

Exhibit No.:  
Issues: System Energy Losses,  
Jurisdictional Allocations  
Witness: ALAN J. BAX  
Sponsoring Party: MoPSC Staff  
Type of Exhibit: Direct Testimony  
Case No.: EC-2002-1  
Date Testimony Prepared: July 2, 2001

**MISSOURI PUBLIC SERVICE COMMISSION**  
**UTILITY SERVICES DIVISION**

**DIRECT TESTIMONY**

**OF**

**ALAN J. BAX**

**FILED<sup>3</sup>**

**JUL 02 2001**

**Missouri Public  
Service Commission**

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

**CASE NO. EC-2002-1**

Exhibit No. 11NP  
Date 7/10/02 Case No. EC-2002-1  
Reporter KRM

Jefferson City, Missouri  
July 2001

**\*\*Denotes Proprietary Information\*\***

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**DIRECT TESTIMONY**

**OF**

**ALAN J. BAX**

**UNION ELECTRIC COMPANY**

**d/b/a/ AMERENUE**

**CASE NO. EC-2002-1**

Q. Please state your name and business address?

A. Alan J. Bax, P.O. Box 360, Jefferson City, Missouri, 65102.

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

A. I am employed by the Missouri Public Service Commission (Commission)  
as an Engineer in the Energy Department of the Utility Operations Division.

Q. Please describe your educational and work background?

A. I graduated from the University of Missouri - Columbia with a Bachelor of  
Science degree in Electrical Engineering in December 1995. Concurrent with my studies,  
I was employed as an Engineering Assistant in the Energy Management Department of  
the University of Missouri - Columbia from the Fall of 1992 through the Fall of 1995.  
Prior to this, I completed a tour of duty in the United States Navy, completing a course of  
study at the Navy Nuclear Power School and Propulsion Plant. Following my graduation  
from the University of Missouri - Columbia, I was employed by The Empire District  
Electric Company (EDE) as a Staff Engineer until August, 1999, at which time I began  
my employment with the Staff of the Missouri Public Service Commission (Staff).

Q. Are you a member of any professional organization?

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1           A.     Yes, I am a member of the Institute of Electrical and Electronic Engineers  
2 (IEEE) and the Missouri Chapter of the National Society of Professional Engineers  
3 (NSPE).

4           Q.     Have you previously filed testimony before the Commission?

5           A.     No, I have not; however, I prepared the calculations used by Staff witness  
6 Dr. Eve Lissik in her direct testimony in the most recent rate case of The Empire District  
7 Electric Company (Case No. ER-2001-299).

8           Q.     What is your responsibility in the AmerenUE (Company) Complaint Case,  
9 Case No. EC-2002-1?

10          A.     The purpose of this testimony is to recommend that the Commission adopt  
11 my determination of the Company's system energy losses and jurisdictional allocation  
12 factors shown on Schedules 1 and 5, respectively, attached to this direct testimony.

13 **SYSTEM ENERGY LOSSES**

14          Q.     What are system energy losses?

15          A.     System energy losses are the energy losses that occur in the electrical  
16 equipment (transmission and distribution lines, transformers, etc.) in the Company's  
17 system between the generating sources and the customers' meters.

18          Q.     How are the system energy losses determined?

19          A.     The basis for this calculation is that Net System Input (NSI) must equal  
20 the sum of "Total Sales," "Company Use" and "System Energy Losses." This can be  
21 expressed mathematically as:

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1                   NSI = Total Sales + Company Use + System Energy Losses

2                   Therefore:

3                   System Energy Losses = NSI - Company Use - Total Sales.

4                   Then:

5                   System Energy Loss Percentage = (System Energy Losses ÷ NSI) • 100

6           Q.     How is NSI determined?

7           A.     NSI is the sum of the Company's Net Generation and the net of off-system  
8 purchases and sales ("Net Interchange"). Net Generation represents the total output of  
9 each generation unit minus the power consumed internally to enable its production. The  
10 output of each generation unit is monitored continuously, as is the net of all purchases  
11 and sales. I obtained this information from data supplied by the Company in responses  
12 received to Staff Data Requests Nos. 4135 and 163.

13          Q.     Please define Total Sales and Company Use and explain how these values  
14 are determined.

15          A.     Total Sales includes the Company's retail and wholesale sales to all end  
16 users. Company Use is the electricity consumed at the Company's non-generation  
17 facilities such as its main office building and, for the most part, is metered by the  
18 Company. Both Total Sales and Company Use data were taken from an update provided  
19 by the Company to Staff Data Requests Nos. 4133 and 4134 received June 12, 2001.

20          Q.     What is the result of your calculation?

21          A.     As shown on Schedule 1 (attached to this direct testimony), I have  
22 calculated the system energy loss percentage to be \*\*       \*\* of NSI.

23          Q.     Did you provide the results of this calculation to anyone on the  
24 Commission Staff?

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1           A.     Yes, I provided the results of my calculations to Staff witness Lena M.  
2     Mantle.

3     **JURISDICTIONAL ALLOCATIONS**

4           Q.     Please define the phrase "jurisdictional allocation."

5           A.     A jurisdictional allocation determination is utilized to apportion the cost of  
6     generation and transmission assets, included in the Federal Energy Regulatory  
7     Commission (FERC) Uniform System of Accounts (USOA) --- account numbers 310-346  
8     for Generation and 350-358 for Transmission --- among the jurisdictions served by a  
9     utility that operates in both interstate and intrastate commerce. In this case, electric  
10    property (investment/ratebase) and expenses (generation and transmission) are divided  
11    among the separate state jurisdictions (retail operations) and the federal jurisdiction  
12    (wholesale operations) based upon the load at the time of the system peak.

13          Q.     Please identify the jurisdictions served by the Company.

14          A.     AmerenUE provides retail service in the states of Missouri and Illinois and  
15    wholesale service in the state of Missouri.

16          Q.     What methodology did you use to determine the aforementioned  
17    jurisdictional allocation factors for generation and transmission?

18          A.     The twelve coincident peak (12 CP) hour methodology.

19          Q.     What is meant by "coincident peak?"

20          A.     The coincident peak is the highest system one-hour demand, in megawatts  
21    (MW), occurring within a designated period (day, month, year etc). In this case, the  
22    designated period is monthly.

23          Q.     Why use peak demand as the basis for allocations?

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1           A.     Peak demand is the largest electric load requirement occurring within a  
2 specified period (i.e., day, month, season, year). Since generation units and transmission  
3 lines are planned, designed and constructed to meet the Company's anticipated system  
4 peak demand, the individual contribution to peak demand is the appropriate factor for the  
5 allocation of facilities costs.

6           Q.     Please describe the procedure for calculating the jurisdictional allocation  
7 factors.

8           A.     The allocation factor for a particular jurisdiction is determined using the  
9 following process:

10                   1.     Determine the total system (i.e., AmerenUE) peak load (CP) for  
11 each month.

12                   2.     Determine the jurisdiction's (i.e., Missouri retail) MW load  
13 occurring at the time of the system CP for each month.

14                   3.     Sum the 12 readings for both the system and the jurisdiction.

15                   4.     Divide the resultant jurisdiction summation (#2) by the resultant  
16 system summation (#1).

17                   The result is the allocation factor for the particular jurisdiction. Totaling  
18 the allocation factor of all applicable jurisdictions will equal ONE.

19           Q.     How was the decision made to recommend using the 12 CP method?

20           A.     A utility that experiences a distinctive peak during a particular month  
21 would most likely determine allocations based on a one CP method. A utility that  
22 exhibits only slight percentage variations in its monthly and/or seasonal (e.g., summer  
23 and winter) peaks during a particular year would be more likely to utilize the 12 CP  
24 method. Schedule 2 attached to this direct testimony presents a table of the Company's

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1 monthly coincident peaks for calendar years 1996 through 2000. This information was  
2 taken from FERC Form 1 and responses provided by the Company to Staff Data Request  
3 Nos. 262 and 4143. As shown, AmerenUE experiences its highest system peak during  
4 the summer months (July, August and September); however, a relatively high system  
5 peak also occurs during the winter months (December or January).

6 The line graph on Schedule 3 attached to this direct testimony represents a load  
7 profile of each month's coincident peak as a percentage of the corresponding annual  
8 system peak for each year. It was derived from the data given in Schedule 2. This also  
9 shows relatively high peaks in both the summer and winter.

10 Schedule 4 attached to this direct testimony is a table reflecting the relationship  
11 between the actual Missouri Retail Load and the System Peak Load during the monthly  
12 Coincident Peak hours in calendar years 1999 and 2000, as well as a twelve-month  
13 average for each year. This data was compiled from the information received in an  
14 update to Staff Data Request No. 4143. Schedule 4 reflects only slight variations in the  
15 percentage of the system peak loads attributed to Missouri retail customers. Collectively,  
16 these attached schedules do not indicate a distinct, extraordinary MW peak in any  
17 particular monthly CP hour. Therefore, the Staff advocates use of the 12 CP method.

18 Q. What jurisdictional allocation factors have you calculated in this case?

19 A. As shown on Schedule 5 attached to this direct testimony, the calculated  
20 factors for calendar year 2000 are as follows:



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1	Missouri Retail	**	**
2	Illinois Retail	**	**
3	Missouri Wholesale	**	**

4 Q. Do these percentages differ from those provided by the Company and if  
5 so, why?

6 A. Yes. The Company also employs a 12 CP methodology in computing  
7 these allocation factors. However, in its determination of net native load, the Company  
8 subtracts the amount of load that could have been interrupted. The Staff considers this  
9 approach to be inappropriate since the "interruptible" load was, in fact, not interrupted.  
10 At the time of coincident peak, Illinois retail records indicate substantially more  
11 interruptible load as compared to Missouri retail. By eliminating this interruptible load  
12 from the jurisdictional allocation calculation, Missouri retail's jurisdictional allocation  
13 factor increases. Accordingly, AmerenUE's approach results in an inappropriate shift in  
14 allocations to Missouri. Staff Data Request No. 4143, attached as Schedule 6 to this  
15 direct testimony, illustrates the situation described above.

16 Q. Did you provide the results of this calculation to anyone on the  
17 Commission Staff?

18 A. Yes, I provided the results of my calculations to Staff Accounting witness  
19 James D. Schwieterman.

20 Q. Does this conclude your prepared direct testimony?

21 A. Yes, it does.

**BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI**

The Staff of the Missouri Public Service )  
Commission, )  
Complainant, )  
vs. )  
Union Electric Company, d/b/a )  
AmerenUE, )  
Respondent. )

Case No. EC-2002-1

**AFFIDAVIT OF ALAN J. BAX**


STATE OF MISSOURI )  
 ) ss  
COUNTY OF COLE )

Alan J. Bax, of lawful age, on his oath states: that he has participated in the preparation of the foregoing written Direct Testimony in question and answer form, consisting of 7 pages of testimony to be presented in the above case, that the answers in the attached written 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.

  
\_\_\_\_\_  
Alan J. Bax

Subscribed and sworn to before me this 2nd day of July, 2001.

MICHELLE SCHWARTZE  
NOTARY PUBLIC STATE OF MISSOURI  
COLE COUNTY

  
\_\_\_\_\_  
Notary Public

My commission expires MY COMMISSION EXP. APR. 25, 2005

**All Schedule Attachments**

**are**

**Deemed Proprietary**