price data to include data through December

5 31, 2006, and for this analysis am using Mr. Schukar's revised data for April 2005 through

6 December 2006. I am also using Mr. Schukar's revised natural gas price data in my analysis.

7 Second, in the analysis done previously, I estimated the trends in price data by using linear

8 line segments. This approach requires judgment on the part of the analyst in determining

9 where to place each of the linear segments. In order to avoid interjecting my judgment into

10 the analysis, I calculated the trend component of the price data using a sixth degree

11 polynomial – an algebraic equation where the variable contains terms x, x^2 … x^6. This allows

12 the estimate of the trend line to determine where to put the changes in direction of the trend

13 rather than leaving that determination to the judgment of the analyst. The only decision I had

14 to make was what degree polynomial to use. I found a fifth degree polynomial did not

15 properly account for the data patterns through 2006, but a sixth degree polynomial did.

16 **Q.   What were the results of your updated analysis?**

17 A.   I performed the same analysis for all four sets of revised price data: coal

18 dispatch prices; off-peak electricity prices; natural gas prices; and on-peak electricity prices.

19 Attached to my surrebuttal testimony, the results of this analysis are shown on Schedules 2.1

20 through 2.4 for the polynomial estimates of the trend, and on Schedules 3.1 through 3.4 for

21 the monthly cyclical components. Finally, attached to my surrebuttal testimony as Schedule

1   4.1 is the statistical summary of the contribution of each component to the variability in the

2   price data.

3   **Q.**   **Please explain what you mean by trend, cyclical and random components**

4   **for the price variables?**

5   A.   Any time series of data has three components. In my rebuttal testimony for the

6   monthly price time series I defined:

7   a)   trend – steady increases/decreases in prices over time;

8   b)   cycles – changes that occur in a repeated pattern over time; and

9   c)   random – variations from trends and cycles that cannot be explained.

10   In the case of these price data, the trend component is estimated consistently across all four

11   sets of price data using the same sixth degree polynomial. The variation within the trend

12   component is then measured as the difference between the four-year average and the

13   estimated trend. Next, the trend component is removed from the data by adding the difference

14   between the monthly data and the trend component to the four-year average of the price data.

15   In essence, this removes the trend from the data by substituting a constant price for the trend

16   and adding the variation around the trend to that constant value. This leaves only a cyclical

17   plus random component to the price data. Notice in this calculation that the variation around

18   the trend includes a cyclical component that is not explained by the trend.

19   The cyclical component is estimated by using the average over four years for each

20   month, and the random component is the variation of the data about that monthly average.

21   The variation in the cyclical component is then calculated as the difference between the

14

1 monthly averages and the mean and is equal to the total variation in the data minus the sum of

2 the variation from the trend component and from the random component.

3   **Q.   What do Schedules 2.1 through 2.4 demonstrate?**

4   A.   These Schedules demonstrate the updated estimate of the trend using a sixth

5 degree polynomial. I should point out that while coal dispatch prices appear to show the least

6 amount of variation, all four series have approximately the same standard deviation as a

7 percent of mean. This can be seen on Schedule 4.1 where for each price series the standard

8 deviation is calculated as a percent of the mean. The lowest percent of total variation as a

9 percent of mean is for natural gas at 24.84% and the highest is for the on-peak price at

10 28.09%.

11   **Q.   What do Schedules 3.1 through 3.4 demonstrate?**

12   A.   For each of the four price series, theses schedules show the four-year average

13 of monthly prices after removing the trend component, and the pattern of prices from each of

14 the four years (2003 through 2006) that were used to calculate the four-year average is also

15 included on the graphs. In Schedules 3.1 and 3.3 there appears to be little cyclical variation

16 for coal and natural gas prices. However, in Schedules 3.2 and 3.4 there is a much clearer

17 cyclical pattern in off-peak and on-peak electricity prices. What appears to be the case from

18 the graphs is supported by the statistics shown on Schedule 4.1. While for off-peak prices the

19 cyclical component makes up 16.09% of the total variation, for coal prices, the "cyclical"

20 component accounts for less than 2% of the total variation. This is a significant difference.

21 While for on-peak prices the cyclical variation accounts for 13.85% of the total variation, for

22 natural gas prices, the "cyclical" components only accounts for 5.92% of the total variation.

1   Thus, while fuel dispatch prices have a very weak cyclical component (if at all), spot-market

2   electricity prices have much stronger cyclical components. In addition, if these four-year

3   averages are plotted against one another, there is virtually no correlation between monthly

4   fuel prices and monthly electricity prices. These plots are shown on Schedule 4.2 and 4.3.

5   The R-squared values for relationships between off-peak to coal (6.17%) and on-peak to

6   natural gas (9.95%) average monthly prices were below 10%, indicating a very low level of

7   correlation.

8   **Q.   What do the correlations between monthly fuel prices and monthly**

9   **electricity prices demonstrate?**

10   A.   First, there is virtually no correlation between monthly natural gas prices and

11   monthly on-peak electricity prices.   The R-squared value for this regression is 9.95%. Thus,

12   when compared to using the mean of the monthly off-system prices to predict the monthly

13   shape of the same series, monthly coal prices only do 10% better.

14   Second, there is even less correlation between monthly coal prices and monthly off-

15   peak electricity prices. The R-squared value for this regression is 6.17%, which is an

16   extremely weak level of correlation. These low levels of correlation indicate that Mr. Schukar

17   should not have used either monthly coal prices or monthly natural gas prices to predict

18   monthly electricity prices.

19   **Q.   Can Mr. Schukar's approach of using monthly data rather than twelve-**

20   **month moving averages be used in estimating the relationship between fuel dispatch**

21   **prices and spot-market electricity prices?**

1 A. Yes, if the Missouri Commission decides that the twelve-month moving

2 average approach is deficient, then a monthly model can be constructed that eliminates the

3 deficiencies in Mr. Schukar's rebuttal model. I will discuss this correction to Mr. Schukar's

4 rebuttal model later in my surrebuttal testimony.

5 **5. Applying Mr. Schukar's monthly regression analysis results in an**
6 **underestimate of the correlation in the annual levels of the fuel dispatch**
7 **prices to the spot-market electricity prices, and a biased estimate of their**
8 **relationship.**

9 **Q. What did Mr. Schukar attempt to do in his rebuttal testimony?**

10 A. Mr. Schukar made the mistake of attempting to correlate on a monthly basis,

11 time series that are correlated only on a twelve-month basis. To put it a different way,

12 monthly coal dispatch prices that do not follow a cyclical pattern cannot be used to predict

13 monthly off-peak prices that do follow a cyclical pattern, but both price series follow the same

14 trend pattern over time and are highly correlated at that level. Likewise, monthly natural gas

15 prices that do not follow a cyclical pattern cannot be used to predict monthly on-peak prices

16 that do follow a cyclical pattern, but both price series follow the same trend pattern over time

17 and are highly correlated at that level. Because of the lack of month-to-month correlation

18 between spot-market electricity prices and fuel dispatch prices, Mr. Schukar's regressions

19 were certain to yield poor levels of correlation.

20 To illustrate this problem, I have designed a simple example of two time series, one of

21 which (series A) has both a trend and cyclical component and the other of which (series B)

22 has only a trend component. To construct these two series, I started with a twelve month

23 cycle for series A and a constant level for series B. I then added 50 cents per month in a trend

24 to both series. Thus, on a trend or annual basis, both series are perfectly correlated with a

1 regression coefficient of 1. These two time series are shown on Schedule 5.1 attached to my

2 testimony. Applying Mr. Schukar's methodology to these two time series, I then ran a

3 regression on the monthly data. The result is that the regression interprets the cycle as an

4 error component in the regression, resulting in an R-squared value of 49.62%, and estimates

5 the coefficient between the two series to be 0.838 rather than 1. This difference between the

6 true coefficient of 1 and the coefficient resulting from running a regression on monthly data of

7 0.838 demonstrates what statisticians call a bias in the results. Thus, applying the monthly

8 regression method supported by Mr. Schukar results in a significant understatement of the

9 year-to-year correlation, as well as a biased estimate of the true relationship that exists on a

10 year-to-year basis between these price variables.

11 **Q.   What can be done to correct the bias resulting from running the**

12 **regression on a monthly basis?**

13 A.   For this particular example, I ran a regression on the 12 month moving

14 averages (MMAs) from the two series. The 12 MMAs were perfectly correlated with an R-

15 squared value of 100%, and produced a coefficient between the two series of 1, which is the

16 true relationship. The results of the biased estimate resulting from the monthly regression and

17 the true relationship are shown on Schedule 5.2 attached to my surrebuttal testimony.

18 **6. <u>Mr. Schukar criticizes the Staff's use of twelve-month moving averages by</u>**
19 **<u>incorrectly characterizing the Staff's regression model as applying to monthly</u>**
20 **<u>rather than annual prices.</u>**

21 **Q.   Do you agree with Mr. Schukar's criticism of your applying regression**

22 **analysis to twelve-month moving averages?**

1   A.   Mr. Schukar's criticism is based on the assumption that the true relationship

2 exists between the monthly observations on prices. If this assumption were true, then I would

3 agree with his criticism set out at page 14, lines 6 through 16 of his rebuttal testimony.

4 However, since the true relationship exists not between monthly observations, but instead

5 between annual observations, his criticism is not valid. As previously stated in my surrebuttal

6 testimony, one cannot predict a monthly cyclical price pattern for electricity prices with

7 monthly non-cyclical price patterns for fuel dispatch prices.

8   In addition, Mr. Schukar criticizes the use of a regression on twelve-month moving

9 averages because he claims that it "incorrectly assumes that the relationship between power

10 and fuel prices is the same throughout the year" (Schukar Rebuttal at page 14, lines 17-20).

11 This is simply an incorrect statement. The use of a twelve-month moving average in a

12 regression assumes that the yearly average relationship between the spot-market electricity

13 prices and fuel dispatch prices is the same no matter which 12-month period is being

14 averaged. Thus, all the discussion that follows in Mr. Schukar's rebuttal testimony about

15 natural gas price having a different relationship to on-peak price in the summer versus the

16 non-summer months is totally irrelevant. This is because the analysis I performed looked at

17 annual average levels for both natural gas prices and on-peak spot-market prices. The extent

18 to which there is a different relationship is then picked up in the Staff's use of cyclical on-

19 peak power prices; i.e., the Staff does not assume a constant on-peak power price throughout

20 the year.

1   **Q.   What analysis does Mr. Schukar perform to show a different relationship**

2   **between natural gas prices and on-peak spot-market prices in the summer months**

3   **versus the non-summer months using Staff's twelve-month moving average model?**

4   A.   Mr. Schukar simply takes the average of summer (June through August) and

5   non-summer (remaining months) 2006 natural gas prices and incorrectly applies these prices

6   to my regression results to obtain a prediction of summer and non-summer on-peak prices.

7   This application of an estimate of an average annual relationship is not valid because the

8   regression model was never intended to be used to predict monthly values. It should only be

9   used to predict annual average values.

10   **Q.   How did Staff get from an average annual on-peak price to different on-**

11   **peak hourly prices throughout the year?**

12   A.   While the annual average value from the twelve-month moving average

13   regression (what Mr. Schukar calls "Proctor Original Relationship") is ** _____ **, this is

14   not the estimate of on-peak prices for each of the summer months of June through August. To

15   obtain this estimate, Staff used the hourly price profile sponsored in Mr. Schukar's direct

16   testimony, but applied the percent increase to every on-peak hour to obtain an annual average

17   on-peak price corresponding to its normal annual average level.

18   From this hourly profile of on-peak prices, I calculated the average on-peak price for

19   June through August to be ** _____ **. Had Mr. Schukar averaged the Staff's monthly

20   values for June through August, he would have determined that these months have higher

21   prices than the annual average on-peak electricity price. The monthly average for Staff's

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1   normalized prices for on-peak and off-peak are shown on Schedule 6 attached to my

2   surrebuttal testimony.

3   **Q.   Because of Mr. Schukar's mistake, what is your evaluation of Table 2 on**

4   **page 23 of Mr. Schukar's rebuttal testimony?**

5   A.   It appears that Mr. Schukar has taken the Staff's regression results that are only

6   applicable for annual average prices and attempted to apply those results to seasons of the

7   year: Summer (June-August); and Non-Summer (Other Months). This is an inappropriate

8   application of the Staff's regression results. In addition, Mr. Schukar makes the same

9   application of the results from his monthly regression models, in which the regressions will

10   incorrectly interpret the cyclical component of on-peak prices as an error term. He then

11   constructs a weighted average using volumes of off-system sales from the Staff's production

12   cost model to come up with an annual average. Any comparisons made between the two

13   regression models need to be done using the application for which those models were

14   designed. Thus, the comparisons in Table 2 of Mr. Schukar's rebuttal testimony are not valid.

15   **Q.   Do you have the same criticism of Table 1 on page 19 of Mr. Schukar's**

16   **rebuttal testimony?**

17   A.   No, I do not. In this instance Mr. Schukar is correctly comparing the results of

18   the Staff's annual regression model to the results of his monthly regression model. He shows

19   that both models over-predict the 2006 twelve-month average off-peak spot-market price of

20   $32.89/MWh, but his monthly model over-predicts by less than the Staff model filed in my

21   direct testimony.

22   **Q.   Do you have an explanation for this over-prediction?**

1   A.   First, and foremost, the actual twelve-month average for 2006 is simply one of

2 several observations, and properly designed regression models do not accurately predict every

3 observation because they are designed to capture the relationship between variables on an

4 average basis. Moreover, showing how a prediction compares to a single observation is not

5 relevant when trying to estimate the average relationship of two variables. There will be

6 observations where the difference between actual and predicted are positive and observations

7 where this difference is negative. This is why analysts use R-squared values to measure the

8 degree of correlation between a regression line (prediction) and the observations.

9   **Q.   Please explain what the R-squared value measures?**

10   A.   The R-squared value takes the difference between the actual and predicted

11 values (error), squares them (over-predicting is as bad as under-predicting) and sums them

12 over all observations. This is called the "regression error sum of squares." This is then

13 compared to the sum of squares of the difference between the observations and the simple

14 average (mean) of these values. This is called the "mean error sum of squares." If the

15 regression is a good predictor then the errors around the regression line (prediction) will be

16 much smaller than the errors around a simple mean. For example, if the ratio of the

17 regression error sum of squares to the mean error sum of squares is 10%, the R-squared value

18 is 100% minus this ratio, or 90%, and this indicates a strong level of prediction.

19   **Q.   Are there any other reasons that both regression models over-predicted**

20 **2006?**

21   A.   Yes. The twelve month average for 2006 represents a period in which off-peak

22 prices were decreasing in rebound to high levels resulting from coal shortages in 2005, and

1   then near the end of 2006, these prices were beginning to level off and perhaps trend back up

2   – See Schedule 2.1. (Note: At the end of a time series it is fairly easy to see a leveling off, but

3   more difficult to determine whether or not a series is beginning to increase.) Moreover, the

4   response of off-peak prices to coal dispatch prices is not a simple one. Starting in September

5   2006, as coal prices were leveling off, off-peak prices had reached a low and were clearly on

6   an upswing - See Schedule 2.2. This complex behavior between coal-prices and off-peak

7   prices is shown on Schedule 7 attached to my surrebuttal testimony. On Schedule 7, I have

8   plotted the trend of off-peak prices against the trend for coal dispatch prices and calculated the

9   average relationship of these trends using a simple regression line. What this chart shows is

10 the changing relationship between off-peak prices and coal prices over time. Notice that once

11 off-peak prices began to increase, the monthly observations are above the average regression,

12 but as prices fell, the monthly observation fall below the average regression. Since most of

13 2006 included observations where both prices were decreasing, it should be expected that

14 estimates based on average response would over-predict average prices during that period.

15 **7. Mr. Schukar incorrectly criticizes the Staff's use of a curved relationship**
16 **between coal dispatch prices and off-peak spot-market prices as being caused**
17 **by a data "outlier" in January 2006.**

18 **Q.   What additional criticism did Mr. Schukar have of the regression you**

19 **used in correlating off-peak spot-market electricity prices to coal dispatch prices?**

20 A.   At page 17 of his rebuttal testimony, Mr. Schukar states that in January 2006

21 "a high coal price of $2.61/MMBTU is observed at a relatively low off-peak price," and "this

22 point results in the 'curved' relationship that Dr. Proctor has measured."

1   **Q.   Do you agree with Mr. Schukar's criticism of your estimate of a curved**

2   **relationship between coal dispatch prices and off-peak spot-market prices?**

3   A.   No, I do not. The curve in the relationship between coal dispatch prices occurs

4   in the data well before January 2006. In addition, I have corrected the mistakes in Mr.

5   Schukar's regression models, and have found that adding a term to account for the curve

6   results in a significant increase in the R-squared value. I will discuss this in the next section

7   of my surrebuttal testimony.

8   ## C. CORRECTIONS TO MR. SCHUKAR'S REBUTTAL MODEL

9   **Q.   With the revisions of the AmerenUE data on spot-market prices, the**

10   **revisions to natural gas prices and the coal dispatch price updates, have you developed a**

11   **monthly model that corrects Mr. Schukar's rebuttal model?**

12   A.   Yes, I have. First, the normal level for coal dispatch prices has not changed.

13   This is primarily because it was determined using the contract price for mine mouth coal, and

14   the updated data did not indicate that a change should be made. Second, the normal level for

15   natural gas prices has also not changed with the new data used by Mr. Schukar. In his rebuttal

16   analysis Mr. Schukar used the twelve-month average for 2006 for the normal natural gas price

17   level, but I am still using Staff's recommended level of $7/MMBtu, which represents the

18   three-year average of the most recent three years of Mr. Schukar's revised natural gas price

19   data.

20   With respect to spot-market electricity prices, in addition to revising the regression

21   analysis of twelve-month moving averages, I have also performed an analysis based on that

22   presented in Mr. Schukar's rebuttal testimony. However, I have made two corrections to his

24

1 analysis. First, Mr. Schukar's model assumes that monthly fuel dispatch prices are correlated

2 with monthly spot-market prices. Since this is clearly not correct, I allowed the coefficients

3 of the model to change on a monthly basis. To do so in every month would result in having to

4 estimate too many coefficients, so I restricted the model to allow for changes on a seasonal

5 basis (i.e., in the on-peak price model, Winter is December through February, Spring is March

6 through May, Summer is June through August, and Fall is September through November, and

7 in the off-peak price model, Winter is December through March, Spring is April through June,

8 Summer is July and August, and Fall is September through November). While this is

9 sufficient for measuring the response of spot-market electricity prices to fuel dispatch prices,

10 it is not totally sufficient to account for cyclical changes in spot-market electricity prices that

11 do occur within each season. In order to model this component, I used the results shown on

12 Schedules 3.2 and 3.4 to calculate how spot-market prices change within each season, and

13 included this additional component in the model.

14 **Q. What are the results of your analysis for on-peak prices?**

15 A. At the Staff's normal natural gas dispatch price of $7/MMBtu, the

16 corresponding average annual on-peak price for the correction to Mr. Schukar's analysis is

17 ** _____ **/MWh, a reduction of $2.74/MWh from the Staff's position filed in its direct

18 testimony. However, going from the twelve-month moving average to the correction of Mr.

19 Schukar's model actually results in an increase of $0.48/MWh. A reduction of $3.22/MWh

20 resulted from the change in on-peak prices proposed by Mr. Schukar (i.e., using average

21 LMPs at AmerenUE's coal plants).

22 **Q. What are the results of your analysis for off-peak prices?**

25

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1   A.   The correction to Mr. Schukar's analysis produces an estimate of

2   ** _____ **/MWh for an annual average off-peak price, a reduction of $1.43/MWh from

3   Staff's position filed in direct testimony. In this case the difference between the corrected

4   Schukar model compared to a twelve-month moving average model accounted for

5     $0.78/MWh of the reduction and the change in off-peak prices proposed by Mr. Schukar

6   accounted for the remaining $0.65/MWh of reduction.

7   **Q.   In the correction to Mr. Schukar's model, did you use a linear or curved**

8   **relationship between off-peak prices and coal dispatch prices?**

9   A.   I ran the corrected model both ways. In his rebuttal testimony Mr. Schukar

10   points out that for the twelve-month moving average analysis on coal dispatch prices and off-

11   peak spot-market electricity prices, the more recent months of October through December of

12   2006 fall below the estimated values predicted by the twelve-month moving average

13   regression. He attempted to correct this by running a linear rather than a quadratic regression.

14   However, this does not correct the problem because his model fails to take into account the

15   cyclical behavior of off-peak prices and the lack of cyclical behavior for coal dispatch prices.

16   By taking this lack of correlation in cyclical behavior into account in the correction to his

17   model, I found that using a quadratic relationship significantly increased the R-squared value

18   from 62.81% for the linear model to 75.35% for the quadratic model, and corrects the Oct-

19   Dec 2006 problem as well.

20   **Q.   From a modeling perspective, do you support using the correction to the**

21   **rebuttal analysis of Mr. Schukar over using the twelve-month moving average method**

22   **from your direct filing?**

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1   A.   No. While there are numerical differences in results of the two models, I do

2 not believe that going to a monthly type model to estimate annual relationships between

3 variables is necessary. Correcting Mr. Schukar's models to properly use monthly data

4 requires a complex construction process, which could result in model misspecifications.

5 Since the intent is to find the relationship between spot-market prices and fuel dispatch prices

6 on an annual basis, I believe the twelve-month moving average regression models are simpler

7 to implement and sufficient for the task.

8   **Q.   How do the results of the corrected version of Mr. Schukar's models**

9 **compare to Mr. Schukar's results?**

10   A.   The corrected models perform well (R-squared values of 75.35% for off-

11 peak/coal and 78.60% for on-peak/natural gas), eliminates any bias that might be in the

12 twelve-month moving average regressions, and corrects the major flaw in Mr. Schukar's

13 models. Mr. Schukar's model for the monthly relationship between off-peak prices and coal

14 prices had an R-squared value of 47.44%, and for the monthly relationship between on-peak

15 prices and natural gas prices, an R-squared value of 53.12% for non-summer months and

16 46.90% for summer months. Thus, the corrected models significantly out-performed the

17 models used by Mr. Schukar in rebuttal.

18   The graphs showing the relationship of data to regression predicted results are shown

19 on Schedules 8.1 through 8.4 for off-peak prices - coal dispatch prices by season, and on

20 Schedules 9.1 through 9.4 for on-peak prices - natural gas dispatch prices by season. For

21 these graphs, I have removed the estimated cyclical components from the data to show the

22 relationship of the spot-market prices to the fuel dispatch prices.

1   **Q.   Mr. Schukar wants to use a lower natural gas price to predict summer on-**

2   **peak prices and a higher natural gas price to predict non-summer on-peak prices. Do**

3   **you agree with this approach?**

4   A.   No, I do not. While it is correct that during 2006, natural gas prices were

5   lower during the summer months of June through August, this was not the case for the four

6   year period 2003 through 2006. During the summer period, natural gas prices, adjusted for

7   trend, averaged only four cents per MMBtu lower than in the non-summer period. This

8   difference is neither numerically nor statistically significant. The Staff still supports the use

9   of a year-round natural gas dispatch price of $7/MMBtu and a year-round coal dispatch price

10   of 139.22 cents/MMBtu.

11   **Q.   Based on these fuel dispatch prices, how do the normal spot-market**

12   **electricity prices produced by the correction to the models used by Mr. Schukar in**

13   **rebuttal compare to his results?**

14   A.   For on-peak prices Mr. Schukar's models result in an average price of

15   ** _____ **/MWh compared to a corrected value of ** _____ **/MWh; the correction

16   resulting in a reduction of $0.51/MWh. For off-peak prices Mr. Schukar's model results in an

17   average price of ** _____ **/MWh compared to a corrected value of ** _____ **/MWh; the

18   correction resulting in an increase of $0.79/MWh. Thus, the results of making these

19   corrections has an opposite impact on the off-peak price (increase) compared to the on-peak

20   price (decrease). However, the increase is larger than the decrease and would apply to just

21   over 52% of the hours in the year.

NP

1   **Q.   Do you recommend that the Missouri Commission adopt the spot-market**

2   **prices resulting from the corrections to Mr. Schukar's rebuttal model?**

3   A.   No. I am not comfortable with the revised AmerenUE prices for off-system

4   sales proposed by Mr. Schukar, as these represent a lower bound estimate for prices that

5   AmerenUE receives for off-system sales. I therefore used the results of AmerenUE's 2007

6   fuel budget as a "sanity" check.

7   **D. AMERENUE'S 2007 FUEL BUDGET**

8   **Q.   How do the results of AmerenUE's 2007 fuel budget compare to the**

9   **results of Staff's production costs runs without the inclusion of the Joppa (EEInc.)**

10   **generating unit?**

11   A.   It is my understanding that the Staff has revised its production cost runs to

12   address the concerns raised by AmerenUE's witness Mr. Timothy Finnell in rebuttal

13   testimony. Using the fuel dispatch prices and spot-market electricity prices that Staff has in

14   its direct filing, the Staff's revised production cost runs yield conservative results compared to

15   AmerenUE's 2007 fuel budget.

16   a) AmerenUE's 2007 fuel budget is **1.28 million MWh higher** in off system sales than
17   Staff's production cost run, with ** _____ ** million MWh in off-system sales,
18   compared to ** ____ ** million MWh generated by the Staff's revised production cost
19   runs.

20   b) AmerenUE's 2007 fuel budget is **$0.82/MWh higher** in average price received for
21   off-system sales than Staff's production cost run, with an average price for off-system
22   sales of ** _____ **/MWh, compared to ** _____ **/MWh for the Staff's revised
23   production cost runs.

24   c) AmerenUE's 2007 fuel budget is **$31 million higher** in profit margins from off-
25   system sales than Staff's production cost run, with ** _____ ** million in profit
26   margins from off-system sales compared to   ** _____ ** million in profit margins
27   from off-system sales for the Staff's revised production cost runs.

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1   Thus, the Staff's revised production cost run results in lower values for off-system

2   MWh sales, average price for off-system sales, and overall profit margins from off-system

3   sales. Since the Staff's runs were based on the spot-market prices from Staff's direct filing, I

4   am very concerned about lowering the spot-market prices from what was filed in Staff's direct

5   testimony.

6   **Q.   What is your understanding of the source of off-system sales prices used**

7   **for the AmerenUE 2007 fuel budget?**

8   A.   The AmerenUE 2007 fuel budget was prepared using a forward price curve for

9   the Cinergy Hub. Therefore, I compared the Cinergy Hub price data to AmerenUE price data.

10   Using Mr. Schukar's revised data for AmerenUE off-system sales, I found that while on-peak

11   prices for AmerenUE average $1.04/MWh lower than the Cinergy Hub prices, the opposite

12   resulted for off-peak prices, where AmerenUE's prices averaged $1.63/MWh higher than the

13   Cinergy Hub prices. These differences were calculated over a 15 month period (June 2005

14   through August 2006). While there were a few months during this 15 month period where

15   AmerenUE's on-peak prices were higher than the Cinergy hub on-peak prices (4 of 15), and a

16   few months where AmerenUE's off-peak prices were lower than the Cinergy hub off-peak

17   prices (3 of 15), the dominant numbers were in the same direction as the averages (i.e.,

18   AmerenUE on-peak/off-peak prices lower/higher than the Cinergy Hub).

19   **Q.   Are you supporting the use of Cinergy Hub forward prices for**

20   **determining normal prices in this rate case?**

21   A.   No, I am not. Instead, I am using a comparison of the Staff's normal fuel

22   dispatch prices and spot-market electricity prices to AmerenUE's fuel budget as a check as to

1 the reasonableness of Staff's position. Because the data proposed by Mr. Schukar is a lower

2 bound estimate of prices for off-system sales, I did not feel comfortable in supporting these

3 lower price levels. The results of AmerenUE's fuel budget for 2007 leave me feeling even

4 less comfortable with Mr. Schukar's proposed prices.

5 **Q.   Based on this comparison of results between AmerenUE's 2007 budget**

6 **and Staff's revised production cost runs, should the prices for fuel dispatch and spot-**

7 **market electricity sales from the Staff's direct filing be lowered?**

8 A.   No. This comparison indicates that the Staff's assumptions were conservative

9 compared to AmerenUE's fuel budget for 2007.

10 **Q.   If the Missouri Commission believes it is important to reflect some**

11 **adjustment to the Staff's original prices filed in direct because of congestion and losses,**

12 **what adjustment would you recommend?**

13 A.   At the most, I would recommend a two percent decrease. Two percent reflects

14 slightly less than the price reduction for the off-peak prices reflected in model results using

15 the data proposed by Mr. Schukar. That same data resulted in just under a 6.3% reduction in

16 on-peak price, which is likely to be an overestimate of the decrease needed to properly reflect

17 congestion and losses in the on-peak period. The result of applying a two-percent decrease in

18 every hour would be a decrease of $0.61/MWh in the off-peak price and $1.09/MWh in the

19 on-peak price, reflecting higher losses and congestion during the on-peak hours.

20 **E..SURREBUTTAL TO AMERENUE WITNESS MR. TIMOTHY D. FINNELL**

21 **Q.   What is Mr. Finnell's surrebuttal of Staff fuel dispatch prices?**

1   A.   Mr. Finnell has adopted Staff's coal dispatch prices, but has moved from a

2   three-year (2003-2005 adjusted) to using the cost of natural gas burned in AmerenUE

3   combustion turbines in 2006 as the measure of normal natural gas dispatch prices and

4   accounting prices. From AmerenUE's direct filing, these changes reduce AmerenUE's price

5   for coal dispatch, but significantly increase its natural gas dispatch price from a twelve-month

6   average of $6/MMBtu to over $7/MMBtu, which is the Staff's normal.

7   **Q.   Do you agree with Mr. Finnell's position on natural gas prices?**

8   A.   I strongly support the use of the same natural gas prices for both dispatch and

9   accounting. This is because AmerenUE only uses its combustion turbines for peaking, when

10 needed, and does not have a strong enough demand for natural gas as a generation fuel to

11 enter into long-term contracts. Thus, it is likely that AmerenUE depends on purchasing

12 natural gas from the spot-market for purposes of generating electricity. However, I do not

13 support the use of the cost of natural gas burned in 2006 as representative of normal gas price

14 levels. With the small amounts of natural gas burned, especially during the non-summer

15 period, these average costs are not likely to be representative of natural gas prices that

16 AmerenUE faces on a day-to-day basis. The Staff's position is that a $7/MMBtu still

17 represents a reasonable level for a normal natural gas dispatch price.

18   **Q.   Given the revisions made by AmerenUE in its rebuttal to natural gas price**

19 **data, what is the basis for the Staff's position in support of the $7/MMBtu as a**

20 **reasonable level for normal natural gas dispatch prices?**

21   A.   The average natural gas price for the most recent three years from Mr.

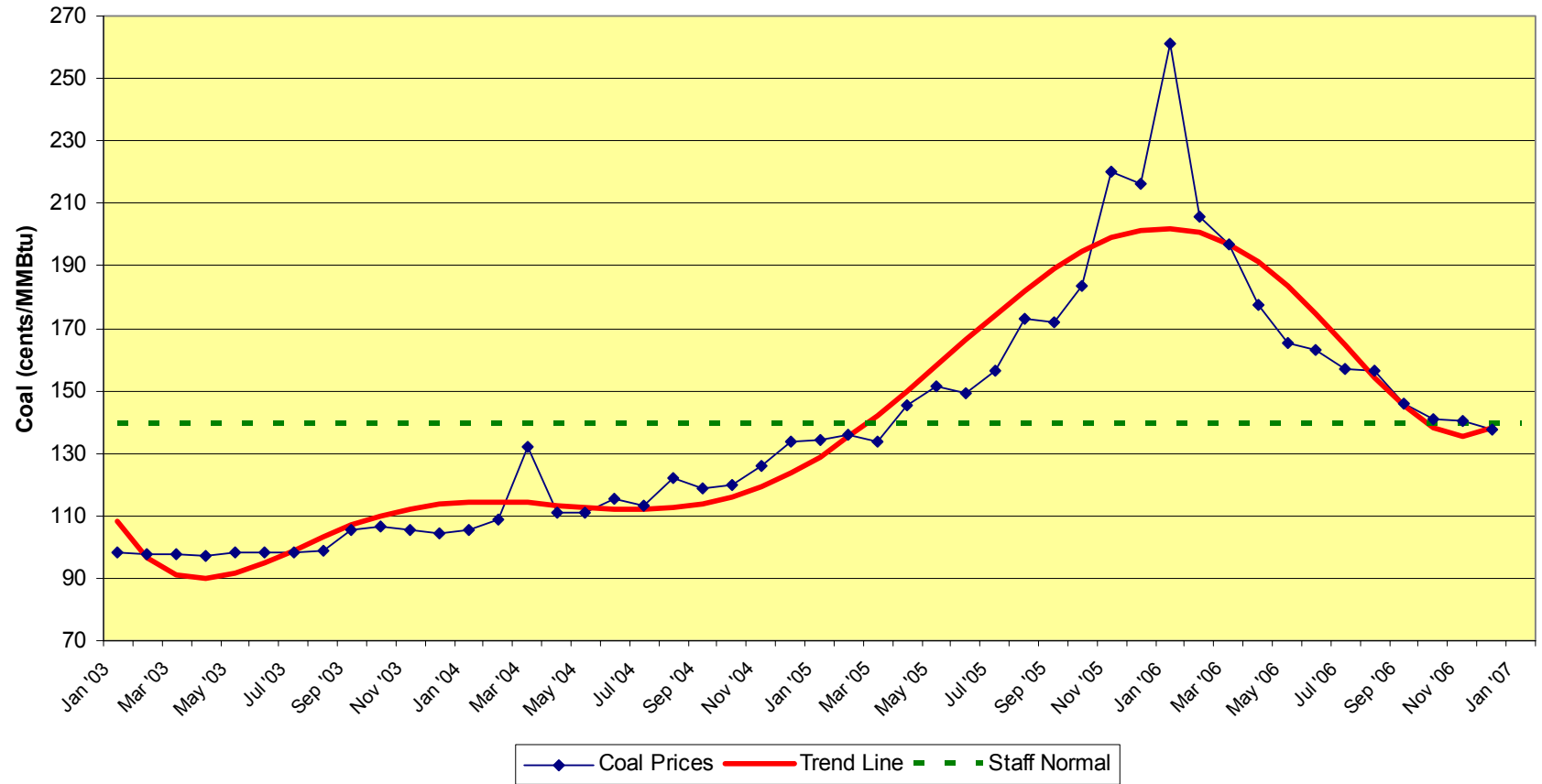22 Schukar's revised gas price data is $6.98/MMBtu.   The 2006 average is lower at

1   $6.58/MMBtu, but the prices for September, October and December of 2006 were well below

2   their three-year average and the price for January 2006 was well above its three-year average.

3   Because of these variations, I would not use 2006 as representative of normal for natural gas

4   prices. From the original data provided to Staff, the average natural gas price for the most

5   recent three years is $6.93/MMBtu. The 2006 average is slightly lower at $6.89/MMBtu, but

6   the price in October was significantly low. I substituted the January 2007 observation for the

7   October 2006 observation resulting in an average price of $7.03/MMBtu. Thus, $7/MMBtu,

8   as recommended in my direct testimony, remains a reasonable value for normal natural gas

9   dispatch prices.

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

11 A.   Yes, it does

Schedule 1

Is Deemed

Highly Confidential

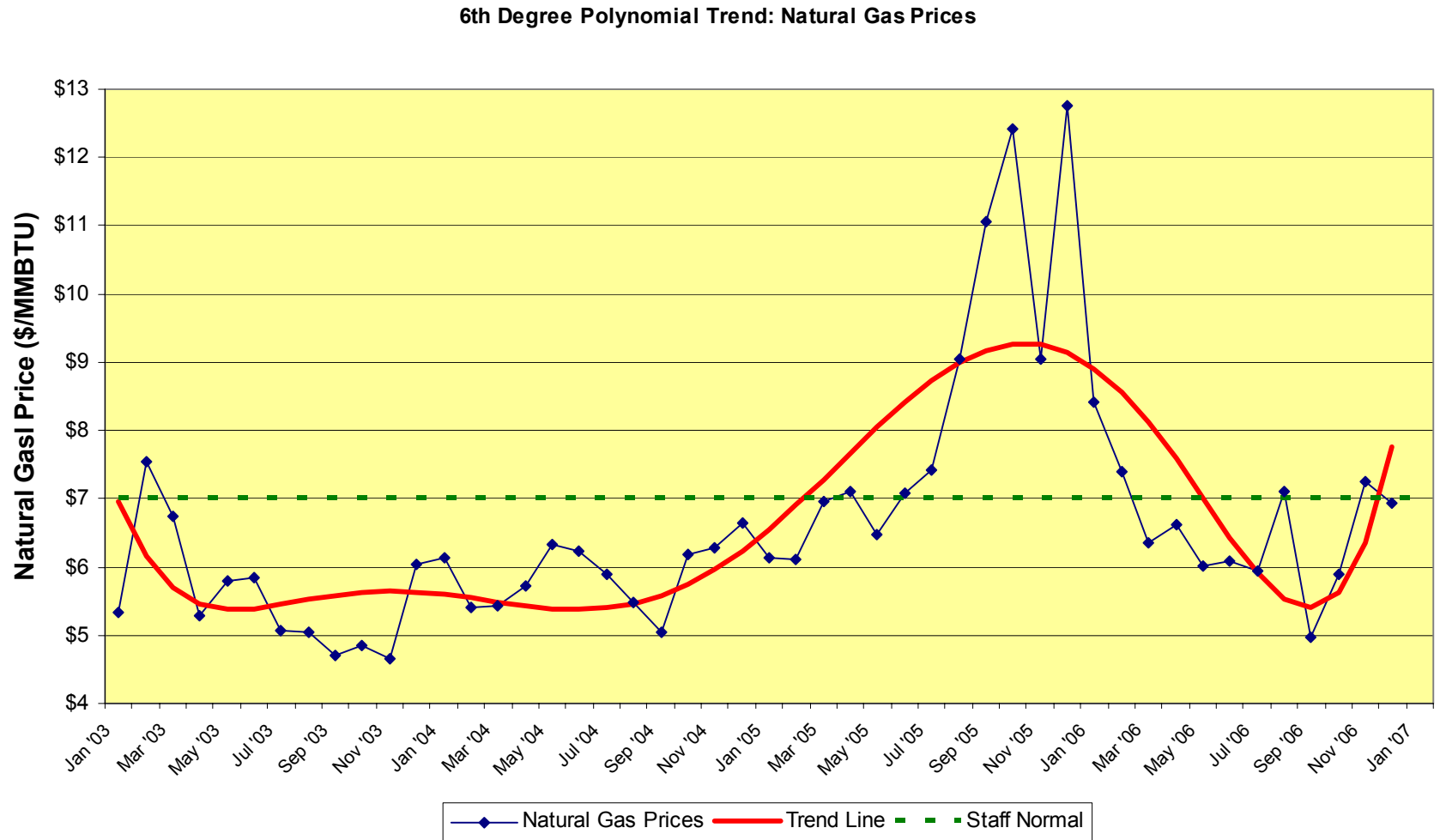# In Its Entirety

6th Degree Polynomial Trend: Coal Prices

Schedule 2.1

Schedule 2.2

Is Deemed

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In Its Entirety

6th Degree Polynomial Trend: Natural Gas Prices

Schedule 2.3
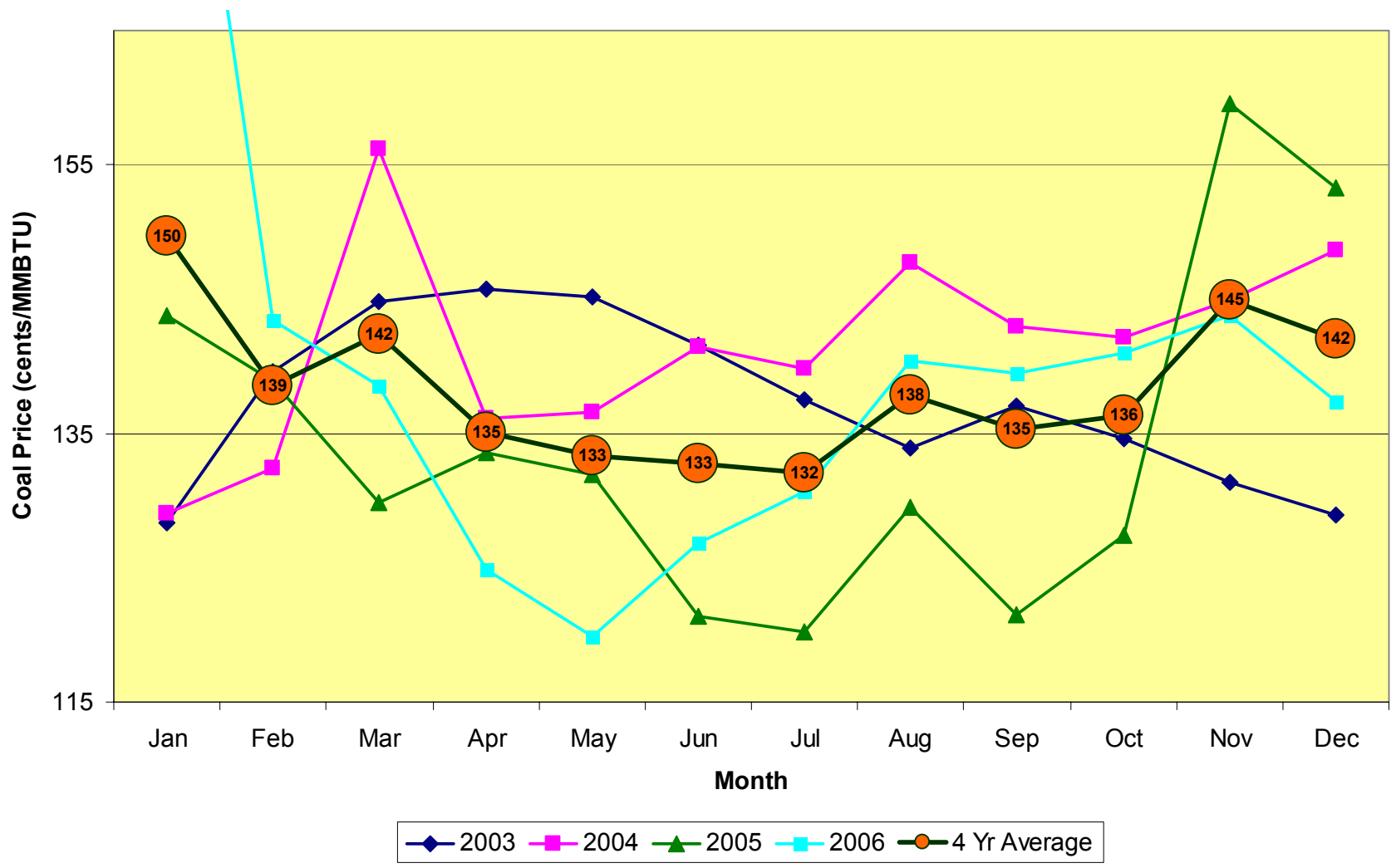
Legend: Natural Gas Prices — Trend Line — Staff Normal

Schedule 2.4

Is Deemed

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In Its Entirety

Detrended Coal Prices by Month
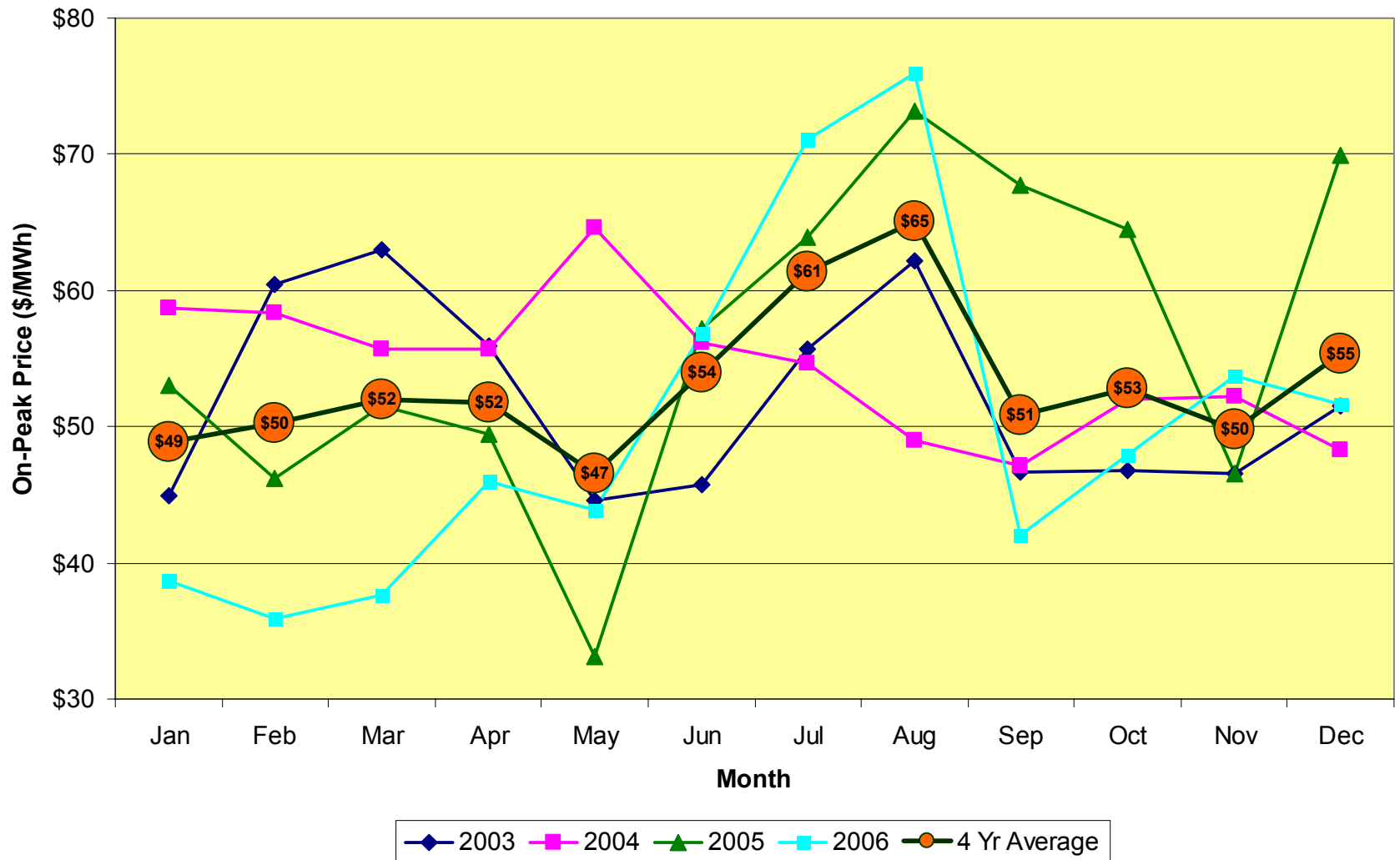
Schedule 3.1

Schedule 3.2

Is Deemed

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In Its Entirety

Detrended Natural Gas Prices by Month

Natural Gas Price ($/MMBTU) vs. Month

4 Yr Average values: Jan 6.13, Feb 6.45, Mar 6.37, Apr 6.28, May 6.33, Jun 6.55, Jul 6.34, Aug 6.92, Sep 6.65, Oct 7.40, Nov 6.63, Dec 7.52

Legend: 2003, 2004, 2005, 2006, 4 Yr Average
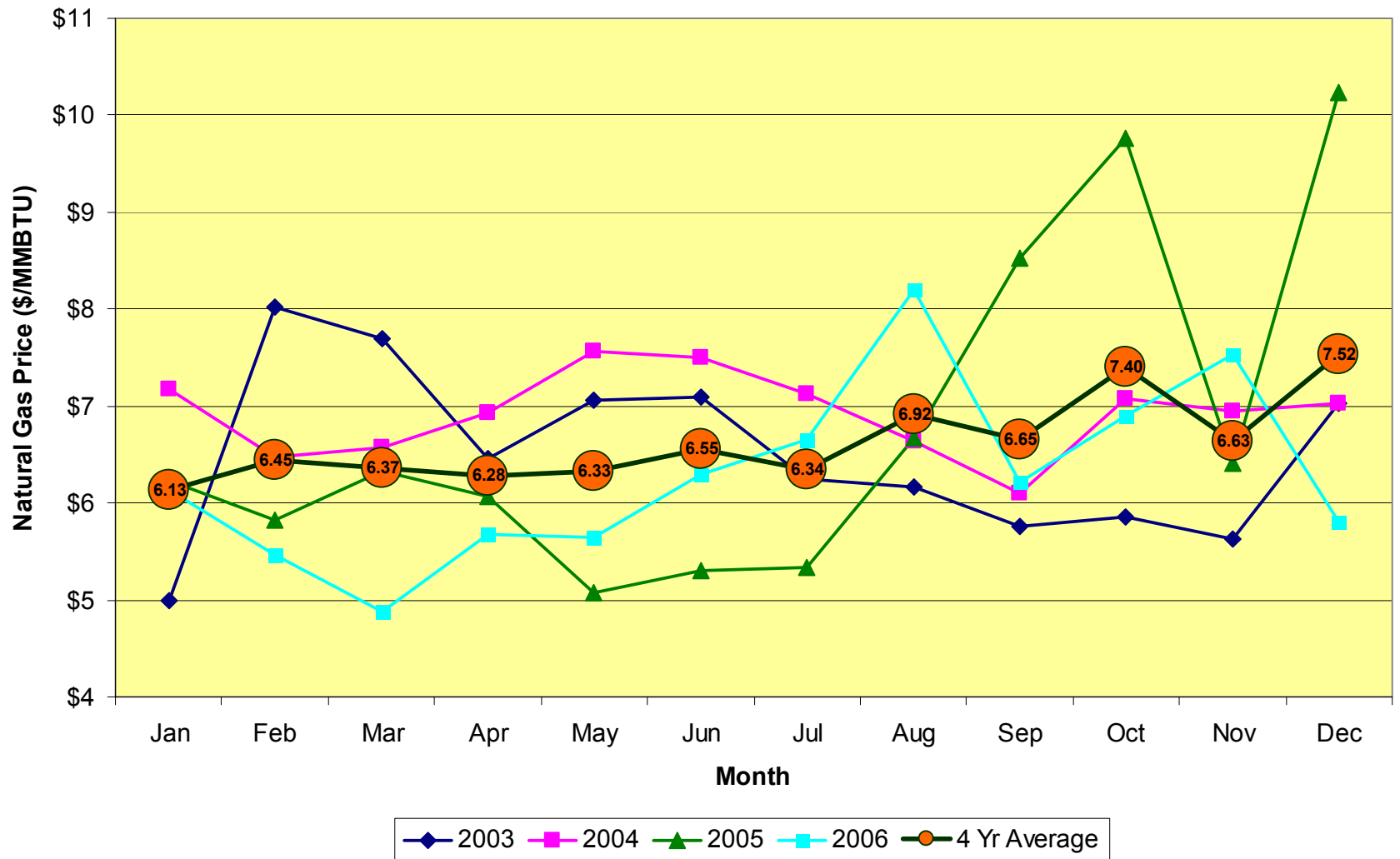
Detrended On-Peak Prices by Month

Schedule 3.4

Schedule 4.1

Is Deemed

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In Its Entirety

Schedule 4.2

Is Deemed

Highly Confidential

In Its Entirety

Schedule 4.3

Is Deemed

Highly Confidential

In Its Entirety

Correlated Price Series
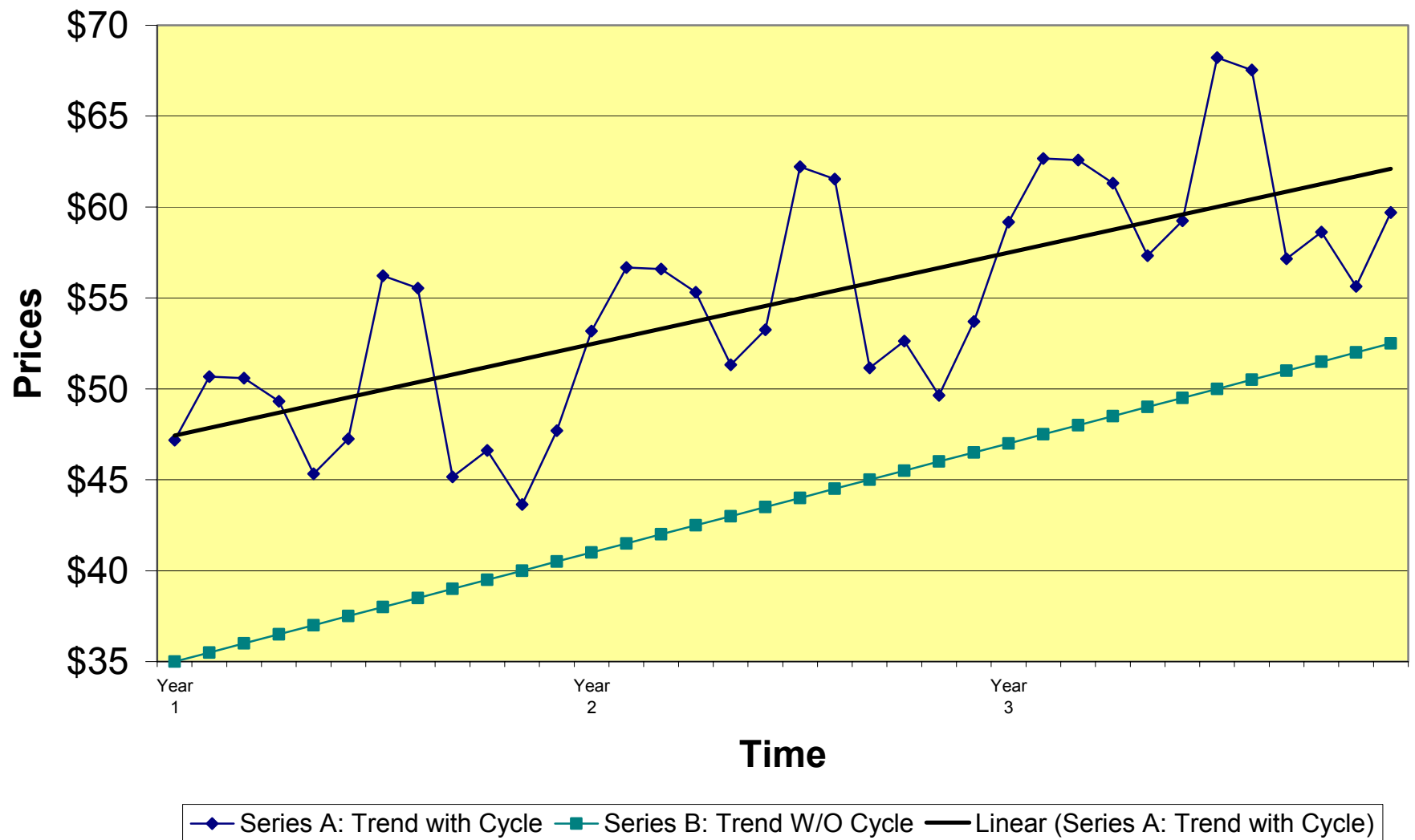
Comparison of Regressions

Series A: Trend with Cycle

Series B: Trend W/O Cycle

Legend: Monthly Data — Monthly Regression — 12 MMA
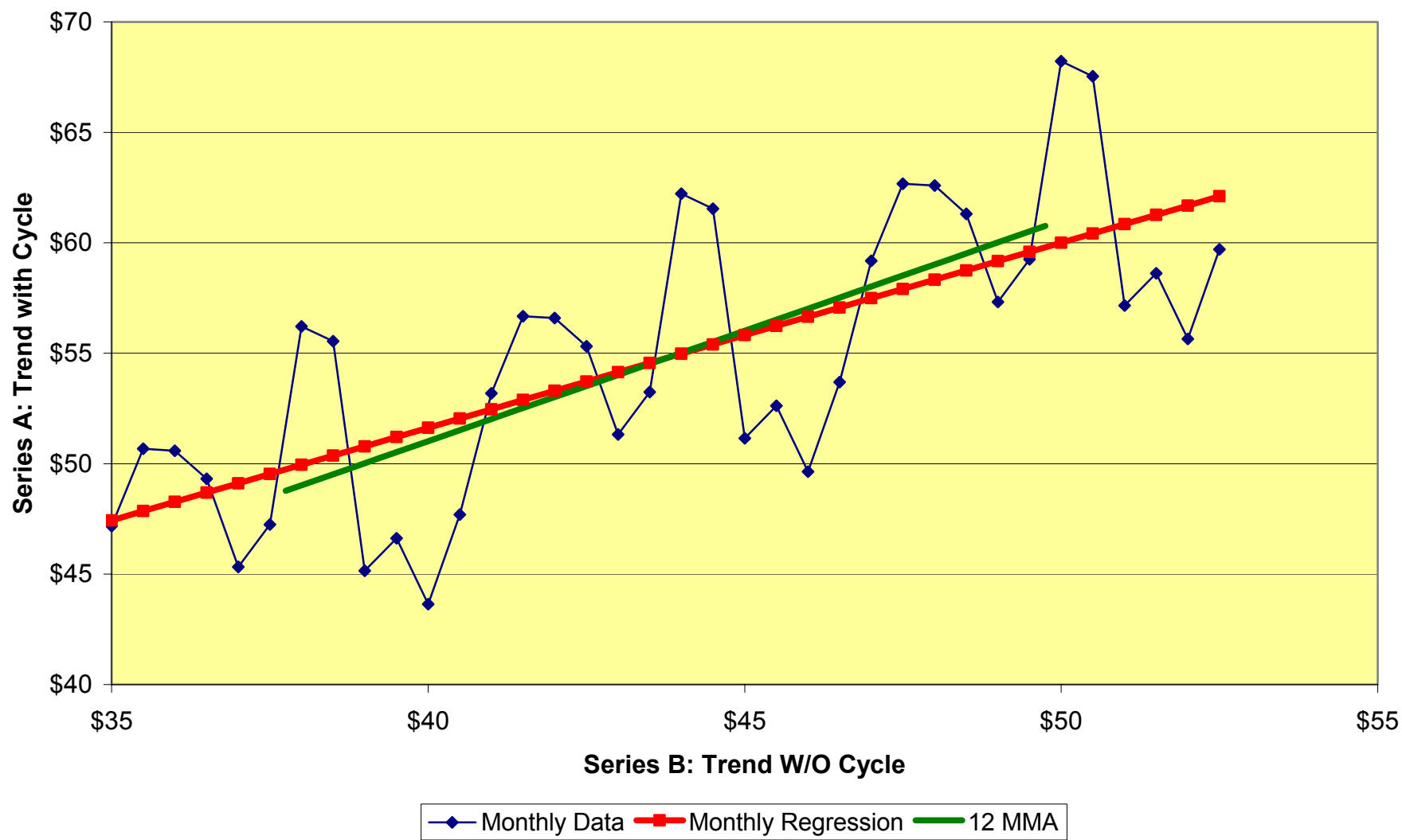
Schedule 6

Is Deemed

Highly Confidential

In Its Entirety

Schedule 7

Is Deemed

Highly Confidential

In Its Entirety

Schedule 8.1

Is Deemed

Highly Confidential

In Its Entirety

Schedule 8.2

Is Deemed

Highly Confidential

In Its Entirety

Schedule 8.3

Is Deemed

Highly Confidential

In Its Entirety

Schedule 8.4

Is Deemed

Highly Confidential

In Its Entirety

Schedule 9.1

Is Deemed

Highly Confidential

In Its Entirety

Schedule 9.2

Is Deemed

Highly Confidential

In Its Entirety

Schedule 9.3

Is Deemed

Highly Confidential

In Its Entirety

Schedule 9.4

Is Deemed

Highly Confidential

In Its Entirety