Exhibit No.:	
Issue(s):	Cost of Service; Rate Design
Witness/Type of Exhibit:	Hong Hu/Surrebuttal
Sponsoring Party:	Public Counsel
Case No.:	ER-2001-299

SURREBUTTAL TESTIMONY

OF

HONG HU

Submitted on Behalf of the Office of the Public Counsel

The Empire District Electric Company

Case No. ER-2001-299

May 17, 2001

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of The Empire District Electric Company's tariff sheets designed to implement a general rate increase for retail electric service provided to customers in the Missouri service area of the company.	)))))	Case No. ER-2001-299

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 surrebuttal testimony consisting of pages 1 through 9.

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 17th day of May, 2001.

Joyce C. Neuner

Notary Public

Joyce C. Neuner
Notary Public, State of Missouri
County of Osage
My Commission Exp. 06/18/2001

TABLE OF CONTENT

SURREBUTTAL TESTIMONY

OF

HONG HU

THE EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2001-299

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

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

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

A. Yes, I filed direct testimony and rebuttal testimony on the issue of cost of service and rate design.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. The purpose of my surrebuttal testimony is to respond to the rebuttal testimonies filed by all parties regarding Class Cost of Service (CCOS) studies and rate design recommendations.

I. COST OF SERVICE STUDY

Q. WHAT IS THE MAIN CONTROVERSY AMONG ALL PARTIES' REBUTTAL TESTIMONIES REGARDING COST OF SERVICE STUDIES?

A. The main controversy among all parties regarding cost of service studies is the appropriate method of allocating production and transmission plant costs. OPC and the Staff criticize the "Average and Excess" ("A&E") methods used by the Company and Praxair because the A&E method produces results that are similar or identical to a peak responsibility method (Watkins rebuttal, page 3; Hu rebuttal, page 5), and because it fails to account for demands in every hour that the production capacity is utilized to serve load (Watkins rebuttal, page 4; Hu rebuttal, page 5). Praxair criticizes both the OPC's 12-month NCP average and peak method and the Staff's time-of-use method.

Q. ON PAGE 3 OF HIS REBUTTAL TESTIMONY, PRAXAIR'S WITNESS MR. BRUBAKER STATED THAT HE WAS CRITICAL OF YOUR ALLOCATION OF GENERATION AND TRANSMISSION FIXED COSTS BECAUSE YOU HAVE NOT "ADDRESSE[D] THE BASIS FOR SELECTING THIS ALLOCATION METHOD" AND BECAUSE THIS METHOD DOES NOT "MIRROR HOW UTILITIES INCUR COSTS". CAN YOU DESCRIBE HOW ELECTRIC PRODUCTION COSTS ARE INCURRED?

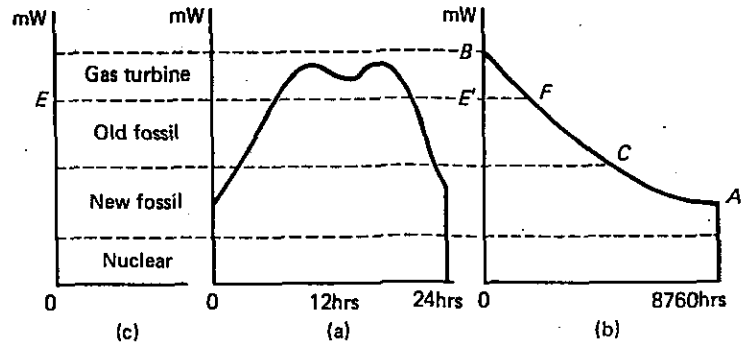
A. Yes. In short, electric utilities choose a mix of different types of electric generation plants to minimize the total generation cost and to satisfy the entire system load. An electric utility's load varies during a day, generally with heavy demand from 10am to 10pm and with much less demand in the night. Load also varies during the year, with heavy demand during the heating and air conditioning seasons. An electric utility usually cannot store its production, and must have the

generators ready to meet those periods of maximum demand. The generation facilities must be in place even if they are expensive to maintain and stand idle for much of the time. The utility needs to serve the entire load, but it does not need the same kind of power plant to meet all of its capacity and energy requirements. Theoretically, the utility would want to minimize the investment it has in plant that is likely to be idle most of the time, and would want the plant that will be in operation most of the time to be as reliable and economical as possible. The solution is to build what are called base load plants to meet the minimum around-the-clock load. Because fixed costs can be spread over many hours of operation, those plants tend to be large and expensive-to-build machines that burn low cost fuels. At the other extreme, the utility builds and runs peaking units for those brief periods of peak demand on the system. Those units are generally inexpensive to build because fixed costs have to be spread over a brief period of usage, but fuel costs often are high. The industry also has an intermediate category of generators that are used less than base load and more than peaking units.

Figuring out how much of each type of plant to build in order to minimize the utility's total production cost is a complicated and dynamic problem. System planning problems are solved typically by engineers using complicated computer programs, and there exists a considerable amount of literature on the subject. A simplified tool for understanding the system planning practice is load and load-duration curves. A load curve plots demands over a given time period. The load-duration curve measures how long a level of demand "lasts" over the year. Figure 1 shows an example of a load curve (a) and a load-duration curve (b). A load-duration curve is obtained by starting with the lowest level of demand on any hour of the year. Since all demands were above this for the rest of the year, this

demand was maintained for the whole year giving point A in Figure 1(b). Similarly, ranking demands in ascending order we are able to plot the whole load-duration curve AB. Thus, at point C, this level of load is maintained for about half the year.

Figure 1. Example of load curve and load-duration curve

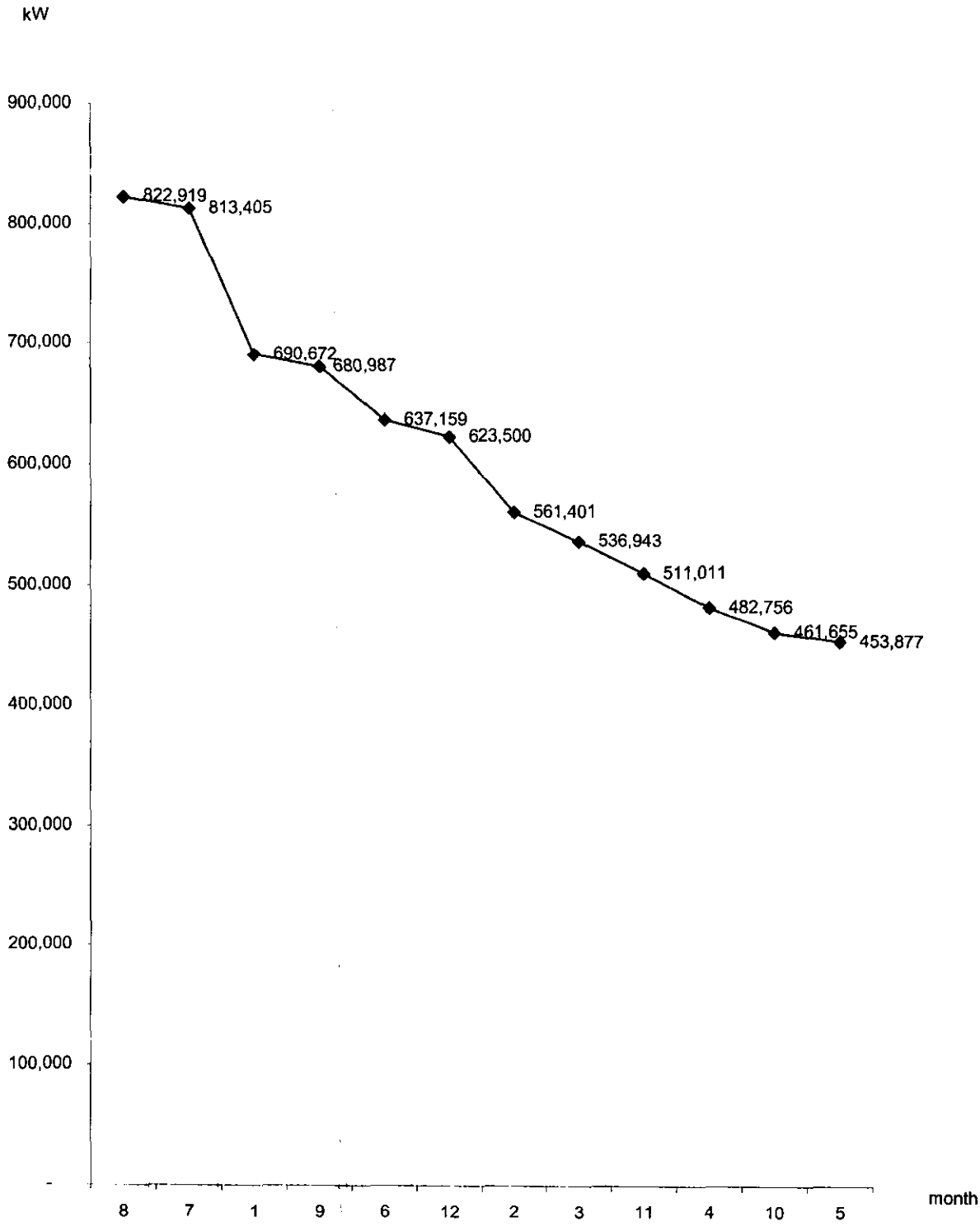


Looking at Figure 1(c), it is clear that the load-duration curve provides a basis for choosing a cost-minimizing plant mix for a given expected load profile. The shape of the load-duration curve is as important as, if not more important than, the magnitude of the peak demand in determining how production costs are to be incurred for an electric utility.

Q. PLEASE EXPLAIN HOW OPC'S METHOD REFLECTS HOW UTILITIES INCUR COSTS.

A. OPC believes that cost allocation should reflect cost causation. Figure 2 on the next page is an approximate load-duration curve for Empire. It is an approximation because it is derived by ranking monthly demands instead of hourly demands. From the curve, we can see that a 453,877 kW load has been served around the year. Therefore, the cost of this portion of production plants should be spread over all hours. Similarly, the portion of production plants that are used to satisfy the additional demand above the base load, should be spread

Figure 2. Empire's Load-Duration Curve



over all hours that these plants are running. For example, loads over 813,405 kW only occurred in two months (July and August), and thus the cost of the peak load facilities that are installed to serve this peak load should be spread only to the hours in these two months. The OPC's method shown in Schedule HH DIR-1 of my direct testimony accomplishes exactly such a task. The peak demands are ranked first to determine their order in the load-duration curve and then the costs are spread accordingly. A method that utilizes hourly demand instead of monthly demand could obtain a more accurate result but I believe the OPC's method produces a reasonably close result. A method that only utilizes the peak demand in production plant cost allocation is much worse at mirroring how utilities incur costs than OPC's method.

Q. ON PAGE 4 OF HIS REBUTTAL TESTIMONY, MR. BRUBAKER WAS ALSO CRITICAL OF YOUR METHOD BECAUSE HE BELIEVED THAT YOU SHOULD USE CLASS SHARE OF COINCIDENT PEAK DEMANDS INSTEAD OF NON-COINCIDENT PEAK DEMANDS IN DEVELOPING THE ALLOCATOR. HAVE YOU EXAMINED THE DIFFERENCE?

A. Yes. I have developed the allocator using class share of coincident peak demands and the difference between the two results is minimal. I have chosen to use non-coincident peak demands because it is likely to be a better representation of the class share of total hours that any production facility are utilized in a certain month.

Q. ON PAGE 5 OF HIS REBUTTAL TESTIMONY, MR. BRUBAKER INDICATED THAT YOUR METHOD "HAVE NO CLAIM TO ACCURACY OR THE REPRESENTATION OF COST CAUSATION" BECAUSE IT "GIVE[S] SIGNIFICANT WEIGHT TO LOADS OCCURING IN OFF-PEAK HOURS AND IN OFF-PEAK MONTHS". DO YOU AGREE?

A. No. The goal here is to allocate the total cost of the entire production system, not only the cost of some peak units that are needed in the peak months. As shown in Mr. Brubaker's own Schedule 1 in his direct testimony, 5 months in 1999, 7 months in 1998, 6 months in 1997, and 9 months in 1996 had loads that exceeded 80% of the maximum system loads. It is only reasonable that all hours that the production facility is running receive some weight, with peak months receiving more weights than non-peak months. That is what OPC's method does. I do not believe a method that gives the entire weight to one single peak month can be representative of cost causation, and that is what the "A&E" method advocated by Mr. Brubaker (or its equivalent "single peak responsibility" method) does.

Q. MR. BRUBAKER INDICATED ON PAGE 5 THAT THAT THE "AVERAGE AND PEAK" METHOD IS NOT CORRECT BECAUSE IT USES THE TOTAL PEAK DEMAND RATHER THAN THE DIFFERENCE BETWEEN AVERAGE DEMAND AND CUSTOMER CLASS PEAK DEMAND, AND THUS IT DOUBLE COUNTS AVERAGE DEMAND. DO YOU AGREE WITH HIM?

A. No. "Average and Peak" method is effectively a weighted average of the two numbers: class peak demand and class average demand. You do not subtract one number from the other number when you try to obtain a weighted average of two numbers. This does not mean you have double counted one number or another. In fact, the resulted allocation factor for any customer class from the "Average and Peak" method will always be between the corresponding allocation factors

from an allocation based on average demand and an allocation based on a single peak demand.

Q. IN HIS CRITICISM OF THE STAFF'S TIME-OF-USE METHOD ON PAGE 6 OF HIS REBUTTAL TESTIMONY, MR. BRUBAKER IMPLIED THAT THE OFF-PEAK HOURS SHOULD NOT RECEIVE ANY ALLOCATION OF PRODUCTION AND TRANSMISSION COST BECAUSE "THEY WOULD NOT CAUSE THE NEED FOR THE ADDITION OF GENERATION OR TRANSMISSION CAPACITY". DO YOU AGREE?

A. No. The fixed cost of the production and transmission facilities should be spread across all hours that such facilities are running. According to Mr. Brubaker's rational, if one only uses electricity in off-peak hours, he should be allowed to use the production and transmission facilities for free. Only those customers who happen to use electricity in the peak hour should be responsible for the entire production and transmission plant cost. It should be remembered that there are 7680 hours per year. It is not reasonable to let customers who use electricity in one certain hour to pay for the entire common cost of production and transmission facilities and let other customers who use electricity in other 7679 hours to get a free ride. Nobody should receive a free ride. One should be responsible for some cost of a facility as long as one is utilizing the facility.

Q. ON PAGES 8 THROUGH 9, MR. BRUBAKER INDICATED THAT THE "TRADITIONAL COST ALLOCATION" APPROACH IS REASONABLE TO ALLOCATE ENERGY COSTS EQUALLY ACROSS ALL CUSTOMER CLASSES ON AN EQUAL CENTS PER KILOWATTHOUR BASIS, AND ALLOCATE FIXED COSTS EQUALLY ACROSS ALL CUSTOMER CLASSES ON A UNIFORM DOLLARS PER KILOWATT OF DEMAND BASIS. WHAT WOULD BE A MORE REASONABLE APPROACH?

A. I believe a more reasonable approach would be to allocate energy costs equally across all customer classes on an equal cents per kilowatthour basis, and allocate fixed costs equally across all customer classes on a uniform dollars per kilowatthour of system utilization basis.

II. RATE DESIGN

Q. COMPANY WITNESS DAVID GIBSON STATED THAT "DUE TO THE SIZE OF THE PROPOSED RATE INCREASE AND THE FACT THAT FUEL AND PURCHASED POWER IS SUCH A LARGE COMPONENT OF EMPIRE'S COST STRUCTURE, AN EQUAL PERCENTAGE RATE INCREASE SHOULD BE GIVEN TO ALL CUSTOMERS". DO YOU AGREE?

A. No. The energy component of an average industrial customer's electric bill is much larger than that of an average residential customer's bill. Because Empire's proposed revenue increase is largely due to an increase in the cost of fuel and purchased power and the fuel and purchased power cost is directly related to the amount of energy consumption, a larger increase for the energy consumption rate component should be expected. Therefore, a bigger share of the revenue increase for the customer groups who use relatively more energy should also be expected. On the contrary, the company's proposal is an equal percentage increase for all

rate groups. It would shift disproportionate share of the increase to the residential customers and small general customers.

Q. PARTIES HAVE RECOMMENDED IN A NON-UNANIMOUS STIPULATION AND AGREEMENT THAT A INTERIM ENERGY CHARGE (IEC) SHOULD BE COLLECTED FROM RATES ON AN INTERIM AND SUBJECT TO TRUE-UP AND REFUND BASIS. WHAT IS OPC'S REOMMENDATION REGARDING HOW THE IEC SHOULD BE INCORPORATED IN THE OVERALL RATE DESIGN IN THE EVENT THAT THE COMMISSION APPROVES THE STIPULATION AND AGREEMENT?

A. OPC recommends spreading the revenue increase excluding IEC revenue according to the OPC's rate design methodology as described in my testimonies. Then the IEC should be allocated to each class on the basis of $0.0054 per kWh and it should be reflected separately on all Empire Missouri rate schedules as was agreed in the Stipulation and Agreement.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.