# MISSOURI PUBLIC SERVICE COMMISSION

# UTILITY OPERATIONS DIVISION

# DIRECT TESTIMONY

# OF

# CURT WELLS

# UNION ELECTRIC COMPANY d/b/a AMERENUE

# CASE NO. ER-2007-0002

**Jefferson City, Missouri**
**December 2006**

# 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 Service Provided to Customers in the Company's Missouri Service Area. | ) ) ) ) ) | Case No. ER-2007-0002 |

## AFFIDAVIT OF CURT WELLS

| | |
|---|---|
| STATE OF MISSOURI | ) |
| | ) ss |
| COUNTY OF COLE | ) |

Curt Wells, of lawful age, on his oath states:  that he has participated in the preparation of the following Direct Testimony in question and answer form, consisting of _10_ pages of Direct Testimony to be presented in the above case, that the answers in the following Direct 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.
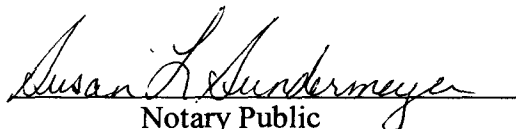
_____
Curt Wells

Subscribed and sworn to before me this _14th_ day of December, 2006.

SUSAN L. SUNDERMEYER
My Commission Expires
September 21, 2010
Callaway County
Commission #06942086

_____
Notary Public

My commission expires_____9-21-10_____

<sub>1</sub>

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**UNION ELECTRIC COMPANY d/b/a AMERENUE**

**CASE NO. ER-2007-0002**

Q.     Please state your name and business address.

A.     My name is Curt Wells and my business address is Missouri Public Service Commission, P. O. Box 360, Jefferson City, Missouri, 65102.

Q.     What is your present position with the Missouri Public Service Commission (Commission)?

A.     I am a Regulatory Economist in the Energy Department of the Utility Operations Division.

Q.     Please review your educational background and work experience.

A.     I have a Bachelor's degree in Economics from Duke University, a Master's degree in Economics from The Pennsylvania State University, and a Master's degree in Applied Economics from Southern Methodist University.  I have been employed by the Missouri Public Service Commission since February, 2006.  Prior to joining the Commission, I completed a career in the U.S. Air Force, which included assignments as a navigator in weather reconnaissance aircraft, and later in the Purchasing/Contracting area as Contract Negotiator and Administrator, Contracting Policy Manager, Installation Purchasing Department Chief, and Contracting Program Manager.

Q.     Have you filed testimony in prior cases?

A.     Yes. My previous testimony is listed in Schedule CW-1.

1

1

## EXECUTIVE SUMMARY

2      Q.      Please summarize your testimony.

3      A.      In my testimony I address two separate issues. First, I discuss the development

4 of the weather data used in this case by explaining (a) what data is needed to derive normal

5 (average) temperatures for the St. Louis area for this rate case, (b) what temperature data is

6 available, (c) why the available temperatures need to be adjusted, and (d) how those

7 adjustments were made. I provided this weather data to Staff witness Mr. Shawn E. Lange,

8 who performed the weather normalization of sales. Second, I discuss and present schedules

9 showing Missouri Retail Large Primary Service (LPS) annualized sales and revenue. I

10 provided LPS sales data to Staff witness Mr. Lange for use in calculating Net System Input,

11 and I provided LPS revenue data to Staff witness Mr. James Busch who is responsible for

12 determining the current level of Missouri retail rate revenue for Union Electric Company

13 d/b/a AmerenUE (AmerenUE) in this case.

14

## WEATHER DATA NEEDED

15      Q.      What type of weather data did the Staff need in this case?

16      A.      Because the weather-related demand for electricity is driven primarily by

17 temperature, the Staff needed temperature data. The data the Staff used in this rate case are

18 the "normal" and "actual" test year daily maximum and minimum temperatures at the St.

19 Louis weather station located at Lambert International Airport. In his direct testimony, Mr.

20 Lange will explain how he applied this information in this case.

21      Q.      What are normal temperatures?

22      A.      As stated by the National Oceanic and Atmospheric Administration (NOAA)

23 in its publication, Climatography of the United States No. 81, Monthly Station Normals of

1  Temperature, Precipitation, and Heating and Cooling Degree Days, 1971-2000, Missouri, "A

2  climate normal is defined, by convention, as the arithmetic mean of a climatological element

3  computed over three consecutive decades (WMO, 1989)."  NOAA applies this concept to

4  temperature by calculating thirty-year temperature normals for the most recent three

5  consecutive decades as monthly average maximum temperature and monthly average

6  minimum temperature, using the Fahrenheit scale.  The three most recent consecutive decades

7  are currently the thirty years ending December 31, 2000.

8        International convention among members of the World Meteorological Organization

9  (WMO), and its predecessor, the International Meteorological Committee, have established

10  that three-decade periods are appropriately long and uniform periods for the calculation of

11  normals.  NOAA recalculates thirty-year normals at the end of each decade as a way of

12  dealing with changes in measurement conditions and changes in the climate itself.

13        Q.  Why did you use temperatures at the St. Louis weather station?

14        A.  The temperatures at the St. Louis National Weather Service (NWS) weather

15  station best represent the weather in AmerenUE's service territory in Missouri, and the St

16  Louis weather station is a "first order (Principal Climatological)" weather station staffed by

17  professional observers.

18        Q.  What weather station and time period were used by AmerenUE in this case?

19        A.  AmerenUE witness Richard A. Voytas also used weather data from the

20  weather station at the St. Louis International Airport (Voytas direct, page 6, lines 9 and 10)

21  and for the same time period used by staff. (Voytas direct, page 7, lines 3 and 4).

22        **WEATHER DATA AVAILABLE**

23        Q.  What temperature data is available from the St. Louis weather station?

1        A.     Actual (unadjusted) maximum and minimum daily temperatures for the 30-

2 year normals period (1971-2000) are available from NOAA internet sources such as the

3 Midwest Climate Information Service and the National Climatic Data Center.  NOAA also

4 provides adjusted maximum and minimum monthly temperatures for this time period in a file

5 known as the NOAA Sequentials – in which NOAA made adjustments to the monthly

6 averages to account for missing data, significant discontinuities with surrounding stations,

7 time of observation, etc.  The NOAA Sequential data set consists of adjusted monthly average

8 maximum and minimum temperatures for each month over the 30-year normals period,

9 resulting in 360 entries for maximum temperature and 360 observations for minimum

10 temperature.  The 30-year average of the adjusted maximum and minimum temperatures for

11 each of the 12 months constitutes NOAA's monthly normals.

12                          **STAFF METHODOLOGY TO ADJUST WEATHER**

13        Q.     Given that NOAA has made adjustments to more accurately reflect

14 temperatures over the 30-year normals period, why are the NOAA normals not usable for the

15 Staff's purposes?

16        A.     Since the NOAA adjustments for changes in measurement conditions and

17 climate are to monthly temperatures over the period, they do not contain sufficient detail for

18 weather-normalizing electricity use.  The Staff needs *daily* temperature normals, because

19 electricity usage varies differently at extreme daily temperatures than it does at mild ones.

20        Q.     Is it possible to incorporate the NOAA adjustments into the actual daily

21 minimum and maximum temperatures?

1    A.    Yes.  However, for the Staff's normals to correspond to NOAA's normals,  the

2    Staff methodology requires that the monthly average of its adjusted daily temperatures

3    correspond with the NOAA monthly normal temperatures.

4    Q.    How is this correspondence insured?

5    A.    It is insured by using the NOAA Sequentials as a benchmark for making the

6    daily temperature data consistent with these monthly temperatures over the NOAA normals

7    period.

8    Q.    What is the Staff's methodology in calculating adjusted daily temperatures for

9    the thirty-year NOAA normals period?

10    A.    The Staff uses the two NOAA temperature data sets described above to make

11    these calculations.  First, is the NOAA Sequentials.  These 360 entries (one for each month of

12    the 30 year history) provide the benchmarks for adjusting actual measured daily temperatures

13    in these months.

14    The second data source is the raw official daily temperatures for the same 30-year

15    time period from NOAA.  In this data set, there are a total of 10,958 maximum temperature

16    entries (365 days times 30 years plus 8 leap days) and 10,958 minimum temperature entries

17    from the 1971 to 2000 period.   These are the actual daily maximum and minimum

18    temperatures that must be adjusted.

19    Q.    How did you use the monthly NOAA Sequentials to make the adjustments to

20    daily temperatures?

21    A.    First, for each month in the years 1971 through 2000, I calculated monthly

22    averages of the actual daily maximum and minimum temperatures that are to be adjusted.

1  This generates 360 monthly observations of both average actual daily maximum temperature

2  and average actual daily minimum temperature.

3  Second, I calculated temperature adjustments for each month by subtracting

4  each of these actual monthly maximum and minimum temperature averages from the

5  corresponding maximum and minimum temperatures in the NOAA Sequentials.

6  Finally, I added that month's adjustment to each day in that month and

7  repeated the process for each month of the thirty year period.  These calculations yield 10,958

8  daily observations (365 days times 30 years plus 8 leap days) for both the adjusted daily

9  maximum and adjusted daily minimum temperature over the 30 years, 1971 through 2000.

10  Q.  How did you make sure that the adjusted daily temperatures correspond to

11  NOAA's normals?

12  A.  I first calculated the monthly averages of the daily maximum and minimum

13  temperatures that were adjusted.  I then verified that these monthly averages are equal to the

14  benchmarks, which are the monthly sequential temperatures that are used by NOAA to

15  calculate its 30-year temperature normals.  I also verified that the monthly averages of the

16  adjusted daily temperatures are equal to NOAA's 12 monthly normal temperatures for the St

17  Louis station.  The crosschecks were successful in this case, thus insuring that the adjusted

18  daily temperature products supplied to Mr. Lange correspond to the NOAA normals.  The

19  calculations and results appear in the computer spreadsheets that make up my workpapers.

20  Q.  Are the methods you applied in this case consistent with those used in previous

21  cases?

22  A.  Yes.  Dr. Wayne Decker, the State Climatologist for Missouri, testified as a

23  witness for the Staff in Case No. GR-92-165 as to the appropriateness of using the NOAA and

1    WMO "normals" period.  The Staff has used this time period and adjusting methodology in

2    all of the electric and gas cases since then.

3    Q.    Has the Commission made any findings with respect to the use of NOAA's

4    thirty-year normal?

5    A.    Yes.  The use of the NOAA 30-year normal and 30-year normals period

6    complies with a provision of the Commission's Report and Order in the Missouri Gas Energy

7    rate case, Case No. GR-96-285.  At page 18 of its Report and Order, the Commission stated:

8    "The Commission finds that NOAA's 30-year normals is the more appropriate benchmark . . .

9    In addition, the data upon which Staff's recommendation is based has gone through the

10   processes established by NOAA to ensure the best data possible."  The 30-year period has

11   been accepted consistently in electric rate cases since then.

12   Q.    Were any unique additional adjustments made to the daily average

13   temperatures over the normals period for the St Louis station?

14   A.    Yes. As a result of analyses performed by former Missouri State Climatologist

15   Dr. Steve Qi Hu in previous AmerenUE cases (Case No. EO-96-14 and EM-96-149), he

16   recommended additional adjustments to daily average temperature for the St Louis station

17   over the 1971-2000 period that had not been incorporated into the NOAA normals.

18   AmerenUE incorporated these adjustments in its weather normals. Staff reviewed these

19   adjustments, has determined that they reflect Dr. Hu's analysis, and has also incorporated the

20   same adjustments into its normals calculations.

21                 **MISSOURI RATE REVENUE ANNUALIZATION**

22   Q.    What was your role in the Staff's determination of Missouri rate revenue in

23   this case?

1      A.     I performed an annualization to each individual customer's test year kWh sales

2  and rate revenues for each customer (account) served under Service Classification No. 11(M)

3  – Large Primary Service(LPS). The annualizations reflect any significant increases or

4  reductions in electric use, estimated annual usage of new customers, the exit from or transfer

5  into the class by specific customers, and an adjustment to assure 365 days of usage are

6  included. The sales and revenue annualizations are shown on my Schedules CW-2 and CW-

7  3, respectively. The large customer annualization to Missouri rate revenues is also shown on

8  Staff's Adjustments to Income Statement-Accounting Schedule 10.

9

| Union Electric Company d/b/a AmerenUE | | | | |
|---|---|---|---|---|
| Case No. ER-2007-0002 | | | | |
| Summary of Annual LPS KWH Sales | | | | |
| | | | | |
| | | | | |
| | | Large Customer | Days | Total |
| Rate Schedule | As Billed Sales | Annualization | Adjustment | kWh |
| | | | | |
| Large Primary Service | 4,214,198,498 | 21,794,021 | 7,187,357 | 4,243,179,876 |
| | | | | |
| | | | | |

10

| Union Electric Company d/b/a AmerenUE | | | | | | |
|---|---|---|---|---|---|---|
| Case No. ER-2007-0002 | | | | | | |
| Summary of Annualized and Normalized LPS Rate Revenue | | | | | | |
| | | | | | | |
| | | To Adjust to | | | | |
| | Billed, | Test Year Billing | As Billed | Large Customer | Days | |
| Rate Schedule | Net of GRT | Determinants | Revenue | Annualization | Adjustment | Total |
| | | | | | | |
| Large Primary Service | $159,408,062 | ($809,591) | $158,598,471 | $7,041 | $265,973 | $158,871,485 |
| | | | | | | |
| | | | | | | |

11
12                                     Schedule CW-3

13      Q.     How did you adjust revenue month data to a 365-day period?

1     A.     I calculated the number of billing days in the 12 revenue months of the test

2     year for each customer using their billing cycle dates.  For those customers with greater or

3     fewer than 365 days in their billing cycles, I calculated their daily sales and revenue and

4     added or subtracted the number of days' sales and revenue needed to normalize that

5     customers' sales and revenues to a 365-day year.

6     Q.     How did you perform the LPS annualizations?

7     A.     The 62 customers in the LPS rate class all use significant amounts of

8     electricity, but are heterogeneous in electric use and load factor.  Because of this, I performed

9     annualizations on an individual customer (account) basis.  The first step was to determine

10     whether a customer's account required annualization.  Each account's monthly demand and

11     energy use over periods prior to the test year and the 12 months of the test year was examined

12     graphically to determine any changes in the amount and usage pattern of the customer.  In

13     those accounts the Staff identified as having changes over time that were significant enough

14     to likely result in a recognizable change to AmerenUE's total kWh sales and revenues,  I

15     adjusted sales and revenue to reflect these changes.

16     For example, annualizing a specific account might entail replacing missing or

17     anomalous months of that customer's test year billing data using average or monthly data

18     from the test year or later, where available.  Or, significant monthly year-over-year increases

19     in the test year compared to prior years might be continued through the test year at the same

20     percentage increase.

21     During the test year, two existing customers switched into the Large Power class and

22     were annualized as LPS customers.  One large customer switched out of LPS during the test

23     year and its sales and revenues were removed from the LPS class.

1   Q.  Did you make any other adjustments?

2   A.  Yes. I included a balancing adjustment to adjust the reported billed revenues to

3 test year actuals.

4   Q.  Does this conclude your direct testimony?

5   A.  Yes, it does.

**TESTIMONY FILED BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION**


| Case Number | Company | Issue |
|---|---|---|
| ER-2006-0315 | Empire District Electric | Revenue |
| ER-2006-0314 | Kansas City Power & Light Company | Calculation of Normal Weather, Revenue |
| GR-2006-0387 | ATMOS Energy Corporation | Calculation of Normal Weather |
| GR-2006-0422 | Missouri Gas Energy | Calculation of Normal Weather |