Exhibit No.: _____

Issue(s): Cost of Service Study/
Rate Design

Witness/Type of Exhibit: Hong Hu/Cross-Surrebuttal

Sponsoring Party: Public Counsel

Case No.: EC-2002-1

CROSS-SURREBUTTAL TESTIMONY

OF

HONG HU

Submitted on Behalf of the Office of the Public Counsel

UNION ELECTRIC COMPANY

Case No. EC-2002-1

June 24, 2002

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

STAFF OF THE MISSOURI PUBLIC SERVICE COMMISSION, Complainant,	)	
vs.	)	Case No. EC-2002-1
UNION ELECTRIC COMPANY, d/b/a AmerenUE, Respondent.	)	

AFFIDAVIT OF HONG HU

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Hong Hu, of lawful age and being first duly sworn, deposes and states:

1. My name is Hong Hu. I am a Public Utility Economist for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my cross-surrebuttal testimony consisting of pages 1 through 15.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Hu Hong
Hong Hu

Subscribed and sworn to me this 24th day of June 2002.

KATHLEEN HARRISON
Notary Public - State of Missouri
County of Cole
My Commission Expires Jan. 31, 2006

Kathleen Harrison
Kathleen Harrison, Notary Public

My Commission expires January 31, 2006.

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CROSS-SURREBUTTAL TESTIMONY

OF

HONG HU

AMEREN UE COMPANY

CASE NO. EC-2002-1

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. Hong Hu, Public Utility Economist, Office of the Public Counsel, P. O. Box 7800, Jefferson City, Missouri 65102.

Q. HAVE YOU FILED ANY PREVIOUS TESTIMONY IN THIS CASE?

A. Yes, I filed rebuttal testimony on the issues of rate design and time-of-use (TOU) rate.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. I will offer some criticisms of the Company's class cost of service (CCOS) study and rate design proposals.

I. Class Cost of Service Study and Revenue Adjustment Distribution

Q. WHAT IS THE MAIN PURPOSE OF PERFORMING A CCOS STUDY?

A. The main purpose of a CCOS Study is to apportion total costs to the various customer classes in a manner consistent with the incurrence of those costs. CCOS study results provide guidance for determining how revenues should be collected from different customer classes and how rates should be designed to collect revenues from customers within a class, depending on customer usage levels and patterns.

Q. COULD YOU PLEASE SUMMARIZE THE RESULTS OF THE COMPANY'S CCOS STUDY AND ITS PROPOSED DISTRIBUTION OF REVENUE REDUCTION?

A. Yes. According to Mr. Kovach, the Company's CCOS results indicate that the residential class is providing a below average rate of return at the Company's present residential rate levels and the non-residential classes are providing above average rates of return at their current rate levels. The Company's proposal of revenue reduction distribution involves a first step of revenue neutral adjustment and a subsequent allocation of any revenue reduction (or increase) based on the percentage of the total net original cost rate base allocated to each customer class. For the residential class, the Company proposes that its revenue should be raised by approximately 10% before it receives a share of any reduction (or increase).

Q. WHAT IS THE EFFECT OF THE COMPANY'S PROPOSED DISTRIBUTION OF REVENUE REDUCTION OR INCREASE?

A. In its initial filing, the Staff is asking a revenue reduction of $245 million to $285 million. In its rebuttal testimonies, the Company argues that it should at least receive a revenue increase of approximately $148 million. In order to show the effect of the Company's proposed method of revenue adjustment distribution, I have included here an example assuming a potential final outcome of approved revenue reduction of $150 million. Table 1 below summarizes revenue neutral shifts indicated by the Company's CCOS study and class distribution of a $150 revenue reduction according to the Company's proposed method, compared with the Staff's rate design proposal.

Table 1. Company's CCOS result and proposed revenue reduction distribution

	Total Revenues	Residential	SGS	LGS	SPS	LPS
Company's Distribution of $150 million Reduction						
Current Revenues	$ 1,773,762	$ 786,445	$ 226,660	$ 393,395	$ 204,361	$ 162,901
Company Revenue Neutral Adjustment	$ -	$ 80,640	$ (10,125)	$ (20,298)	$ (32,539)	$ (17,678)
Total net original cost rate base	$ 3,969,867	$2,051,454	$ 491,753	$ 826,080	$ 328,317	$ 272,264
Spread of $150million	$ (150,000)	$ (77,513)	$ (18,581)	$ (31,213)	$ (12,405)	$ (10,287)
Total	$ (150,000)	$ 3,127	$ (28,706)	$ (51,511)	$ (44,944)	$ (27,965)
% of reduction	-8.46%	0.40%	-12.66%	-13.09%	-21.99%	-17.17%
Staff's Distribution of $150 million Reduction						
Total	$ (150,000)	$ (62,146)	$ (20,169)	$ (35,005)	$ (18,185)	$ (14,495)
% of reduction	-8.46%	-7.90%	-8.90%	-8.90%	-8.90%	-8.90%

From Table 1, we can see that if the Commission determines that the Company's total revenue should be reduced by **$150 million** (an approximately 8.5% reduction), then the Company's method would allocate absolutely **no** reduction to the residential class. On the contrary, the Company would actually **raise**

residential rates while reducing rates for primary customers by about 20%. In fact, if the company's cost of service results and revenue distribution method are accepted, the residential class will not receive any revenue reduction until the total company revenue reduction reaches $156 million.

Q. DOES PUBLIC COUNSEL AGREE WITH THE COMPANY'S CCOS STUDY AND ITS PROPOSED METHOD OF REVENUE ADJUSTMENT DISTRIBUTION?

A. Absolutely not. OPC disagrees with two main aspects of the Company's CCOS study. The first is the allocation of production plant. The second is the classification and allocation of distribution plant other than services and meters. Further, OPC disagrees with two components of the Company's proposal for revenue adjustment distribution. First, OPC disagrees that class revenue requirements should completely mirror one party's CCOS study result. Secondly, OPC does not agree that an equal percentage distribution of any revenue adjustment should be based on an **allocated** class net original cost rate base as proposed by the Company.

Q. COULD YOU ELABORATE ON THE FIRST POINT THAT OPC DISAGREES WITH THE COMPANY'S CCOS STUDY?

A. Yes. The Company used an average and excess demand allocation (A&E) method to allocate the production plant account. The allocation for each class is determined by the following formula:

average class demands * system load factor + excess class demands * (1-system load factor). (1)

Here excess class demands are the differences between class peak demands and class average demands. OPC disagrees that the A&E method is the most appropriate method for allocation of production facilities.

Q. WHY DOES PUBLIC COUNSEL BELIEVE THAT THE A&E METHODOLOGY IS NOT APPROPRIATE FOR ALLOCATING PRODUCTION PLANT?

A. In addition to the system peak demands, energy loads are also a major determinant of production plant costs. Thus, cost of service analysis must incorporate both demand and energy weighting into the treatment of production plant costs. In lines 20 to 21 on page 74 of his rebuttal testimony, Company witness Mr. Richard Kovach agrees that "a cost allocation methodology that gives weight to both a) class peak demands and b) class energy consumption (average demands) is required" to properly address both the "amount of capacity" and "type of capacity" considerations associated with capacity planning of the generation system. However, despite of the Company's acknowledgement that it is appropriate to give weight to both the peak demand and the average demand, the Company's A&E method generates a resulting allocation that is heavily tilted toward peak demand allocation. Clearly shown in table 2 below, the Company's A&E allocator apparently has not given appropriate weight to the average demand. In fact, depending on the system's total load factor, it is possible that the A&E method could actually generate a result that is even worse than an allocation that is based solely on peak demand.

Table 2. Comparison of allocators based on A&E method, peak demand, and average demand

	RES	SGS	LGS	SPS	LPS
A&E	47.50%	12.24%	22.74%	9.52%	8.00%
Peak Demand (4ncp)	48.27%	12.31%	22.64%	9.13%	7.64%
Average Demand	38.23%	11.37%	23.98%	14.13%	12.30%

Q. WHAT WOULD BE THE IMPACT OF USING THE A&E METHOD IN ALLOCATION OF PRODUCTION COSTS?

A. The results of such allocations of production costs would be to penalize consumers who have low class load factors. Customers with lower load factor will have a larger amount of access demand relative to the same peak demand and thus will be allocated more cost if the allocation is based on access demand instead of peak demand. Generally the residential class has a lower load factor than large industrial and primary customers and therefore would be penalized by the A&E allocation method.

Q. WHAT DO YOU BELIEVE IS A MORE APPROPRIATE ALLOCATION METHOD FOR THE PRODUCTION PLANT ACCOUNT THAT TAKES INTO CONSIDERATION BOTH PEAK DEMAND AND AVERAGE DEMAND?

A. If we replace excess class demands with peak class demands in formula (1), we will get an allocator that is effectively a weighted average of the two numbers: class peak demand and class average demand.

average class demands * system load factor + peak class demands * (1-system load factor). (2)

This is often called the "average and peak demand" method (see Table 3). I believe that this allocation method gives weight to both average demand and peak demand and is more appropriate for the allocation of production plant.

Table 3. Comparison of allocators based on A&P method, peak demand, and average demand

	RES	SGS	LGS	SPS	LPS
A&P	42.95%	11.81%	23.35%	11.78%	10.11%
Peak Demand (4ncp)	48.27%	12.31%	22.64%	9.13%	7.64%
Average Demand	38.23%	11.37%	23.98%	14.13%	12.30%

Q. WHAT IS THE SECOND REASON THAT OPC DISAGREES WITH THE COMPANY'S CCOS STUDY?

A. The Company classified distribution costs as both customer-related and demand-related. I believe that distribution costs other than services and meters should be allocated based exclusively on demand.

Q. WHY DOES PUBLIC COUNSEL BELIEVE THAT DISTRIBUTION PLANT OTHER THAN METERS AND SERVICES SHOULD NOT BE CHARACTERIZED AS CUSTOMER-RELATED?

A. The distribution plant other than meters and services includes conductors, poles, conduits, transformers, etc. The main reason that these distribution facilities are asserted to be partially customer-related is that you must have a certain amount of conductors and poles or conduits, etc. to cover a certain geographic area. A common practice in performing CCOS study is to utilize simple or weighted customer numbers to allocate customer-related costs. For example, the utility needs to install one (or more) meter(s) for each individual new customer.

Therefore, meter cost can be appropriately allocated based on customer numbers weighted by the ratio of meter cost for different size meters and weighted by meter/customer ratios. However, for most of the distribution facilities other than meters and services, the existence of the customer itself is not the true cost causer. In other words, the addition of a new customer will not necessarily cause new investment in poles, conduits, conductors or transformers. The length of conductors and number of poles or conduits to cover a certain geographic area may not be much different for a subdivision that has 100 narrowly spaced houses or a subdivision that has 50 widely spread houses. In fact, there may be very little correlation between distribution cost (other than meters and services) and customer numbers.

On the other hand, the correlation between distribution cost and demand is more apparent. Conductors are a means to distribute and deliver power and energy. When a conductor is specified it is sized to satisfy the demands projected to be carried by the conductor and its function in the distribution network such as providing redundancy for service reliability. To predict the demand to be placed on the conductor, growth in the number of customers of different types and usage patterns are both considered. However, there are numerous combinations of different numbers of customers which may produce the same resultant demand. It is the projected level of demand that is used in the design, not the number of customers. Therefore, conductors are best allocated on basis of demand. Poles and conduits provide support for the conductors and thus these accounts should be allocated on the same basis as the conductors.

Q. IS THERE OTHER EVIDENCE INDICATING THAT CHARACTERIZING DISTRIBUTION COSTS OTHER THAN METERS AND SERVICES AS CUSTOMER-RELATED IS INAPPROPRIATE?

A. Yes. For those who assert that distribution facilities are partly customer-related, two commonly adopted approaches for determining the customer/demand split are the minimum-size (or minimum-system) method and the minimum-intercept (or zero-intercept) method. Both methods have encountered some problems in their application to real world data. The minimum-size method is consistently criticized for double counting the cost. Since the minimum-size distribution equipment has a certain load-carrying capability, it satisfies a certain amount of demand and thus its cost should also be viewed as a demand-related cost. Therefore, in addition to a share of distribution costs classified as demand-related, this method allocates a second layer of demand-related costs that have been mislabeled customer costs to the customers.

To amend this problem, the minimum-intercept method seeks to identify that portion of plant related to a hypothetical no-load situation. However, there is no reasonable justification for hypothesizing the existence of a distribution system whose purpose is to make power and energy available to customers who are assumed not to want power or energy. Due to the lack of a real world basis, this method utilizes intercept from a regression in lieu of the no load portion. From time to time, statistically unreliable results are produced such as a negative intercept indicating negative cost at zero-load.

I believe that the problems encountered when using these two methods are not the result of data abnormality and can not be solved by simply changing statistical techniques. Instead, these problems are inherent. They are due to the

fundamental mistake in assuming distribution costs are partially customer-related. The results of these methods are arbitrary and do not represent a fair allocation of costs and thus can not be relied upon in the CCOS studies.

Q. WHAT WOULD BE THE IMPACT OF ALLOCATING DISTRIBUTION COSTS ON THE BASIS OF WEIGHTED OR UNWEIGHTED CUSTOMER NUMBERS?

A. The results of such allocations of distribution costs would be to place an unfair and unjustified burden on the smaller consumers, resulting in an unfair distribution among classes and within classes. All customers who have characteristically low usage would be harmed by this process, especially low-use residential customers.

Q. HOW WOULD THE COMPANY'S CCOS STUDY RESULTS CHANGE IF MODIFIED TO REFLECT THE CORRECTIONS OF USING A&P METHOD IN ALLOCATION OF PRODUCTION PLANT AND NOT CLASSIFYING DISTRIBUTION COSTS OTHER THAN METERS AND SERVICES AS CUSTOMER-RELATED?

A. I have modified the Company's CCOS study spreadsheet by changing the relevant classification and allocation for different accounts to reflect Public Counsel's position that

1) production plant should be allocated based on the A&P method, and

2) distribution plant (other than meters and services) should be classified as demand-related only.

The end result is shown below:

Table 4. Company CCOS Study Indicated
Revenue Neutral Rate Revenue Increase/Decrease Percentages

	RES	SGS	LGS	SPS	LPS
Original	10.25%	-4.47%	-5.16%	-15.92%	-10.85%
Modified	6.43%	-5.08%	-2.83%	-10.22%	-4.31%

Q. COULD YOU ELABORATE ON YOUR FIRST POINT OF DISAGREEMENT WITH THE COMPANY'S METHOD OF REVENUE ADJUSTMENT DISTRIBUTION?

A. Yes. The Company advocated that class revenues should be brought to the level of class costs indicated in the Company's CCOS study results before any spread of total revenue reduction or increase. I do not agree that the Company's CCOS study should be accepted by the Commission as a basis for rate design. The Company's accounting data depart largely from the data contained in the Staff's filing. Since different cost accounts are allocated differently through different allocation factors, CCOS studies that start from the Company's accounting data or the Staff's accounting data will surely generate different results. In addition, the Company's classification and allocation of different costs are disputable. For example, for production plant that consists about half of the total plant in service, the Company has utilized an inappropriate allocation method. In summary, the Company's CCOS study results would not be an appropriate starting point for the rate design in this case.

Furthermore, I believe that a CCOS study is only one of many factors that should be considered in determining class revenue responsibilities. The Commission has repeatedly emphasized this point. Performing a CCOS study can be a helpful exercise to provide guidance in designing rate. However, by its nature, it is a

product of numerous assumptions and not precise. Electric utilities are characterized by large joint and common costs. Generation, transmission, and distribution plant are all examples of facilities that are shared by more than one customer class. Therefore these costs cannot be directly assigned but must be allocated to each class, which in turn would involve judgments and thus generate different results. This is why performing a CCOS study is more of an art than a science. I recommend the Commission adopt a rate design that reflect balances between movement to cost of service and other considerations such as rate impact and affordability.

Q. WHAT GENERAL FRAMEWORK FOR RATE DESIGN WOULD YOU PROPOSE IN ORDER TO BALANCE MOVEMENT TO COST OF SERVICE AND OTHER CONSIDERATIONS?

A. I believe that the Commission should adopt a gradual approach to mitigate rate shock. Specifically, when the effect on a class might be detrimental, interclass revenue neutral shifts should be no more than halfway toward cost of service. Also, to address affordability, equity, and rate impact considerations, no class should receive a net increase (the combined effect of revenue neutral shifts and overall revenue requirement decrease) in its revenue requirement when there is a total company revenue requirement reduction. Similarly, no class should receive a net decrease in its revenue requirement when there is a total company revenue requirement increase.

Q. COULD YOU ELABORATE ON YOUR SECOND DISAGREEMENT WITH THE COMPANY'S METHOD OF REVENUE ADJUSTMENT DISTRIBUTION?

A. Yes. The Company proposed a spread of revenue adjustments based on the percentage of the total net original cost rate base allocated to each customer class. I do not agree that the net original cost rate base is an appropriate basis for any spread of revenue adjustment. Since most of an electric utility's costs are joint and common costs, it is not possible to accurately determine each class's net original cost rate base. On the contrary, this is something that involves allocation and would likely cause disagreement among different parties. In the past a common practice in rate design is to spread revenue adjustment based on class current revenues. Current revenue can be accurately determined and agreed upon among parties. Public Counsel believes that any spread of revenue reduction from this case should be more appropriately based on class current revenues.

II. Other Rate Design Issues

Q. IS THERE ANY OTHER ISSUE INCLUDED IN THE COMPANY'S RATE DESIGN PROPOSAL THAT YOU WOULD LIKE TO DISCUSS?

A. Yes. In line 6, page 88 to line 16, page 90 in his rebuttal testimony, Company witness Mr. Richard Kovach proposes that the residential customer charge should be raised from $7.25 to $11.30, a 56% increase. Public Counsel opposes such radical increase in the residential customer charge.

Q. WHY DO YOU OPPOSE THE COMPANY'S PROPOSED INCREASE IN RESIDENTIAL CUSTOMER CHARGE?

A. I believe that the Company does not have convincing evidence that the residential customer charge needs to be raised to the level of $11.30. Costs that should be recovered from customer charges include costs that are directly related to the addition of a new customer, such as costs of meters, services, meter reading, and customer accounting. In calculating the new proposed customer charges, the Company has included many costs that are not directly related to the addition of a new customer. For example, Company included a portion of distribution costs to be recovered from customer charges. I disagree. Distribution costs are demand-related and are most appropriately recovered from demand charges. However, there is no demand charge component in residential rates. Because of the relative homogeneity of the residential customers, it is reasonable to assume that customers with large usage would generally have large demand. Therefore the demand-related cost would be appropriately recovered based on energy usage (commodity charge) in the absence of a demand charge. On the other hand, trying to recover demand-related costs through a customer charge neglects differences in customers' usages and would allocate the same amount of cost to each customer no matter how much or how little energy a customer uses. This is unfair to the low usage and low demand customers.

After removing the portion of distribution cost that are inappropriately included in the customer charge, the Company's calculation of the residential customer charge becomes $8.64.

Q. ARE THERE ANY OTHER REASON THAT OPC OPPOSES THE COMPANY'S PROPOSAL OF A RESIDENTIAL CUSTOMER CHARGE OF $11.30?

A. Yes. Raising a rate component by approximately 60% in a complaint case where other rate components are to be decreased violates the principles of equity and moderateness. The result of such a rate design may lead to some low usage customers actually see an increase in their bills while the Company's total revenue is reduced. This is certainly not a desirable public policy outcome. My proposal to keep the customer charges unchanged while reducing other rate components would ensure all customers benefit from the reduction of the total company revenue.

Q. YOU HAVE PROPOSED AN EXPRIMENTAL TIME-OF-USE (TOU) PROGRAM IN YOUR REBUTTAL TESTIMONY. HOW WOULD TOU RATES AFFECT THE CUSTOMER CHARGE?

A. Customer charges in a TOU rate structure will likely be higher than the standard customer charges because there are more customer-related costs that needs to be recovered such as advanced meters and more frequent meter reading.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.