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MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

REBUTTAL TESTIMONY

OF

MICHAEL S. PROCTOR

KANSAS CITY POWER & LIGHT COMPANY

CASE NO. ER-2009-0089

Jefferson City, Missouri
March 2009

****Denotes Highly Confidential Information****

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BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the Application of Kansas City Power and Light Company for Approval to Make Certain Changes in its Charges for Electric Service To Continue the Implementation of Its Regulatory Plan	)))))	Case No. ER-2009-0089

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 Rebuttal Testimony in question and answer form, consisting of 23 pages of Rebuttal Testimony to be presented in the above case, that the answers in the following Rebuttal 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 10th day of March, 2009.

Notary Public

DANNY H. STEPHENS
Notary Public - Notary Seal
State of Missouri - County of St. Louis
My Commission Expires May 31, 2009
Commission #05533063

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KANSAS CITY POWER & LIGHT COMPANY

CASE NO. ER-2009-0089

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. What is your education background and work experience?

A. I have Bachelor and Master of Arts Degrees in Economics from the University of Missouri at Columbia, and a Ph.D. degree in Economics from Texas A&M University. Prior to coming to work for the Commission, I was an Assistant Professor of Economics at Purdue University and at the University of Missouri at Columbia. Since June 1, 1977, I have been on the Staff of the Commission and have presented testimony on various issues related to weather normalized energy usage and rate design for both electric and natural gas utilities. With respect to electric issues, I have worked in the areas of load forecasting, resource planning and transmission pricing. Currently, I am serving as chairman of the Southwest Power Pool (SPP) Regional State Committee's Cost Allocation Working Group, chairman of the Organization of Midwest ISO States' (OMS') Financial Transmission Rights Working Group and co-chairman of the OMS' Transmission Pricing Working Group.

Q. What are your current duties in the Energy Department as Chief Regulatory Economist?

A. I have the responsibility of being actively involved with the activities of Regional Transmission Organizations (RTOs) which have the purpose of increasing efficiency and reliability in the competitive supply of electricity at wholesale. In addition, I am also responsible to testify before the Commission on various issues where I have relevant expertise and experience.

Q. On what issues have you filed rebuttal testimony in this proceeding?

A. My rebuttal testimony will address the direct testimony of Kansas City Power & Light Company (KCPL) Witnesses Mr. Burton L, Crawford and Mr. Michael M. Schnitzer, from the NorthBridge Group, Inc. Mr. Crawford's direct testimony addresses the model used by KCPL to forecast electricity prices that are used as inputs to Mr.Schnitizer's model (NorthBridge Model) that is then used to assess the uncertainty of the profit margins (Margins) that KCPL earns from its off-system sales (OSS).

Q. What experience do you have regarding the issue of OSS?

A. In the previous two Union Electric Company d/b/a AmerenUE (AmerenUE) rate cases, Case Nos. ER-2007-0002 and ER-2008-0318, I presented testimony on the issue of OSS. In Case No. ER-2007-0002, I presented direct, rebuttal and surrebuttal testimony on the normalized level for test-year electricity prices, as the test year included prices from 2005 when electricity markets experienced significant price increases from the effects of hurricanes Rita and Katrina, as well as rail problems for coal deliveries from Powder River Basin coal mines. In Case No. ER-2008-0318 I presented rebuttal and surrebuttal testimony on the distribution of net fuel expense related to price volatility in electricity markets, and I worked

with Staff in developing normalized test-year electricity prices. Both normalization of test-year prices and the distribution of net fuel expense are critical issues in the instant case.

Q. What other experience do you have with electricity prices that relate to the OSS issue in the instant case?

A. On behalf of the Commission, I participated in both the Midwest ISO and the SPP in the development of their electricity market structures and the rules that govern the operations of their electricity markets. I understand the differences in the two market structures, with the Midwest ISO electricity markets having both a day-ahead and real-time markets, while SPP depends on bilateral trades of electricity for day-ahead decisions for unit commitment, and has an energy imbalance market for improving the efficiency (substituting lower cost power for higher cost power from committed generation units) of trading of electricity.

BACKGROUND

Q. What methodology does KCPL use for inclusion of Margins from OSS in its determination of net fuel expense?

A. In Case No. ER-2006-0314, the Commission approved a methodology proposed by KCPL that was developed and implemented by Mr. Schnitzer. The NorthBridge Model calculates the distribution of Margins from OSS. Based on the results of the distribution of Margins generated by the NorthBridge Model, the Commission determined that the Margins used to offset fuel expense from meeting native load to be at a level at which the probability of Margins being lower than that level is twenty-five percent (25%). Expressed alternatively, KCPL has a 75% probability of earning that level of Margins or higher. If KCPL earns a higher level of Margins than the 25% level included in net fuel

expense, the excess is accumulated as a regulatory liability that KCPL must pay back to rate payers at a future date.

Q. In a subsequent KCPL rate case, Case No. ER-2007-0291, the Staff did not oppose this ratemaking approach. Why has this approach become an issue in this case?

A. From the time of KCPL's initial filing there has been a significant decrease in its forecasts of prices for electricity sales into the wholesale markets with a resulting decrease in Margins proposed for inclusion as an offset to fuel expense. In its original filing (September 5, 2008), KCPL proposed to include $** ___ ** million in Margins. This level of Margins was based on a forecasted expected value for an annual Around-the-Clock (ATC) electricity price of $** _____ **/MWh. Based on updated inputs through September 30, 2008, KCPL's forecasts had dropped to include only $** __ ** million in Margins, based on an annual ATC electricity price of $** _____ **/MWh, a drop of $** _____ **/MWh in the annual ATC electricity price. A few weeks ago, KCPL informed the Staff that the results of another model indicated its estimate of Margins should be again revised downward. Shortly after receiving information regarding the expectation of further reductions in the forecast of Margins, the Commission's KCPL audit staff contacted me, asking if I would review the methodology used by KCPL that has led to these reductions in Margins.

Q. What is the extent of your review of the KCPL methodology for forecasting Margins?

A. I have reviewed the process followed by KCPL and NorthBridge, including how the inputs to the NorthBridge Model were developed for both the original KCPL filing and the September 30th update. I have also reviewed the relationship of the modeling results

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to the modeling inputs; with a focus on two primary drivers for the change in the distribution of Margins from the NorthBridge Model: electricity prices and natural gas prices.

Q. What have you found in your review?

A. The following is a list of findings from my review.

1. I found that while there are several inputs provided by KCPL to NorthBridge, the primary reason for the significant drop in the distribution for Margins is the result of a significant drop in the inputs assumed for natural gas and electricity prices. The original forecasts for these prices were developed at a time when natural gas and electricity prices were experiencing historical high levels in July 2008. This is shown on Schedule MP-1. attached to the Highly Confidential version of my rebuttal testimony, where a graph over time showing both SPP monthly spot prices and natural gas monthly prices at KCPL are presented. In August 2008, prices for electricity began to fall, and continued to fall in September of 2008. From an analysis of forward electricity prices presented in Case No. ER-2008-0318, forward electricity prices for 2009 began to fall in mid-July 2008. (Surrebuttal Testimony of AmerenUE witness Ajay Arora, page 14)
2. Between the original filing and the September 30th update, the forecasts for delivered natural gas price dropped $** ___ **/MMBtu (from $** ____ **/MMBtu to $** ___ **/MMBtu), and KCPL's forecast for the annual ATC electricity price dropped $** ____ **/MWh (from $** ____ **/MWh to $** ____ **/MWh). According to Mr. Crawford, KCPL reruns its forecasting model on a monthly basis, primarily to provide information to its power marketing group that is engaged in forward sales and purchases of electricity. KCPL's forecast of natural gas prices is

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based on forward natural gas prices at the Henry Hub,[1] and these forward prices are used as inputs to its forecasting model for electricity prices. So as forward prices began to fall in middle-to-late summer of 2008, KCPL's forecast of electricity prices also fell. With the decrease in its forecast of natural gas prices and electricity prices, the NorthBridge Model calculated a significant decrease in Margins. My conclusion is that the drop in forward natural gas prices is the key driver for the drop in KCPL's forecast of the electricity price. But this drop in KCPL's forecast of electricity prices is consistent with what was taking place in electricity markets where forward trading has developed. This drop in forecasted electricity prices is also consistent with the drop in spot electricity prices that began in August 2008 in the SPP electricity markets.

3. The decrease in KCPL's forecast of natural gas prices and electricity prices driven by the volatility in forward natural gas prices raise a fundamental issue regarding the process of using forecasts to set rates compared to using historical test period data. I have testified on price inputs used in the two most recent AmerenUE rate cases (ER-2007-0002 and ER-2008-0318), where historical test-year prices, adjusted for known and measurable changes, are used in contrast to the forecasted prices used by KCPL. Whether test-year prices or forecasted prices are used, the distribution of Margins can be developed using the NorthBridge Model, and the Commission's decision to set Margins based on KCPL having a 75% probability of recovering those Margins can still be implemented. Using historical prices instead of forecasted prices is an alternative that the Commission should seriously consider for KCPL.

[1] The Henry Hub is the largest centralized point for natural gas spot and futures trading in the United States. The Henry Hub is the pricing point for natural gas futures contracts traded on the New York Mercantile Exchange (NYMEX). It is a point on the natural gas pipeline system in Erath, Louisiana. It interconnects with nine interstate and four intrastate pipelines.

4. With respect to the statistical metrics used in the NorthBridge Model, I found that while the degree of variation used for natural gas prices was consistent with historical volatility in annual average natural gas prices, the degree of variation for electricity prices in the NorthBridge Model is somewhat higher than what has historically occurred for annual ATC electricity prices in the SPP North markets. I also found that the distribution results for Margins and natural gas prices inputs to the Northridge Model are both highly correlated to the electricity prices inputs. Specifically, a large variation in the distribution of electricity prices produces a large variation in the distribution of Margins, with high electricity prices resulting in high Margins and low electricity prices resulting in low Margins. I found a similar high level of correlation between natural gas prices and electricity prices.

EXECUTIVE SUMMARY

Q. Based on your findings, what are your recommendations regarding the methodology used to determine Margins?

A. The following are my recommendations:

1. **Test Year Determination of Electricity Prices:** The electricity prices used to drive the distribution for Margins in the NorthBridge Model should be based on test year SPP North prices that have been normalized and adjusted for known and measurable changes. My rebuttal testimony will recommend those prices and adjustments based on the data that was provided at the time of this filing. Any true-up to electricity price should incorporate the most recent months of information from SPP North, for February 2009, March 2009 and possibly April 2009, depending on the true-up period.
2. **Consistent Use of Natural Gas Prices:** The natural gas prices used to drive the distribution for Margins in the NorthBridge Model should be the same natural gas

prices used in the model used to determine KCPL's production (generation) costs and should be consistent with the test year SPP North electricity prices that have been normalized for known and measurable changes. I will use the correlation between the distribution of electricity prices and natural gas prices from the NorthBridge Model to show the consistency between the natural gas price driving the electricity prices and the distribution of Margins and the Staff's recommended natural gas price used in the production cost model. I also recommend that the electricity prices used to calculate off-system purchases of power by KCPL in its production cost model be consistent with the test-year electricity prices used as inputs to the NorthBridge Model.

3. **Price Volatility Based on Deviations of Annual Prices:** The standard deviation for electricity prices used as an input to the scenarios generated by NorthBridge to calculate the distribution for Margins should be consistent with historical annual price data. My rebuttal testimony will recommend the standard deviation that should be used for electricity prices based on the standard deviation of the annual ATC average electricity price levels observed for SPP North over the past five years.

4. **Correlations Used to Estimate the Distribution of Margins:** Finally, I will use the correlations between the distribution of electricity prices and the distribution of Margins to estimate the level of Margins consistent with the Commissions previous determination to allow KCPL a 75% probability level to recover Margins included in net fuel expense.

1. TEST-YEAR DETERMINATION OF ELECTRICITY PRICES

Q. What is your understanding of the basis for KCPL's forecasts for electricity prices?

A. In Mr. Crawford's direct testimony he provides a brief summary of the method that KCPL uses to forecast electricity prices. Using the National Database inputs (assumptions about market supply, demand and transmission) for the utilities in the Eastern Interconnection, KCPL runs an hourly chronological dispatch of all generation resources to meet the hourly demands in each region. The relevant region for KCPL is described by Mr. Crawford as North Southwest Power Pool, what is being called SPP North in this testimony.

Q. How often does KCPL run its forecast of electricity prices?

A. Mr. Crawford has indicated that KCPL reruns its electricity price forecasting model on a monthly basis. The apparent reason for doing this is because of the revision in the forecasted input to this model; the primary driver being the forecast of the price of natural gas. The revision in the forecast of the price of natural gas can have a significant impact on the results, and appears to be the primary driver for the downward revisions in KCPL's forecast of electricity prices and Margins.

Q. Why are you concerned with the use of KCPL's forecasting model for electricity prices as a primary input to the NorthBridge Model?

A. My primary concern is not with the KCPL forecasting model; rather it is with the use of forward natural gas prices as a primary driver in KCPL's model. Forward natural gas prices can experience an increase in volatility; particularly when there are significant changes occurring in the current spot markets; i.e., when spot prices are significantly different from hedged prices. When current expectations of market participants are not being met, this introduces substantial uncertainty into the futures markets. Under these kinds of conditions, the expectations of those engaging in forward transactions become less certain (subject to

sudden, and large changes), and this introduces a significant increase in the volatility of forward prices at which traders are willing to purchase and sell at a future point in time.

Q. What do you mean by volatility in prices?

A. The statistical measurement of price volatility is defined as the standard deviation of the probability distribution of prices. For forward prices, this measure of volatility has a specific time frame. Thus, at a given point in time a trader may estimate the volatility of prices based on the recent historical behavior of the forward price markets. When prices in spot markets take sudden and unexpected moves that fall within the extreme range of the probability distribution for forward prices measured from recent history, the result will be that traders will adjust up their measure of price volatility.

Q. What alternative are you proposing to the use of KCPL's forecasting model for electricity prices that are a primary input to the NorthBridge Model?

A. Instead of forecasting electricity prices, I recommend that the Commission use the same approach for KCPL that was used by both Staff and Company witnesses in AmerenUE's previous two rate cases. Electricity prices used by both AmerenUE and Staff were test-year prices that are normalized and adjusted for known and measurable changes. It is also the approach that is being used in this case by Staff to develop natural gas prices used as an input to the fuel model.

Q. Specifically what do you mean by "test-year" prices?

A. In the previous two AmerenUE rate cases, both the AmerenUE and the Staff used electricity prices from the test year. Because the Staff's filing follows that of the Company, the Staff updates those prices for its filing.

Q. What do you mean by "normalized" prices?

A. While the Staff and the Company may propose different methods and criteria for normalizing test-year prices, the objective is to make adjustments to prices that are found to be abnormal. For example, in Case No. ER-2008-0318, the Staff found the ATC electricity prices for June and July for the twelve months ending September 30, 2008, to be the highest prices observed over the past history of active wholesale power markets, including the very high prices that occurred in 2005 following hurricanes Rita and Katrina. These prices were clearly abnormal when compared to prices in April and May, August and September of the same year, and were significantly higher than the June and July prices observed in the previous year. The Staff proposed to normalize the prices for these two months by setting them equal to the prices from the previous year.

Q. What do you mean by "adjusted for known and measurable changes?"

A. A true-up period is agreed to, and both parties adjust for any price changes that have occurred from the time of their original filings. True-up occurs after the hearings, and true-up testimony is then presented so parties have the opportunity to present their final proposals, and discuss possible settlement before true-up hearings.

Q. Have you looked at the test year prices for KCPL?

A. Yes, I have. From the SPP, I requested and obtained KCPL specific price information for the SPP's real-time, energy imbalance market (SPP KCPL data) from the start of that market in February 2007 through February 2009. From NorthBridge, I requested and was provided SPP North daily price information from January 2003 through January 2009. SPP North is the trading region (hub) for which KCPL runs its electricity price forecasting model, and those prices represent the day-ahead markets in which KCPL makes the most significant portion of its day-ahead power transactions.

Q. What would you consider test-year data for the purpose of this rebuttal filing?

A. I am using the most recent twelve-month period ending February 28, 2009. I am also using the SPP North data as being the most relevant for KCPL. Thus, I am estimating the SPP North price for February 2009, using the SPP KCPL data for that month adjusted for the basis difference between the two price series.

Q. What normalization would you make to the test-year data?

A. I found the prices for March through July of 2008 to be significantly high compared to prices for the same months from 2007. So I have adjusted these prices to their 2007 levels. I also found the SPP North prices for August through October to be significantly higher than the normal basis difference between SPP North and SPP KCPL prices that occurred in other months. When comparing both price series to prices in surrounding months, I did not find the reason for these abnormally high differences in prices to be abnormally low levels for the SPP KCPL prices in those months, but instead to be the abnormally high SPP North prices. So, I have adjusted the SPP North prices down to reflect the average basis difference to the SPP KCPL prices.

Q. Based on this test year, what are the electricity prices you have determined to be appropriate for use as the driver for estimating the probability distribution for Margins?

A. My recommendation focuses on the annual ATC electricity price, or put another way, the simple average of the hourly prices from the test year. My recommendation is for an annual average ATC electricity price of ** _____ **/MWh. This annual average

ATC electricity price is $** ___ **/MWh below the annual average ATC electricity price that KCPL used as input to the NorthBridge September 30 update.

Q. What additional adjustments should be made for known and measurable changes?

A. I recommend that the actual SPP North price replace the estimate used in my calculations for February. I also recommend that if the true-up is through March 31, 2009, the March 2007 price used to normalize the March 2008 price be replaced with the March 2009 price. If the true-up period is extended to April 30, 2009, the April 2007 price used to normalize the April 2008 price should be replaced with the April 2009 price. Of course this recommendation is subject to both March and April 2009 prices not being abnormal.

2. CONSISTENT USE OF NATURAL GAS PRICES

Q. Why is it important the natural gas prices used in the NorthBridge Model and in the model used to calculate production costs be consistent with the electricity prices that are used as the basis for calculating Margins?

A. If the Commission goes to a test-year determination of electricity prices for the determination of the distribution of Margins, it should also go to a test-year determination of natural gas prices for the determination of the distribution of Margins. In addition, the SPP found in the first year of its operation of its energy imbalance market that over 82 % of the hours, generation at the margin that sets the energy imbalance price is determined by generation fired by natural gas (see Table III.10; ***2007 State of the Market Report: Southwest Power Pool Inc.***; Boston Pacific Company, Inc., External Market Advisor, April 24, 2008, p. 60, available on the SPP website). Also, the chart on Schedule MP-1 shows the strong relationship of KCPL natural gas prices to SPP KCPL electricity prices. In the SPP there is little doubt that natural gas prices drive electricity price for most hours of the year.

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Q. What test-year natural gas price has the Staff determined is appropriate for KCPL?

A. It is my understanding that the Staff, for its direct filing, has determined that an average annual price of $** ___ **/MMBtu is the appropriate test-year price for natural gas.

Q. Is this price consistent with your recommendation for the annual average ATC electricity price?

A. Yes, it is. From the NorthBridge Model, I correlated the 1,000 ranked annual ATC electricity prices and 1000 ranked annual natural gas prices at the Henry Hub and found a correlation of 0.9931 with a standard error (1 standard deviation around the regression line) of just under $0.20/MMBtu. I calculated the distribution of annual ATC electricity prices using the recommended normalized annual ATC test-year electricity price. Then using the regression results also calculated the distribution of natural gas prices at the Henry Hub. The average natural gas price at the Henry Hub from that distribution adjusted for the basis difference for delivery at KCPL was $** ___ **/MMBtu, with a Median price of $** ___ **/MMBtu. These natural gas prices are absolutely consistent with the Staff's recommended annual average test-year price for delivered natural gas at KCPL's generation units.

Q. Why did you rank these variables before you ran the regressions instead of running the regression on the individual scenarios run by NorthBridge?

A. Running the regression on the individual scenarios would indicate the level of correlation that NorthBridge had assumed existed between annual natural gas prices and annual ATC electricity prices, but that was not the objective. The objective was to determine how well the distribution of one of the variables correlated with the distribution of the other

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variable. In other words, using the regression and the ranked distribution of annual ATC electricity prices, how well could the distribution of the annual natural gas price be predicted? In this instance the prediction error for the 25th percentile and the standard deviation were both less than one percent. Thus, the distribution predicted from the regression is statistically equal to the distribution generated in the NorthBridge Model.

Q. If in the true-up the test-year annual ATC electricity price changes, should there also be an adjustment to the test-year natural gas price used in both the determination of the distribution for Margins and in the determination of fuel expense in the production cost model?

A. Yes. If there is a change in the true-up for the annual average ATC electricity price, then in order to maintain consistency, there should also be a change in the true-up annual average natural gas price. In addition, the electricity prices used to determine off-system purchase power should be consistent with the test-year determination of annual average ATC electricity prices.

Q. Have you performed an analysis of monthly electricity prices that could be used as the basis for the monthly distribution of the annual ATC electricity price to the months of the test year used in the true up?

A. Yes, I have. Schedule MP-2.1, attached to my rebuttal testimony, shows the monthly ATC prices as a percentage of the annual ATC prices for 2008 and for what I would recommend be used as a normalized percentage profile of prices.

Q. What did you use as the basis for your normalized percentage profile for monthly ATC electricity prices?

A. For the normalized percentage profile I used the average percentage distributions from 2003, 2004, 2006 and 2007, which I then smoothed out because of the small sample size. I excluded 2005 and 2008 from the average because these two years had dramatic price changes starting in the middle of each year. In 2005, prices dramatically escalated in the second half of the year, and in 2008, prices dramatically deflated in the second half of the year.

Q. What would be the monthly distribution of prices for the test-year normalized price that you discussed earlier in your testimony?

A. Using the normalized percentage profile and the test-year normalized price produces the monthly prices shown on Schedule MP-2.2 attached to the Highly Confidential version of my rebuttal testimony. I have also included the actual SPP North prices for 2008 to show the difference resulting from the normalization.

3. PRICE VOLATILITY BASED ON DEVIATIONS OF ANNUAL PRICES

Q. Have you performed an analysis of the volatility of natural gas price for KCPL?

A. Yes, I have. NorthBridge's work papers provided Henry Hub natural gas prices going back to 1991, and performed a price volatility calculation using annual prices from 1991 through 2007. I am in agreement with the use of annual prices to determine price volatility; however, I do have a methodological issue with the specific calculations that NorthBridge uses. I would calculate price volatility using the standard deviation of price changes from one year to the next. NorthBridge calculates the standard deviation of the difference in the natural log of the prices from one year to the next.

Q. What are the implications of using these two different approaches to calculating price volatility?

A. The standard deviation of the price changes from one year to the next is based on the simplest form of a forecast that projects next year's annual price to be equal to this current year's annual price. Forecasters call this a "naïve" forecasting model. Statisticians and Econometricians call this simple time series forecasts a Random Walk Model where the forecast of next year's price is this year's price plus an error term that is independent of the price being forecasted. This difference between the price in the current year and the previous year is the forecasting error, and the standard deviation of these errors is a measure of the volatility in the annual price. This forecasting error does not change with the level of the price; i.e., it is the same for low prices as well as for high prices.

The standard deviation of the natural log of price changes from one year to the next is based on a forecasting model that forecasts the natural log of next year's price to be the natural log of the current year's price. The difference between the natural log of the price in the current year and the previous year is the forecasting error. The standard deviation of these errors is independent of the natural log of the price, and is a measure of the volatility in the annual price. In essence this forecasting error assumes that the percentage standard deviation is constant, and the dollar level for the standard deviation is lower for low price levels and higher for high price levels.

Q. In your opinion, which approach for measuring price volatility is preferred for measuring price volatility?

A. I analyzed the relationship of the error terms to the forecast values for the Random Walk Models using natural gas prices and the natural log of natural gas prices. Neither model showed any correlation between the forecasted value and the forecasting error. Thus, statistically, either approach appears to be acceptable. However, I prefer using the

standard deviation of price changes because it does not change with the price level of the forecast. On the other hand the percentage approach is very similar to measuring volatility using the ratio of the standard deviation to the mean (coefficient of variation). The difficulty with this approach is that the volatility appears to decrease with a higher mean price simply because the average price is higher. The opposite is the case for the percentage approach associated with natural logs, where the volatility appears to increase with a higher forecasted level for the price and decrease with a lower forecasted price level.

Q. What did you determine to be the price volatility for natural gas prices at the Henry Hub?

A. I found the standard deviation of year-to-year price changes at the Henry Hub to be $** ___ **/MMBtu. This value is lower than the standard deviations of $** ___ **/MMBtu from the September 30th update distributions used in the NorthBridge Model. The reason for this higher standard deviation is that the forecasted average price for natural gas at the Henry Hub in the NorthBridge Model is $** ___ **/MMBtu, which is a relatively high forecasted price. A lower forecasted average price would result in a lower standard deviation. Using the NorthBridge percentage measure, the natural gas price at the Henry Hub would have to fall to $** ___ **/MMBtu in order to generate the standard deviation of year-to-year price changes at the Henry Hub. I am concerned that because this methodological approach forces the standard deviation of the distribution of inputs to the model to depend on the magnitudes of the mean of its distribution of prices rather than on a fixed historical level of price variation, the calculation of the distribution for Margins will reflect a higher level of dispersion than is consistent with historical data.

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Q. Have you performed a similar analysis of the volatility for electricity prices?

A. Yes, I have. I used the annual ATC electricity prices at SPP North, from 2003 through 2008 to estimate the price volatility for electricity prices for KCPL.

Q. Were you concerned with estimating price volatility from such a short history of prices?

A. My concern is that because of the significant price increases that occurred in 2005 because of hurricanes Rita and Katrina, combined with the interruptions in rail transportation for Powder River Basin coal, the small sample would over estimate the volatility in electricity price.

Q. What were the results of your estimates?

A. I found the standard deviation for yearly changes in SPP North annual ATC electricity prices to be $** ___ **/MWh, and the standard deviation for yearly changes in the natural log of SPP North annual ATC electricity prices to be ** ____ **%. This is higher than similar calculations made using AmerenUE's annual ATC electricity prices from 1999 through 2008. The standard deviation for yearly changes in AmerenUE's day-ahead annual ATC electricity prices is $6.29/MWh, and the standard deviation for yearly changes in the natural log of AmerenUE's annual ATC electricity prices is 18.22%. The annual ATC electricity price volatility in the SPP markets can be higher than in the Midwest ISO markets; particularly because of the greater influence of natural gas on the determination of the SPP spot-market electricity prices. The important part of this comparison is that I performed a second estimate of volatility using only AmerenUE annual ATC electricity price data from 2003 through 2008 (the same as for data available from SPP North) and found that while there

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was a slight increase in the standard deviation for yearly price changes (it increased to $7.32/MWh), the standard deviation in natural log of AmerenUE's annual ATC electricity price fell slightly to 17.99%. Thus, my concerns about not having historical data on SPP North going back further than 2003 were alleviated.

Q. How do your estimates of price volatility compare to those used in the NorthBridge calculation of the distribution of Margins in its September 30 update?

A. The standard deviations for electricity prices in the NorthBridge Model were higher than what I found when estimating price volatility using historical average annual ATC electricity price history at SPP North. The standard deviation for yearly changes in SPP North annual ATC electricity prices in the NorthBridge Model was $** ____ **/MWh, and the standard deviation for yearly changes in the natural log of SPP North annual ATC electricity prices in the NorthBridge Model was ** ____ **%.

Q. What do you anticipate will be the impact of higher volatility on the distribution of the Margins?

A. While there is no impact on the mean of the Margins distribution, the median and the 25% probability levels will be lower the higher the level of the standard deviations. This indicates that for the same forecasts of electricity prices and natural gas prices, the NorthBridge Model will likely yield a recommended level of Margins to include in net fuel expense that is lower than what is consistent with historical price volatility experienced in the SPP North power markets

Q. In order to correct for this difference in the measure used for electric price volatility, what analysis did you perform?

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A. I recalculated the distribution for annual ATC electricity prices at SPP North based on the estimates of the standard deviations that I calculated from the historical SPP North price data from 2003 through 2008. I used the NorthBridge approach of holding the standard deviation for the natural log of the annual ATC electricity price fixed, and found that for electricity prices, the resulting standard deviation for the resulting distribution for annual ATC electricity prices is very comparable to the historical level, albeit slightly lower. The resulting distribution for annual ATC electricity prices at SPP North is shown on Schedule MP-3 attached to the Highly Confidential version of my rebuttal testimony.

4. CORRELATIONS USED TO ESTIMATE THE DISTRIBUTION OF MARGINS

Q. What impact does your estimate of the annual ATC electricity price distribution have on the distribution of Margins in the NorthBridge Model?

A. Using the correlation of annual ATC electricity price distribution to the distribution of Margins from the NorthBridge Model, I calculated the distribution of Margins that would be generated using the distribution for test-year annual ATC electricity price of $** ____ **/MWh, the average level for Margins is $** _____ ** million, the standard deviation is $** _____ ** million, and the resulting Margin level that KCPL would have a 75% or greater probability of recovering is $** _____ ** million.

Q. How good of a predictor is the correlation between annual ATC electricity prices and Margins?

A. The regression coefficient is 0.9958 with a standard error for the regression of only $2.317 million. In addition, I compared the 25th percentile of the regression results based on the annual ATC electricity price distribution used in the September 30th update to the 25th percentile level from the distribution for Margins generated in the NorthBridge Model. The regression predicted a level of $** ____ ** million compared to $** ____ **

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million from the NorthBridge Model; a prediction error of less than one percent. I also compared the standard deviations of the distribution generated by the regression results against the distribution generated by the NorthBridge Model. The results were that the regression model predicted the standard deviation of the NorthBridge Model with an error of only 0.21%. In essence, the two distributions are statistically equal.

Q. If NorthBridge were to rerun its Model using the test-year annual ATC electricity price, the test-year annual natural gas price and the standard deviations you used for these two variables, would the results for the distribution of Margins match the results of your regression model?

A. If no other changes were made to the inputs to the NorthBridge model, I would expect the distributions to be almost identical. I am not aware of the status of the other inputs with respect to differences between the Staff and KCPL. Other inputs involve such things as the load forecast and their volatility, capacity for generation units and their outage rates, the level of long-term contract sales and their volatility, fuel prices other than natural gas, their mix of contract and spot prices and their volatility, as well as how the annual ATC electricity price is spread to the hours throughout the year for each scenario. If any of these or other input assumptions are different from those used in the September 30th update, the resulting distribution for Margins from the NorthBridge Model could be different from the one predicted by the regression.

Q. What is your purpose in reporting the predicted results from the regression between the distribution of the annual ATC electricity price and the distribution of Margins?

A. Most importantly, I think the Commission should have a reasonably accurate indication of what the recommendation for implementing a test-year determination of annual ATC electricity prices will be on the determination of Margins under its policy to allow KCPL a 75% probability of recovering the level of Margins used to calculate net fuel expense. Using the annual ATC electricity price distribution and the regression from the NorthBridge Model to generate a distribution for Margins provides the Commission with a highly accurate estimate of the distribution for Margins. In addition, the use of the regressions is important to illustrate the consistency between the average annual natural gas price and the average annual ATC electricity price that are driving the resulting distribution for Margins.

Q. Does this complete your rebuttal testimony?

A. Yes, it does.

Schedule MP-1

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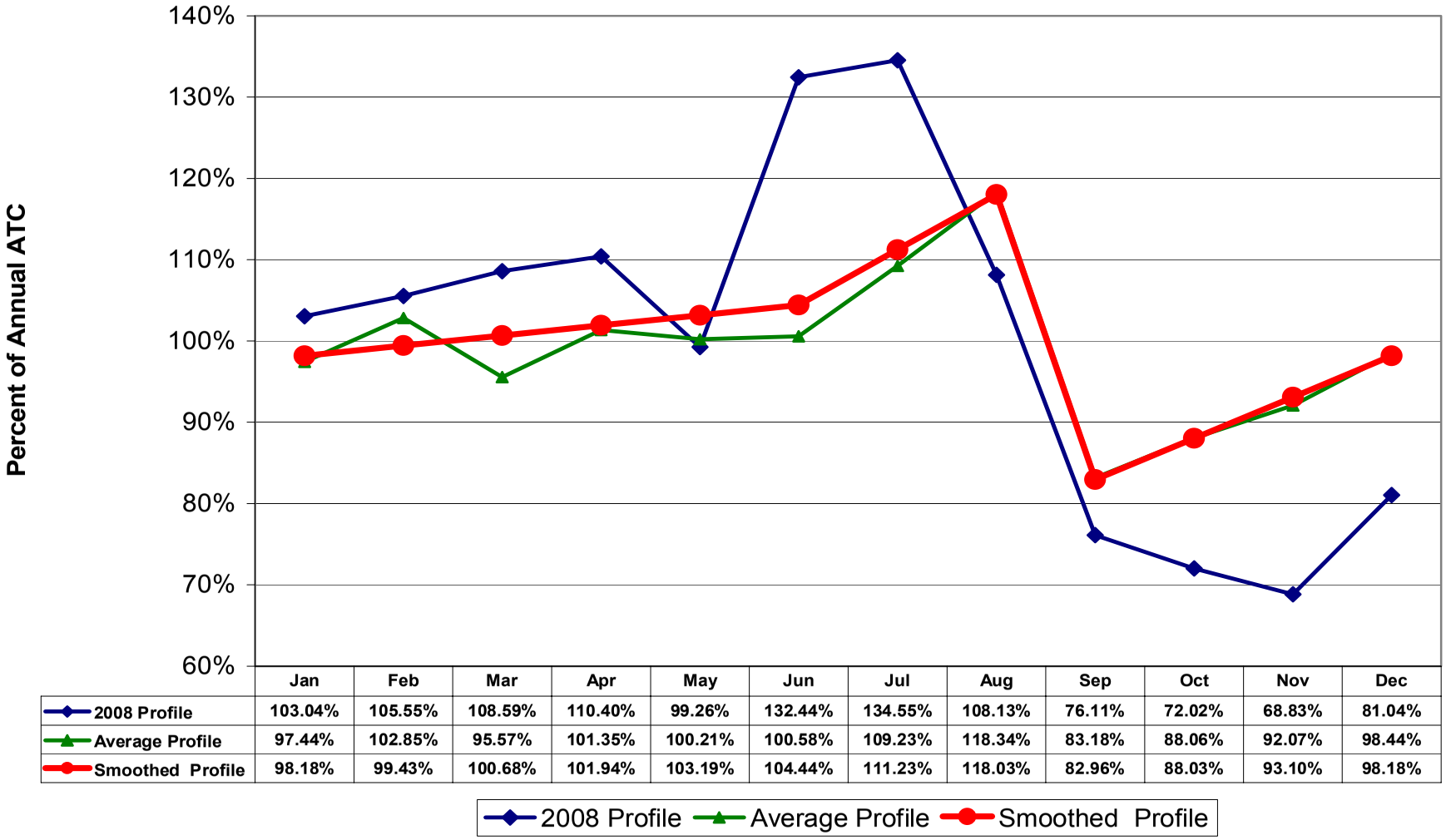
Schedule MP-2.1

Actual and Normal Monthly Profiles for SPP North



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008 Profile	103.04%	105.55%	108.59%	110.40%	99.26%	132.44%	134.55%	108.13%	76.11%	72.02%	68.83%	81.04%
Average Profile	97.44%	102.85%	95.57%	101.35%	100.21%	100.58%	109.23%	118.34%	83.18%	88.06%	92.07%	98.44%
Smoothed Profile	98.18%	99.43%	100.68%	101.94%	103.19%	104.44%	111.23%	118.03%	82.96%	88.03%	93.10%	98.18%

Schedule MP-2.2

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