Exhibit No.:
Issues: System Energy Loss & Jurisdictional Allocations
Witness: Alan J. Bax
Sponsoring Party: MoPSC Staff
Type of Exhibit: Direct Testimony
Case No.: EC-2002-1
Date Testimony Prepared: March 1, 2002

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY SERVICES DIVISION

DIRECT TESTIMONY

OF

ALAN J. BAX

UNION ELECTRIC COMPANY, d/b/a AMERENUE

CASE NO. EC-2002-1

Exhibit No. 12 NP
Date 7/10/02 Case No. EC-2002-1
Reporter KEM

Jefferson City, Missouri
March 1, 2002

****Denotes Proprietary Information****

NP

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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 a Navy Nuclear Propulsion Plant. Following my graduation from the University of Missouri - Columbia, I was employed by The Empire District Electric Company as a Staff Engineer until August 1999, at which time I began my employment with the Commission.

Q. Are you a member of any professional organizations?

A. Yes, I am a member of the Institute of Electrical and Electronic Engineers (IEEE).

Q. Have you previously filed testimony before the Commission?

A. Yes, I filed testimony on jurisdictional allocations and system energy losses in the most recent electric rate case involving UtiliCorp United, Inc. d/b/a Missouri Public Service (ER-2001-672). I filed true-up testimony concerning jurisdictional allocations in the most recent electric rate case of The Empire District Electric Company (ER-2001-299). In addition, I previously filed testimony in this case concerning jurisdictional demand allocations and system energy losses on July 2, 2001. I was subsequently given the responsibility of calculating jurisdictional energy allocation factors and have included details of my analyses in this testimony.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to recommend that the Commission adopt the system energy loss factor and the jurisdictional allocation factors for demand and energy that I calculated for AmerenUE (UE) shown on Schedules 1, 5, and 6 respectively, attached to this direct testimony. My testimony also describes how I determined these aforementioned factors.

SYSTEM ENERGY LOSSES

Q. What is the result of your system energy loss factor calculation?

A. As shown on Schedule 1 attached to this direct testimony, I have calculated the system energy loss factor to be ** ** of Net System Input (NSI).

Q. What are system energy losses?

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

Q. How are system energy losses determined?

A. The basis for this calculation is that NSI equals the sum of "Total Sales," "Company Use," and "System Energy Losses." This can be expressed mathematically as:

NSI = Total Sales + Company Use + System Energy Losses

NSI, Company Use and Total Sales are known; therefore, system energy losses may be calculated. The system energy loss factor is the ratio of system energy losses to NSI. Accordingly:

System Energy Losses = NSI – Total Sales – Company Use

As a consequence:

System Energy Loss Factor = (System Energy Losses ÷ NSI)

Q. What is NSI and how is it determined?

A. NSI is also the sum of UE's net generation and net interchange, the latter being the net of off-system purchases and sales. Net generation is the total energy output of each generating station minus the energy consumed internally to enable its production. The output of each generating station is monitored continuously, as is the net of off-system purchases and sales. I obtained this information from data supplied by UE in response to Staff Data Requests 163, 4135, and 4141 in Case No. EM-96-149, Staff Data Requests 2903 and 2904 in this case, and also from UE's Financial and Statistical (F&S) Schedules C 3-1 and C 3-2.

Q. What are Total Sales and Company Use and how are these values determined?

A. Total Sales includes all of UE's retail and wholesale sales. Company Use is the electricity consumed at UE's non-generation facilities, such as its corporate office building at One Ameren Plaza, 1901 Chouteau Avenue. Total Sales data was provided by UE in response to Staff Data Request 4133 in Case No. EM-96-149 and Staff Data Request 2901 in this case, as well as from UE's F&S Schedules C 2-1 and C 2-3. Company Use data was provided by UE in response to Staff Data Request 4134 in Case No. EM-96-149 and Staff Data Request 2902 in this case.

Q. Which Staff witness used your calculated system loss factor?

A. I provided my calculated system loss factor to Staff witness Lena M. Mantle.

JURISDICTIONAL ALLOCATIONS

Q. Please define the phrase "jurisdictional allocation"?

A. For purposes of my testimony, jurisdictional allocation refers to the process by which demand-related and energy-related costs are allocated to the applicable jurisdictions. In the case of UE, these costs are divided among three jurisdictions; namely, Missouri retail operations, Illinois operations, and Missouri wholesale operations. Wholesale operations are subject to the jurisdiction of the Federal Energy Regulatory Commission (FERC). Which allocation factors are used is dependent upon the types of costs being allocated.

DEMAND ALLOCATION FACTOR

Q. What is the definition of demand?

A. Demand refers to the rate at which electric energy is delivered to or by a system, generally expressed in kilowatts or megawatts, either at an instant in time or averaged over any designated interval of time. In my analyses, I used hourly demands.

Q. What types of costs are allocated on the basis of demand?

A. Capital costs associated with generation and transmission plant and certain operational and maintenance expenses are allocated on this basis. This is appropriate because generation and transmission are planned, designed and constructed to meet the anticipated demand.

Q. What methodology did you use to determine the demand allocators?

A. I used what is known as the Twelve Coincident Peak (12 CP) methodology.

Q. What is meant by "coincident peak"?

A. As used in my analyses, the term coincident peak refers to the load in megawatts (MWs) in each of the three jurisdictions, coinciding with the hour of Ameren's monthly peak. Included in these peaks is the load being used by interruptible customers (i.e., load classified as interruptible but was, in fact, not interrupted). It should be noted that the allocation factors should be calculated using the coincident load in each jurisdiction at the time of UE's monthly peak. However, according to the response received in Staff Data Request 2923 in this case, this information is not available.

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

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

Q. Please describe the procedure for calculating the jurisdictional demand allocation factors using the 12 CP methodology.

A. The allocation factor for each jurisdiction was determined using the following process:

1. Identify Ameren's peak hourly load in each month for the twelve-month period October 2000 through September 2001 and sum the hourly peak loads.
2. Sum the particular jurisdiction's corresponding loads for the hours identified in #1 above.
3. Divide #2 above by #1 above.

The result is the allocation factor for the particular jurisdiction. The sum of the demand allocation factors will equal one.

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

A. The 12 CP method is appropriate for a utility, such as UE, that experiences marginal variations in monthly and/or seasonal (e.g., summer and winter) peaks during a particular year. Schedule 2 attached to this direct testimony presents a table of Ameren's peaks for calendar years 1996 through 2001. This information was taken from FERC Form 1 and data provided by UE in response to Staff Data Requests 262 and 4143 in Case No. EM-96-149 and Staff Data Requests 2904, 2906 and 2923 in this case. As shown, Ameren experiences its highest system peak during the summer months (July,

August, and September); however, a relatively high system peak also occurs during the winter months (December and/or January).

The line graph on Schedule 3 attached to this direct testimony represents a load profile of each month's coincident peak as a percentage of the corresponding annual system peak (at the time of Ameren's peak) for calendar years 1996 through 2001 and for the test year. It was derived from the data shown in Schedule 2. This indicates relatively high peaks in both the summer and the winter.

Schedule 4 attached to this direct testimony is a table reflecting the relationship between the actual Missouri Retail Load and the Ameren Peak Load during the monthly coincident peak hours in calendar years 1999 through 2001. This data was compiled from the information received from UE in response to Staff Data Request 4143 in Case No. EM 96-149, and Staff Data Requests 2106 and 2123 in this case. Schedule 4 reflects little variation in the percentage of system peak loads attributed to Missouri retail customers.

These attached schedules provide evidence to support Staff's use of the 12 CP method.

Q. What are the results of your calculations?

A. As shown on Schedule 5 attached to this direct testimony, the calculated demand jurisdictional allocation factors for the updated test year are as follows:

Missouri Retail	**	**
Illinois	**	**
Missouri Wholesale	**	**

Q. Which Staff witness used your jurisdictional demand allocation factors?

A. I provided these jurisdictional allocation factors to Staff witness Doyle Gibbs. In his testimony, Mr. Gibbs refers to these as the "fixed allocation factors."

ENERGY ALLOCATION FACTOR

Q. What types of costs were allocated on the basis of energy?

A. Variable expenses, such as fuel, and certain operational and maintenance (O&M) costs, are allocated to the jurisdictions based on energy consumption.

Q. How did you calculate the energy allocation factor?

A. The energy allocation factor for an individual jurisdiction is the ratio of the normalized annual kilowatt-hour (kWh) usage in the particular jurisdiction to the total normalized UE kWh usage. The sum of the energy allocation factors will equal one.

Q. How were these usages normalized?

A. An annual adjustment for deviations from normal weather obtained in response to Staff Data Request 2914 was applied to the jurisdictional kWh usage totals. This adjustment is shown as "Adjustment 1" on Schedule 6. The jurisdictional kWh usage totals were provided in response to Staff Data Request 4133 in Case No. EM-96-149, Staff Data Requests 2901 and 2906 in this case and, to an extent, were contained in UE's F&S Schedule C 2-3.

Q. Where there any other adjustments made to Schedule 6?

A. Yes. I also reduced the total Missouri wholesale energy by the usage of the City of Rolla. This is necessary as the City of Rolla is no longer a wholesale customer of UE after December 31, 2000.

Q. What are the calculated energy allocation factors in this case?

A. The factors are shown in Schedule 6 and repeated here.

Missouri Retail	**	**
Illinois	**	**
Missouri Wholesale	**	**

Q. Which Staff witness used your jurisdictional energy allocation factors?

A. I provided these jurisdictional energy allocation factors to Staff witness Doyle Gibbs. In his testimony, Mr. Gibbs refers to these as the "variable allocation factors."

Q. Does this conclude your prepared direct testimony?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

The Staff of the Missouri Public Service Commission,	)	
	)	Case No. EC-2002-1
Complainant,	)	
vs.	)	
	)	
Union Electric Company, d/b/a AmerenUE,	)	
	)	
Respondent.	)	

AFFIDAVIT OF ALAN J. BAX

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

Alan J. Bax, is, of lawful age, and on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form, consisting of 9 pages to be presented in the above case; that the answers in the foregoing Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

Alan J. Bax

Subscribed and sworn to before me this 28th day of February, 2002

Dawn L. Hake
Notary Public

DAWN L. HAKE
Notary Public – State of Missouri
County of Cole
My Commission Expires Jan 9, 2005

SCHEDULE 1 IS DEEMED

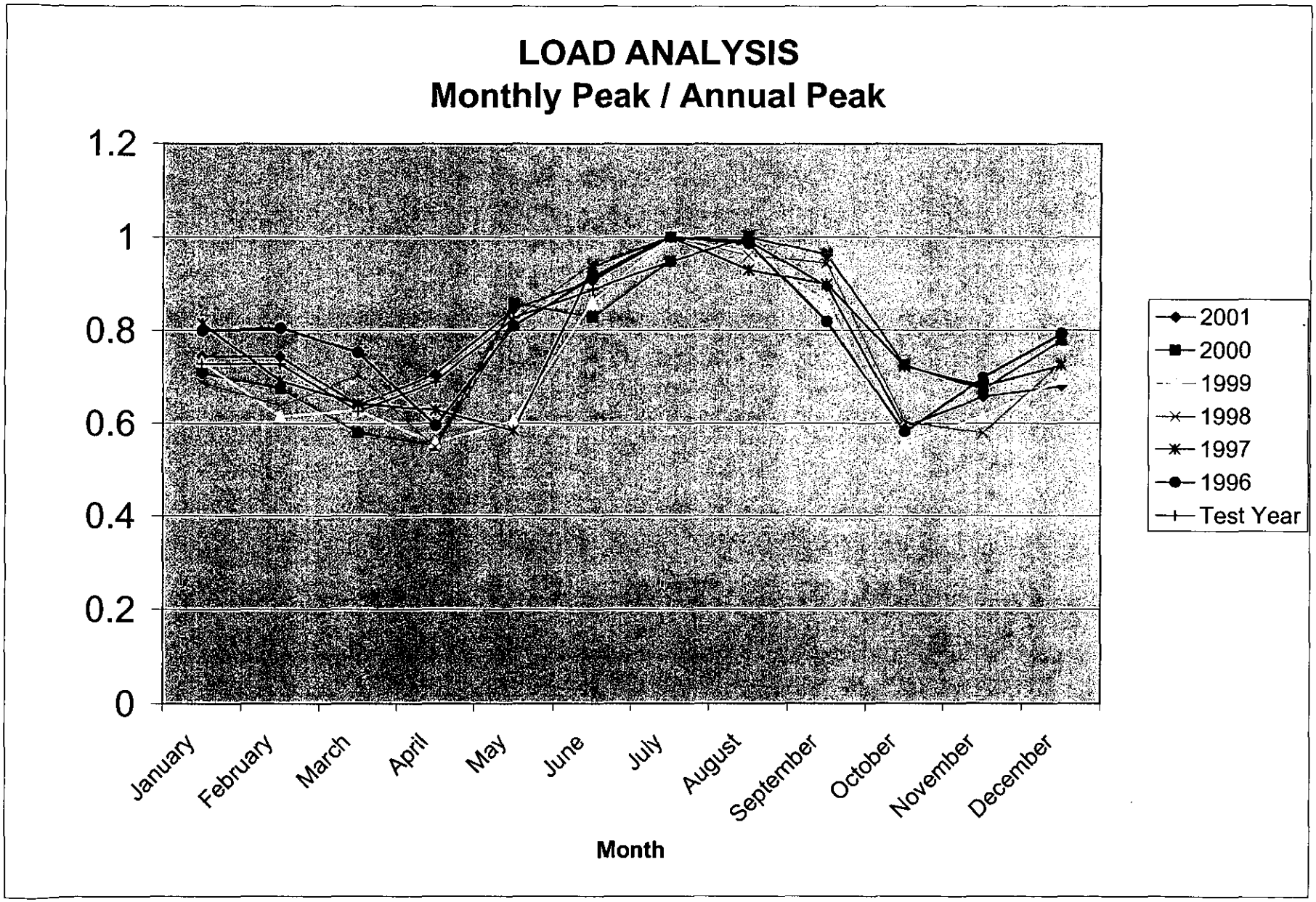
PROPRIETARY

IN ITS ENTIRETY

SCHEDULE 2 IS DEEMED

PROPRIETARY

IN ITS ENTIRETY


LOAD ANALYSIS
Monthly Peak / Annual Peak
1.2
1
0.8
0.6
0.4
0.2
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2001
2000
1999
1998
1997
1996
Test Year

Schedule 3

SCHEDULE 4 IS DEEMED

PROPRIETARY

IN ITS ENTIRETY

SCHEDULE 5 IS DEEMED

PROPRIETARY

IN ITS ENTIRETY

SCHEDULE 6 IS DEEMED

PROPRIETARY

IN ITS ENTIRETY