

Exhibit No.:  
Issue: Weather Normalization;  
Customer Growth; and Other  
Revenue Normalizations  
Witness: George M. McCollister, PH.D  
Type of Exhibit: Direct Testimony  
Sponsoring Party: Kansas City Power & Light Company  
Case No.: ER-2009-\_\_\_\_  
Date Testimony Prepared: September 5, 2008

**MISSOURI PUBLIC SERVICE COMMISSION**

**CASE NO.: ER-2009-\_\_\_\_**

**DIRECT TESTIMONY**

**OF**

**GEORGE M. MCCOLLISTER, PH.D**

**ON BEHALF OF**

**KANSAS CITY POWER & LIGHT COMPANY**

**Kansas City, Missouri  
September 2008**

**DIRECT TESTIMONY**  
**OF**  
**GEORGE M. MCCOLLISTER, Ph.D**

**Case No. ER-2009-\_\_\_\_\_**

1   **Q:   Please state your name and business address.**

2   A:   My name is George M. McCollister, Ph.D. My business address is 1201 Walnut, Kansas  
3       City, Missouri 64106.

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

5   A:   I am employed by Kansas City Power & Light Company (“KCP&L”) as Manager of  
6       Market Assessment.

7   **Q:   What are your responsibilities?**

8   A:   I am responsible for weather-normalizing and forecasting kWh sales, revenues and  
9       system hourly loads. I am also responsible for the variance analysis of the budget  
10      forecast.

11  **Q:   Please describe your education, experience and employment history.**

12  A:   I earned three degrees from the University of California at San Diego. These include a  
13      Bachelor of Arts degree in mathematics and chemistry, a Master of Arts degree in  
14      mathematics, and a Ph.D. in economics. My specialties in the economics program were  
15      microeconomics and econometrics.

16           I was previously employed at three electric and natural gas utilities. I was  
17      employed as an Energy Economist at Pacific Gas and Electric Company where I was  
18      responsible for developing end-use models of electric and natural gas sales and for  
19      analyzing responses to energy-use surveys of our customers. I was employed as a Senior

1 Forecast Analyst at San Diego Gas and Electric Company where I developed models of  
2 customer choice, energy sales and system reliability. I was also employed by UtiliCorp  
3 United, Inc. as the Forecast Leader where I was responsible for end-use forecasting in  
4 integrated resource plans; budget forecasts; weather normalization; variance analysis; and  
5 for statistical analysis. I have also been employed by several consulting firms including  
6 Resource Management International and Spectrum Economics, Inc. that specialized in  
7 regulated industries. The majority of my consulting projects focused on energy  
8 forecasting issues and modeling for electric and natural gas utilities.

9 **Q: Have you previously testified in a proceeding at the Missouri Public Service**  
10 **Commission (“MPSC” or “Commission”) or before any other utility regulatory**  
11 **agency?**

12 A: Yes, I have testified before the MPSC, the Oklahoma Corporation Commission, the  
13 Kansas Corporation Commission, and the Public Utilities Commission in Colorado.

14 **Q: What is the purpose of your testimony?**

15 A: I am sponsoring several normalizations to monthly Kilowatt-hour (“kWh”) sales and  
16 peak loads in Schedules GMM-1 through GMM-4. I recommend that the Commission  
17 adopt these results in the current case.

18 **Q: What are normalizations of kWh sales and hourly loads?**

19 A: Both kWh sales and hourly loads are adjusted to reflect normal weather conditions. This  
20 is called a weather adjustment. kWh sales are further adjusted for expected customer  
21 growth through March 2009 and for rate switchers (customers who were switched from  
22 one rate to another).

1 **Q: What adjustment was made for rate switchers?**

2 A: Each year a small percentage of customers are switched from their current tariff to  
3 another that is expected to reduce their electric bills. We adjusted the customer numbers  
4 and kWh sales to reflect the switch for the entire test year. The load research data was  
5 also adjusted for customers switching to or from the Large Power group.

6 **Q: What is the purpose of making a weather adjustment?**

7 A: Abnormal weather can increase or decrease a utility company's revenues, fuel costs and  
8 rate of return. Therefore, revenues and expenses are typically adjusted to reflect normal  
9 weather when these are used to determine a company's future electric rates. These  
10 adjustments are made by first adjusting kWh sales and hourly loads and then using these  
11 results to adjust revenues and fuel costs.

12 During 2007, there were 6.4 percent fewer heating degree days and 20.5 percent  
13 more cooling degree days than normal as measured at the Kansas City International  
14 Airport. Thus, heating loads were less than normal and cooling loads were greater than  
15 normal.

16 **Q: What method was used to weather-normalize kWh sales?**

17 A: Our method was based on load research ("LR") data, which was derived by measuring  
18 hourly loads for a sample of KCP&L's customers representing the Residential, Small  
19 General Service, Medium General Service, Large General Service and Large Power  
20 Service classes. The hourly loads were grossed up by the ratio of the number of  
21 customers for each of these classes divided by the number sampled.

1           In the first step, the hourly loads for the sample were calibrated to the annual  
2 billed sales of all customers in each class. The ratio of the billed sales divided by the sum  
3 of the hourly loads was multiplied by the load in each hour.

4           In the second step, the hourly loads were estimated for lighting tariffs and the  
5 loads for all tariffs, including sales for resale, were grossed up for losses and compared to  
6 Net System Input (“NSI”). The difference between this sum and the NSI was then  
7 allocated back to the LR data in proportion to the hourly precisions that were estimated  
8 for the load research data.

9           In the third step, regression analysis was used to model the hourly loads for each  
10 tariff. These models included a piecewise linear temperature response function of a two-  
11 day weighted mean temperature.

12           In the fourth step, this temperature response function was used to compute daily  
13 weather adjustments as the difference between loads predicted with normal weather and  
14 loads predicted with actual weather. Normal weather was derived using spreadsheets  
15 provided by the MPSC Staff. The normal weather represents average weather conditions  
16 over the 1971-2000 time period.

17           In the fifth step, the daily weather adjustments were split into hourly adjustments  
18 and these were added to NSI to weather-normalize that series.

19           In the sixth step, the daily weather adjustments were split into billing months  
20 based on the percentage of sales on each billing cycle and the meter reading schedule for  
21 the test year period. These weather adjustments are then summed by billing month and  
22 added to billed kWh sales to weather-normalize that data.

23 **Q: Is the Large Power class weather-sensitive or is it simply seasonal?**

1 A: In our previous cases, Case No. ER-2006-0314 and Case No. ER-2007-0291, I argued  
2 that as a result of a statistical regression, Large Power loads were driven by daily  
3 temperatures. Staff countered by arguing that Large Power customers were not weather-  
4 sensitive but seasonal, meaning that the higher summer loads were not caused by weather  
5 but other seasonal factors. Schedule GMM-4 provides additional evidence that higher  
6 summer loads are driven by daily weather conditions. Schedule GMM-4 shows the daily  
7 MWh average loads for Large Power customers plotted against the two-day weighted  
8 mean temperature for the months of August 2006 and 2007. As you can see, the load  
9 varies on a daily basis in response to temperature. A statistical regression of this data is  
10 highly statistically significant. If the daily load were higher in August due only to  
11 seasonal factors, it would not vary with daily temperatures.

12 **Q: Are Large Power customers all industrial?**

13 A: No. KCP&L's Large Power customers are a combination of industrial and commercial  
14 customers. There are a larger number of commercial customers (68%) than industrial  
15 customers (32%).

16 **Q: Are industrial customers typically weather-sensitive?**

17 A: Often times they are not.

18 **Q: Are commercial customers typically weather-sensitive?**

19 A: Yes, almost always. Our Large Power commercial customers include hospitals, schools,  
20 office buildings and casinos. These customers nearly always have air conditioning and  
21 therefore are weather-sensitive.

22 **Q: What adjustments were made for load and customer growth?**

1 A: In the filing, kWh sales are for 2007. These sales were adjusted for expected customer  
2 growth by multiplying the weather-normalized sales by the ratio of customers for March  
3 2009 to the number of customers for that month. This adjustment was made to the  
4 Residential, Small General Service, Medium General Service and Large General Service  
5 customer classes.

6 **Q: Are these your final calculations?**

7 A: After March 2009, I will re-compute the adjustments for customer growth and rate  
8 switchers using data from March 2009, as part of the true-up process in this case.

9 **Q: What are the results of these normalizations?**

10 A: Schedule GMM-1 shows the adjustments for each normalization on kWh sales. Schedule  
11 GMM-2 shows weather-normalized customer annualized monthly sales by class, and  
12 Schedule GMM-3 shows weather-normalized customer annualized loads by class at the  
13 time of the monthly system peak load.

14 **Q: How are these results used?**

15 A: Weather-normalized, customer-annualized kWh sales are used to calculate test year  
16 revenues.

17 **Q: How are the weather-normalized monthly peak loads used?**

18 A: These loads are used to calculate the demand allocator, which is used to allocate certain  
19 accounts in the Revenue Model. The use of the demand allocator is described in the  
20 Direct Testimony of KCP&L witness John P. Weisensee.

21 **Q: Does that conclude your testimony?**

22 A: Yes, it does.





## NORMALIZATIONS TO MONTHLY BILLED SALES

| Tariff      | Weather Adjustments to Monthly Billed Sales |        |        |        |         |        |        |         |         |         |        |        | March<br>2009<br>Customer<br>Growth |         |
|-------------|---|--------|--------|--------|---------|--------|--------|---------|---------|---------|--------|--------|-------------------------------------|---------|
|             | Jan-07                                      | Feb-07 | Mar-07 | Apr-07 | May-07  | Jun-07 | Jul-07 | Aug-07  | Sep-07  | Oct-07  | Nov-07 | Dec-07 |                                     | 2007    |
| Residential | 13,560                                      | -2,419 | 3,227  | 912    | -6,156  | -3,167 | 11,529 | -17,749 | -57,337 | -18,573 | 1,244  | -152   | -75,080                             | -8,198  |
| Small GS    | 1,147                                       | -116   | 124    | -337   | -674    | -648   | 596    | -1,044  | -3,557  | -1,646  | 24     | 15     | -6,116                              | 73      |
| Medium GS   | 1,141                                       | -142   | -231   | -1,848 | -1,576  | -1,847 | 1,280  | -1,925  | -7,090  | -3,585  | -601   | -142   | -16,565                             | 797     |
| Large GS    | 5,772                                       | -1,000 | 58     | -3,545 | -3,019  | -2,502 | 2,302  | -3,142  | -11,176 | -5,147  | -71    | -290   | -21,763                             | -15,045 |
| Large Power | -481  | 334    | -2,944 | -636   | -2,325  | -732   | 1,255  | -4,323  | -4,730  | -3,216  | -993   | 391    | -18,402                             | 0       |
| Total       | 21,139                                      | -3,344 | 233    | -5,453 | -13,751 | -8,896 | 16,962 | -28,182 | -83,889 | -32,167 | -398   | -179   | -137,925                            | -22,374 |

**WEATHER NORMALIZED MONTHLY SALES ADJUSTED FOR RATE SWITCHERS AND  
MARCH 2009 CUSTOMER GROWTH**

**(KWH)**

|                  | Res                  | Small GS           | Medium GS            | Large GS             | Large Power          |
|------------------|----------------------|--------------------|----------------------|----------------------|----------------------|
| Jan              | 237,546,529          | 34,860,119         | 91,885,579           | 188,176,685          | 187,224,945          |
| Feb              | 237,762,842          | 35,562,777         | 94,844,705           | 190,786,575          | 174,178,904          |
| Mar              | 201,585,860          | 31,766,787         | 91,128,210           | 187,726,448          | 185,421,456          |
| Apr              | 153,008,870          | 26,718,356         | 79,725,415           | 161,257,621          | 172,320,027          |
| May              | 154,408,025          | 28,119,376         | 86,279,181           | 168,542,136          | 204,740,122          |
| Jun              | 195,798,016          | 32,417,176         | 97,234,672           | 179,884,631          | 209,075,980          |
| Jul              | 281,622,468          | 37,551,840         | 110,049,637          | 208,737,031          | 222,780,882          |
| Aug              | 310,288,177          | 39,343,419         | 116,393,055          | 204,995,866          | 227,860,038          |
| Sep              | 254,688,762          | 36,931,423         | 114,199,968          | 199,330,968          | 212,947,844          |
| Oct              | 177,457,256          | 31,059,176         | 97,336,761           | 187,874,587          | 204,633,996          |
| Nov              | 156,787,448          | 27,361,350         | 83,752,161           | 169,743,325          | 182,541,813          |
| Dec              | 225,598,086          | 34,084,347         | 96,536,889           | 195,265,784          | 182,513,081          |
| <b>Test Year</b> | <b>2,586,552,340</b> | <b>395,776,146</b> | <b>1,159,366,233</b> | <b>2,242,321,657</b> | <b>2,366,239,087</b> |

**WEATHER NORMALIZED MONTHLY COINCIDENT PEAK LOADS (MW)**

|           | Missouri | Kansas | Sales for Resales | System |
|-----------|----------|--------|-------------------|--------|
| Jan       | 1,419    | 1,171  | 20                | 2,610  |
| Feb       | 1,327    | 1,103  | 19                | 2,448  |
| Mar       | 1,211    | 986    | 16                | 2,214  |
| Apr       | 1,273    | 1,020  | 10                | 2,304  |
| May       | 1,483    | 1,275  | 14                | 2,772  |
| Jun       | 1,838    | 1,585  | 21                | 3,445  |
| Jul       | 1,984    | 1,696  | 23                | 3,703  |
| Aug       | 1,859    | 1,576  | 21                | 3,456  |
| Sep       | 1,744    | 1,490  | 20                | 3,253  |
| Oct       | 1,378    | 1,165  | 14                | 2,556  |
| Nov       | 1,229    | 991    | 16                | 2,236  |
| Test Year | 1,297    | 1,134  | 20                | 2,451  |

Note: Includes losses and adjustments for rate switchers and projected customer growth for March 2009.

# Large Power Missouri Weekday Loads vs Temperature

