Exhibit No.: _____

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

DIRECT TESTIMONY

OF

HONG HU

Submitted on Behalf of the Office of the Public Counsel

THE EMPIRE DISTRICT ELECTRIC COMPANY

Case No. ER-2001-299

April 10, 2001

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of the application of The Empire District Electric Company for a general rate increase.	)))	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 direct testimony consisting of pages 1 through 15 and Schedules HH DIR-1 and HH DIR-2.

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.

Hong Hu

Subscribed and sworn to me this 10th day of April, 2001.

Nila S. Hagemeyer, Notary Public

NILA S HAGEMEYER
NOTARY PUBLIC STATE OF MISSOURI
COLE COUNTY
MY COMMISSION EXP. OCT. 14,2003

DIRECT TESTIMONY

OF

HONG HU

EMPIRE DISTRICT ELECTRIC COMPANY

CASE NO. ER-2001-299

TABLE OF CONTENTS

DIRECT TESTIMONY
OF
HONG HU

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, P. O. Box 7800, Jefferson City, Missouri 65102.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND EMPLOYMENT BACKGROUND.

A. I hold a Bachelor of Engineering degree in Management of Information Systems from Tsinghua University of Beijing, China and a Masters of Arts degree in Economics from Northeastern University. I have completed the comprehensive exams for a Ph.D. in Economics from the University of Missouri at Columbia. I have been employed as a regulatory economist with the Office of Public Counsel (Public Counsel, OPC) since March 1997.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THIS COMMISSION?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my direct testimony is to present Public Counsel's Class Cost of Service (CCOS) study results and rate design recommendations.

I. CLASS COST OF SERVICE STUDY

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

A. The main purpose of a CCOS Study is to determine the relative class cost responsibility for each customer class by allocating costs in a reasonable manner. CCOS study results provide guidance for determining how rates (e.g., customer charges) should be designed to collect revenues from customers within a class, depending on customer usage levels and patterns.

Q. PLEASE OUTLINE THE BASIC ELEMENTS OF THE CCOS STUDY THAT YOU PERFORMED FOR THIS CASE.

A. The three primary steps that must be taken in order to perform a CCOS Study are the functionalization, classification, and allocation of costs.

Functionalization of costs involves categorizing accounts by the type of function with which an account is associated. Accounts are categorized as being related to Production, Transmission, Distribution, Customer Accounts, Administrative and General, etc., depending on the electric utility functions of which they are a part.

Once costs have been functionalized, they are classified as being customer (related to the number of customers), demand (related to the portion of peak usage), commodity (related to annual energy consumption), or "other" costs,

depending on the function with which they are associated. For example, customer records and collection expense, meter plant, and meter reading expense are considered customer-related, since company expenditures in these areas are related to the number of customers that it serves. These expenses, although dependent to some extent on a customer's size, will be incurred for each customer whether or not the customer uses any electricity so it would not be reasonable to classify them as being commodity-related.

Finally, after costs have been classified, the analyst chooses allocation factors that will allocate a reasonable share of jurisdictional costs to each customer class. Allocation factors are based on ratios that represent the proportion of total units (total number of customers, total annual energy consumption, etc.) attributable to a certain customer class. These ratios are then used to calculate the proportions of various cost categories for which a class is responsible.

Q. WHICH CUSTOMER CLASSES HAVE YOU USED IN YOUR CCOS STUDY?

A. I have used the Residential, Commercial, Small Heating, General Power, Total Electric Building (TEB), Large Power, Electric Furnace (PF), Feed Mill (PFM), Special Contract (i. e. Praxair), Lighting (includes Municipal Street Lighting, Private Lighting and Special Lighting), and Miscellaneous Service classes.

Q. ON WHAT DATA IS YOUR CCOS STUDY BASED?

A. My CCOS study is based on accounting schedules filed by the Staff on April 3, 2001, for the test year ending December 31, 2000. My allocation factors were developed based on information obtained from the Company.

Q. WHAT IS INTANGIBLE PLANT AND HOW WAS INTANGIBLE PLANT ALLOCATED?

A. Intangible Plant (FERC Account No. 301) pertains to organization cost. It includes all fees paid to federal or state governments for the privilege of incorporation along with related expenditures. It should be allocated to each customer class according to the benefits each receives from the existence of this business, or according to the extent to which each class contributes to the overall cost of conducting the business. Therefore, I applied a composite total cost of service allocator to Intangible Plant.

Q. WHAT IS PRODUCTION PLANT AND HOW WAS PRODUCTION PLANT ALLOCATED?

A. Production Plant includes the cost of land, structures and equipment used in connection with power generation. Both demand and energy characteristics of a system's loads are important determinants of production plant costs. In previous cases, the Commission had accepted the Time of Use (TOU) method as the most reasonable method for allocating the production costs of serving various customer classes. In this case I chose to allocate the Production Plant according to the 12 month non-coincident peak (NCP) average and peak allocators that I calculated. I chose this method because it is a reasonable approximation to the more accurate TOU method. The details of the calculation are provided in Schedule DIR HH-1.

Q. WHAT IS TRANSMISSION PLANT AND HOW DID YOU ALLOCATE IT?

A. Transmission Plant includes the cost of land, structures and equipment used in connection with transmission operations. Transmission facilities are installed to provide reliable service throughout the year including periods of scheduled maintenance. It is sometimes also a substitute for generation and can be used to

minimize the cost of generation facilities through the sales or purchase of power. Therefore, Transmission Plant costs can be equitably allocated on the same basis as the Production Plant. Accordingly, I chose to use the same 12 month NCP average and peak allocator that I used for Production Plant to allocate Transmission Plant.

Q. WHAT IS DISTRIBUTION PLANT AND HOW DID YOU ALLOCATE IT?

A. Distribution Plant includes the cost of land, structures and equipment used in connection with distribution operations. Distribution plant equipment reduces high-voltage energy from the transmission system to lower voltages, delivers it to the customer and monitors the amounts of energy used by the customer. Many of the distribution costs associated with providing service to electric utility customers are not directly assignable to a particular class. With the exception of service drops and meters, most of the facilities between the utility customer's point-of-service and the distribution substation are shared facilities. In other words, no portion of such facilities are directly related to the number of customers. For example, conductors are sized to meet the demands at each location they are employed in the distribution grid. A specific level of demand may be the result of one customer or twenty customers. Therefore, such costs are best classified as demand related, rather than customer related. Furthermore, since distribution systems are designed to meet more localized peak demand instead of system-wide peak demand, such costs are best allocated based upon non-coincident peak demand.

In the functionalization and allocation of Distribution Plant, I also recognized that distribution facilities provide service at two voltage levels: primary and secondary, and that some large industrial customers may choose to take service at

primary voltages because of their large electrical requirements. Different allocation factors were used for allocating costs at different levels of the distribution system.

Meter facilities costs are generally believed to be related to each individual customer. New investment occurs when a new customer is added to the system. Therefore, meter costs are usually classified as customer related. Since large customers require large meters and some large customers use multiple meters, I allocated the meters account based upon meter numbers weighted by meter cost for different customer classes. Service facilities are also classified as customer related. Since data regarding the number of service drops was not available, I chose to use customer numbers weighted by the cost of service drops for different customer classes in the allocation of the services account. Since primary customers take service directly at primary voltages, no cost of service drops were allocated to the Primary class.

The functional categories for Distribution Plant are as follows:

360-362	Distribution Substations	Demand at Primary Station
364	Poles Towers and Fixtures	Demand at Primary
		Demand at Secondary
365	Overhead Conductors & Devices	Demand at Primary
		Demand at Secondary
366	Underground Conduit	Demand at Primary
		Demand at Secondary
367	Underground Conductors & Devices	Demand at Primary
		Demand at Secondary
368	Line Transformers	Transformer Demand
369	Services	Weighted Customer Count
370	Meters	Weighted Meter Count
371	Installation on Customer Premises	Direct Assign to Industrial
373	St. Lighting & Signal Systems	Direct Assign to Lighting

Q. HOW DID YOU ALLOCATE GENERAL PLANT?

A. General Plant includes land, structures and equipment used in support of Production, Transmission and Distribution Plant. Therefore, it was allocated by a composite allocator based on previously allocated net non-general plant.

Q. PLEASE DISCUSS THE METHODS THAT YOU USED TO ALLOCATE EXPENSES.

A. Expenses were directly assigned if possible. For the expenses that could not be directly assigned, consistent with the principle that "expenses follow plant", the allocators that were applied to the expenses accounts were the same as those applied to the Production, Transmission, and Distribution Plant accounts to which the expenses are related.

Q. HOW DID YOU ALLOCATE POWER PRODUCTION EXPENSES?

A. Power Production Expenses were broken down into demand-related and energy-related production and purchased power costs. The demand-related expenses were allocated based on the 12 month NCP average and peak allocators. The energy-related expenses were allocated based on kwhs at generation.

Q. HOW WERE TRANSMISSION EXPENSES ALLOCATED?

A. Transmission Expenses were allocated according to the "expenses follow plant" principle. The allocators applied to transmission expenses were the same as those I applied to the plant associated with those expenses.

Q. HOW WERE DISTRIBUTION EXPENSES ALLOCATED?

A. Distribution Expenses were allocated according to the "expenses follow plant" principle. The allocators applied to distribution expenses were the same as those I applied to the plant associated with those expenses. For expenses that are not associated with any particular category of distribution plant, such as supervision and engineering, I used an allocator based on the corresponding allocated distribution expenses.

Q. HOW DID YOU ALLOCATE CUSTOMER ACCOUNTS EXPENSES?

A. I allocated Customer Records & Collections (Account 903) to all customer classes based on unweighted customer numbers. I used data from the Company's study to calculate the allocator for Meter Reading (Account 902) and Uncollectible Accounts (Account 904).

Q. HOW DID YOU ALLOCATE CUSTOMER SERVICE EXPENSES AND SALES EXPENSES?

A. Customer Assistance and Advertising Expenses (Account 913) were allocated to all customer classes based on weighted customer numbers. Other customer accounts were allocated to all customer classes based on unweighted customer numbers. Demonstrating & Selling Expenses (Account 912) was allocated to the industrial customer classes only. Supervision and miscellaneous sales accounts were allocated to all customer classes based on the corresponding allocated customer service or sales expenses.

Q. HOW WERE ADMINISTRATIVE AND GENERAL (A & G) EXPENSES ALLOCATED?

A. Property Insurance expense (Account 924) was allocated on the basis of net plant since this expense is linked to the amount of net plant already allocated to each customer class. Maintenance of General Plant (Account 935) was allocated on the basis of gross plant since this expense is linked to the amount of gross plant allocated to each customer class. Injuries and Damages and Employee Pensions and Benefits (Accounts 925 and 926) are both payroll related expenses so I allocated them on the basis of the amount of payroll expense that I had previously allocated to each class. Rents (Account 931) was allocated based data from the Company's study. I believe all of the remaining A & G accounts represent expenditures that support the company's overall operation, so I have allocated them based on each class' share of total cost of service.

Q. HOW DID YOU ALLOCATE PROPERTY AND PAYROLL TAXES?

A. I allocated property taxes on the basis of allocated total net plant and payroll taxes on the basis of allocated payroll expenses.

Q. HOW DID YOU ALLOCATE STATE AND FEDERAL INCOME TAXES?

A. These taxes were allocated on the basis of rate base since a utility company's income taxes will be a function of the size of its rate base, and thus each class should contribute revenues for income taxes in proportion with the amount of rate base that is necessary to serve it.

Q. PLEASE DESCRIBE THE RESULTS OF PUBLIC COUNSEL'S CLASS COS STUDY.

A. Schedule HH DIR-2.1 shows the results of Public Counsel's Class COS Study which was based on the assumption that total company revenues remain constant. Line 18 of this schedule shows the current rate of return of each aggregated customer class. Our result shows that the Residential, SGS (Commercial & Small Heating) and LGS (General Power and TEB) classes are providing operating revenues above their cost of service. Special Contract (Praxair), Large Power and Other classes (Electronic Furnace, Feed Mill, Misc and Other Lighting) are providing lower rates of return than the system-wide average. Line 36 of Schedule HH DIR-2.1 shows the percentage by which rate revenues in each class would have to change in order to make all customer class rates of return equal to the company's overall rate of return. Line 35 of Schedule HH DIR-2.1 shows the revenue shifts that would be needed to equalize class rates of return. This information from lines 18, 35 and 36 of Schedule HH DIR-2.1 is summarized below in Table 1.

Table 1 – COS Indicated Revenue Neutral Class Revenue Shifts

	TOTAL	Residential	SGS (Commercial & Small Heating)	LGS (Gen Power & TEB)	Special Contract (Praxair)	Large Power	Other (PFM, PF, Misc, & Ltg)
Class Rate of Return	7.88%	8.52%	9.37%	9.18%	-2.75%	2.96%	1.44%
Revenue Neutral Shift	(0)	(1,225,951)	(886,595)	(1,341,434)	326,928	2,153,457	973,595
%	0.00%	-1.32%	-3.12%	-2.72%	27.39%	8.95%	25.00%

II. RATE DESIGN RECOMMENDATIONS

Q. DOES PUBLIC COUNSEL HAVE ANY GUIDING PRINCIPLES THAT IT GENERALLY FOLLOWS WHEN MAKING RECOMMENDATIONS IN RATE DESIGN CASES?

A. In previous rate design cases, Public Counsel has recommended that the Commission should adopt a rate design that balances movement towards cost of service with rate impact and affordability considerations. To reach such a balance, Public Counsel believes that the Commission should impose, at a maximum, revenue shifts equal to one half of the revenue neutral shifts indicated by Public Counsel's CCOS study. Also, to address affordability and rate impact considerations, no class should receive a net decrease (the combined effect of revenue neutral shifts and overall revenue requirement change) in its revenue requirement while there is a total company revenue requirement increase. Similarly, no class should receive a net increase in its revenue requirement while there is a total company revenue requirement decrease.

Q. WHAT RATE DESIGN CHANGES IS PUBLIC COUNSEL PROPOSING BASED ON THE REVENUE SHIFTS NEEDED TO EQUALIZE CLASS RATES OF RETURN INDICATED IN TABLE 1?

A. Public Counsel's CCOS study indicated a class revenue requirement decrease for the residential, SGS and LGS classes and a significant increase for the Special Contract, Large Power and Other classes. I believe that it would be appropriate that a movement toward the cost of service be implemented.

Q. ASSUMING NO CLASS WOULD RECEIVE A NET DECREASE FROM THE COMBINED EFFECT OF REVENUE NEUTRAL SHIFTS AND THE OVERALL REVENUE REQUIREMENT INCREASE, WHAT REVENUE NEUTRAL CLASS REVENUE SHIFTS IS PUBLIC COUNSEL RECOMMENDING IN THIS CASE?

A. Public Counsel recommends a revenue neutral class revenue shift that moves halfway toward each class's cost of service. These shifts are shown in lines 5 of Schedule HH DIR-2.2 and have also been summarized below in table 2. For example, Public Counsel's study indicated that, on a revenue neutral basis, the revenues for the residential class would need to be reduced by $1,225,951 to bring its return down to the total system rate of return. However, Public Counsel is recommending that residential revenues be reduced by one-half that amount, or $612,975.

Table 2 – OPC Recommended Revenue Neutral Class Revenue Shifts

	TOTAL	Residential	SGS (Commercial & Small Heating)	LGS (General Power & TEB)	Special Contract (Praxair)	Large Power	Other (PFM, PF, Misc, & Ltg)
OPC Recommended Revenue Neutral Shift	0	(612,975)	(443,298)	(670,717)	163,464	1,076,728	486,797
% Class Revenue Change of Revenue Neutral Shift	0.00%	-0.66%	-1.56%	-1.36%	13.70%	4.48%	12.50%
Class Revenue Share after Revenue Neutral Shift	100.00%	46.13%	14.02%	24.40%	0.68%	12.58%	2.19%

Q. PLEASE DESCRIBE THE INFORMATION CONTAINED IN LINE 9 THROUGH LINE 15 OF SCHEDULE HH DIR-2.22 AND EXPLAIN HOW IT WAS CALCULATED.

A. In Schedule HH DIR-2.2, lines 9 to 15 show two examples of the combined impact of spreading the revenue requirement increase amounts among the

customer classes and the revenue neutral class revenue shifts recommended by Public Counsel. Lines 10 through 11 of this Schedule illustrate how total company revenue requirement increases are spread to the various customer classes at $17 million and at $40 million. The spread of these total company revenue requirement change amounts is based on the percentages that appear in line 7.

For each revenue requirement increase, the combined impact was derived by adding each class' share of the overall revenue requirement increase to the revenue neutral shifts that Public Counsel has recommended for each class. For example, adding the residential revenue neutral shift in line 5, -$612,975, to the residential share of an $17 million revenue increase in line 10, $7,841,617, yields the $7,228,642 figure shown under the Residential column in line 14. In these two examples there is no customer class receiving a net revenue decrease at an overall revenue requirement increase.

Q. PLEASE SUMMARIZE PUBLIC COUNSEL'S RATE DESIGN RECOMMENDATION FOR THE CLASS REVENUE REQUIREMENTS THAT SHOULD GO ALONG WITH ANY INCREASE IN OVERALL REVENUE REQUIREMENT THAT THE COMMISSION DETERMINES TO BE REASONABLE IN THIS CASE.

A. In this testimony, Public Counsel has proposed and illustrated the application of a method for increasing or decreasing class revenue requirements to accompany any increase or decrease in the overall revenue requirement. This method could be utilized to calculate class revenue requirements for any level of overall revenue requirement increase or reduction that might be ultimately decided in this case. Schedule HH DIR-2.2 shows the result of applying Public Counsel's recommended method for determining class revenue requirements at two different levels of revenue requirement increase ($17 million and $40 million). The final

results of applying Public Counsel's method appear in lines 14 and 15 of Schedule HH DIR-2.2 and are also shown below in Table 3.

Table 3 – OPC Recommended Class Revenue Requirements Increases

Associated With $17 million & $40 million Overall Revenue Increases

	TOTAL	Residential	SGS (Commercial & Small Heating)	LGS (Gen Power & TEB)	Special Contract (Praxair)	Large Power	Other (PFM, PF, Misc, & Ltg)
17 Mil Increase	17,000,000	7,228,642	1,939,676	3,477,235	278,964	3,215,770	859,712
40 Mil Increase	40,000,000	17,837,889	5,163,700	9,089,170	435,229	6,109,768	1,364,244

Q. DID YOU PERFORM ANY ANALYSIS COMPARING THE $9.15 RESIDENTIAL CUSTOMER CHARGE TO THE CUSTOMER-RELATED COSTS THAT ARE ATTRIBUTABLE TO THE TYPICAL RESIDENTIAL CUSTOMER?

A. Yes, my analysis showed that the customer-related cost, which is one of the factors considered in the determination of a customer charge level, is $10.15 for Residential class.

Q. WHAT CATEGORIES OF COSTS ARE INCLUDED IN YOUR CUSTOMER CHARGE ANALYSIS?

A. I have included costs that are related to services, meters, meter installations, and customer accounts expenses. The costs associated with services, meters, and meter installations include the return on rate base for the relevant plant accounts, distribution operation and maintenance expenses associated with services, meters, and meter installations, plus the depreciation expense, payroll benefits, and property taxes associated with services, meters, and regulators.

Q. WHAT IS PUBLIC COUNSEL'S PROPOSAL FOR THE CUSTOMER CHARGE FOR RESIDENTIAL CUSTOMERS?

A. Public Counsel believes that the current residential customer charge is supported by my CCOS study and can be raised by the residential class revenue increase percentage if a revenue requirement increase is approved by the Commission. We are not making any recommendations at this time regarding customer charges for the other customer classes.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Calculation of NCP Peak and Average Allocators

			oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	
		annual energy	Monthly NCP Demands												
41.46%	RG	1,677,744,098	219,626	213,885	369,177	414,128	279,702	338,784	226,802	223,767	316,534	395,883	477,998	402,675	3,878,961
8.77%	CB	354,740,918	57,421	56,221	70,939	60,370	55,149	62,078	59,438	62,655	80,256	90,407	100,930	88,660	844,524
3.16%	SH	127,841,278	20,026	18,742	33,536	37,631	28,783	32,318	19,185	19,473	24,598	28,971	30,831	25,336	319,430
18.64%	GP	754,408,522	90,303	118,432	112,570	113,029	108,768	119,832	115,692	122,333	131,582	147,618	142,754	138,361	1,461,274
0.05%	PF	2,138,632	2,255	2,408	2,262	2,414	2,255	2,195	2,155	2,302	2,279	2,219	2,328	2,265	27,337
1.31%	Prax	53,196,146	6,987	7,003	6,755	7,179	6,880	7,886	6,820	7,185	6,300	8,084	8,080	7,759	86,918
7.70%	TEB	311,709,412	44,833	48,237	71,242	66,096	58,479	53,653	42,347	49,115	50,795	60,852	64,640	56,405	666,694
0.03%	PFM	1,084,220	389	451	487	418	329	400	316	290	401	613	440	460	4,994
17.79%	LP	719,814,000	83,936	82,658	81,454	83,242	84,966	84,896	88,332	88,740	94,692	99,143	97,553	95,524	1,065,136
0.01%	MS	477,668	57	57	57	58	57	57	57	56	58	58	58	58	688
1.07%	SPL,PL,SPL	43,143,855	10,221	9,230	8,621	8,579	9,280	11,479	10,665	12,099	16,683	16,283	13,453	11,515	138,108
100.00%	Sum	4,046,298,749	536,054	557,324	757,100	793,144	634,648	713,578	571,809	588,015	724,178	850,131	939,065	829,018	8,494,064

MO System "Load Factor" 56.13%

Monthly Percentage of Monthly Sum of NCP Demands

		40.97%	38.38%	48.76%	52.21%	44.07%	47.48%	39.66%	38.05%	43.71%	46.57%	50.90%	48.57%
8760	822,919	10.71%	10.09%	9.37%	7.61%	8.69%	8.70%	10.39%	10.66%	11.08%	10.63%	10.75%	10.69%
hrs/yr	cp	3.74%	3.36%	4.43%	4.74%	4.54%	4.53%	3.36%	3.31%	3.40%	3.41%	3.28%	3.06%
		16.85%	21.25%	14.87%	14.25%	17.14%	16.79%	20.23%	20.80%	18.17%	17.36%	15.20%	16.69%
		0.42%	0.43%	0.30%	0.30%	0.36%	0.31%	0.38%	0.39%	0.31%	0.26%	0.25%	0.27%
		1.30%	1.26%	0.89%	0.91%	1.08%	1.11%	1.19%	1.22%	0.87%	0.95%	0.86%	0.94%
		8.36%	8.66%	9.41%	8.33%	9.21%	7.52%	7.41%	8.35%	7.01%	7.16%	6.88%	6.80%
		0.07%	0.08%	0.06%	0.05%	0.05%	0.06%	0.06%	0.05%	0.06%	0.07%	0.05%	0.06%
		15.66%	14.83%	10.76%	10.50%	13.39%	11.90%	15.45%	15.09%	13.08%	11.66%	10.39%	11.52%
		0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
		1.91%	1.66%	1.14%	1.08%	1.46%	1.61%	1.87%	2.06%	2.30%	1.92%	1.43%	1.39%

Monthly NCP Demands Reordered Descending Order

													(2) NCP Allocator	(3) NCP A&P Allocator
		8	7	9	1	12	6	3	2	5	4	11	10	46.59%	43.71%
		939,065	850,131	829,018	793,144	757,100	724,178	713,578	634,648	588,015	571,809	557,324	536,054	10.04%	9.32%
		88934	21113	35874	36044	32922	10600	78930	46633	16206	14485	21270	536054	3.70%	3.40%
		1	2	3	4	5	6	7	8	9	10	11	12	16.87%	17.86%
		88934	10557	11958	9011	6584	1767	11276	5829	1801	1449	1934	44671	0.31%	0.16%
		9.47%	1.12%	1.27%	0.96%	0.70%	0.19%	1.20%	0.62%	0.19%	0.15%	0.21%	4.76%	0.99%	1.17%
		20.85%	11.38%	10.25%	8.98%	8.02%	7.32%	7.13%	5.93%	5.31%	5.12%	4.96%	4.76%	7.70%	7.70%
														0.06%	0.04%
														12.15%	15.32%
Sort Back to Original Order		10	11	12	1	2	3	4	5	6	7	8	9	0.01%	0.01%
(1) Monthly Shares of Incremental Demands		4.76%	4.96%	8.02%	8.98%	5.93%	7.13%	5.12%	5.31%	7.32%	11.38%	20.85%	10.25%	1.59%	1.30%

1 The calculation involves ordering the monthly NCP Demands above, forming differences or increments of demand, then dividing those increments by the number of months in which they occur.
Then calculating the percentages that the increments represent of the largest sum of NCP demands. The portions (percentages) occuring in each month are added together for each month to obtain the monthly shares of

2 Each class's NCP allocator is the sum of the products of the monthly shares of the incremental demands and the class's monthly percentages of the total CP demands for that month.

3 The NCP peak & average allocator is a weighted average of the annual energy usage fraction and the NCP allocator. It is equal to "Load Factor" * Energy Share + (1 - "Load Factor") * NCP Allocator

OPC CCOS Study Summary

10-Apr-01	TOTAL	Residential	SGS (Commercial & Small Heating)	LGS (Gen Power & TEB)	Special Contract (Praxair)	Large Power	Other (PFM, PF, Misc, & Ltg)
1 O & M EXPENSES	125,395,809	56,279,458	15,975,875	31,078,799	1,345,544	18,548,714	2,167,419
2 DEPREC. & AMORT. EXPENSE	18,457,279	8,206,619	3,814,105	3,890,611	98,950	1,617,324	829,670
3 TAXES	22,434,389	10,629,497	3,058,545	5,308,395	178,753	2,570,934	688,265
4							
5 TOTAL EXPENSES AND TAXES	166,287,477	75,115,574	22,848,525	40,277,806	1,623,246	22,736,973	3,685,353
6							
7 CURRENT RATE REVENUE	199,731,289	92,743,347	28,440,617	49,404,587	1,193,537	24,054,659	3,894,542
8 OFFSETTING REVENUES:							
9 Reveue Credits	526,986	0	0	140,997	342,912	43,077	0
10							
11 TOTAL CURRENT REVENUE	200,258,275	92,743,347	28,440,617	49,545,584	1,536,449	24,097,736	3,894,542
12 CLASS % OF CURRENT REVENUE	100.00%	46.31%	14.20%	24.74%	0.77%	12.03%	1.94%
13							
14 OPERATING INCOME	33,970,798	17,627,773	5,592,092	9,267,778	(86,797)	1,360,763	209,189
15							
16 TOTAL RATE BASE	431,141,166	206,909,374	59,675,052	100,956,041	3,156,269	45,943,679	14,500,751
17							
18 IMPLICIT RATE OF RETURN	7.88%	8.52%	9.37%	9.18%	-2.75%	2.96%	1.44%
19							
20 OPC RECOMMENDED RATE OF RETURN	8.88%	8.88%	8.88%	8.88%	8.88%	8.88%	8.88%
21							
22 REQUIRED OPERATING INCOME							
23 Equalized (OPC) Rates of Return	38,285,336	18,373,552	5,299,145	8,964,896	280,277	4,079,799	1,287,667
24							
25 TOTAL COST OF SERVICE	204,572,813	93,489,126	28,147,670	49,242,702	1,903,523	26,816,771	4,973,020
26 CLASS % of COS	100.00%	45.70%	13.76%	24.07%	0.93%	13.11%	2.43%
27							
28 Allocation of difference between							
29 current revenue and recommended revenu	4,314,538	1,971,730	593,648	1,038,552	40,146	565,578	104,883
30 MARGIN REVENUE REQUIRED							
31 to Equalize Class ROR - Revenue Neutral	200,258,275	91,517,396	27,554,022	48,204,150	1,863,377	26,251,193	4,868,137
32							
33 COS LESS OFFSETTING REVENUES	199,731,289	91,517,396	27,554,022	48,063,153	1,520,465	26,208,116	4,868,137
34							
35 COS INDICATED REVENUE NEUTRAL SHIFT	0	(1,225,951)	(886,595)	(1,341,434)	326,928	2,153,457	973,595
36 % REVENUE NEUTRAL RATE INCREASE	0.00%	-1.32%	-3.12%	-2.72%	27.39%	8.95%	25.00%
37 CLASS % OF REVENUE AFTER REVENUE SHIFT	100.00%	45.82%	13.80%	24.06%	0.76%	13.12%	2.44%

OPC Rate Design Summary

10-Apr-01		TOTAL	Residential	SGS (Commercial & Small Heating)	LGS (Gen Power & TEB)	Special Contract (Praxair)	Large Power	Other (PFM, PF, Misc, & Ltg)
1	COS INDICATED RATE REVENUE INCREASE	0	(1,225,951)	(886,595)	(1,341,434)	326,928	2,153,457	973,595
2	COS REQUIRED % RATE REVENUE INCREASE	0.00%	-1.32%	-3.12%	-2.72%	27.39%	8.95%	25.00%
3	CLASS % OF REVENUE AFTER REVENUE SHIFT	100.00%	45.82%	13.80%	24.06%	0.76%	13.12%	2.44%
4								
5	OPC RECOMMENDED REVENUE NEUTRAL SHIFT	0	(612,975)	(443,298)	(670,717)	163,464	1,076,728	486,797
6	OPC RECOMMENDED % RATE REVENUE INCREASE	0.00%	-0.66%	-1.56%	-1.36%	13.70%	4.48%	12.50%
7	CLASS % OF REVENUE RECOMMENDED BY OPC	100.00%	46.13%	14.02%	24.40%	0.68%	12.58%	2.19%
8								
9	SPREAD OF REVENUE DECREASE/INCREASE							
10	17 Mil Increase	17,000,000	7,841,617	2,382,974	4,147,952	115,500	2,139,042	372,915
11	40 Mil Increase	40,000,000	18,450,864	5,606,997	9,759,887	271,765	5,033,040	877,447
12								
13	COMBINED IMPACT OF REVENUE INCREASE AND OPC REVENUE NEUTRAL SHIFT							
14	17 Mil Increase	17,000,000	7,228,642	1,939,676	3,477,235	278,964	3,215,770	859,712
15	40 Mil Increase	40,000,000	17,837,889	5,163,700	9,089,170	435,229	6,109,768	1,364,244