BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of Missouri Public Service tariff sheets designed to increase rates for gas service provided to customers in the Missouri service area of the company.	))))	Case No. GR-93-172

AFFIDAVIT OF PHILIP B. THOMPSON

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Philip B. Thompson of lawful age, being first duly sworn, deposes and states:

1. My name is Philip B. Thompson. I am Chief 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 21 and Schedules 1 through 4.

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.

Philip B. Thompson

Subscribed and sworn to me this 28th day of May, 1993.

Bobbie J. Richards
Notary Public

My commission expires November 3, 1996.

BOBBIE J RICHARDS
NOTARY PUBLIC STATE OF MISSOURI
COLE COUNTY
MY COMMISSION EXP. NOV 3,1996

DIRECT TESTIMONY

OF

PHILIP B. THOMPSON

MISSOURI PUBLIC SERVICE

CASE NO. GR-93-172

Q. Please state your name and business address.

A. Philip B. Thompson, Office of the Public Counsel (OPC), P.O. Box 7800, Jefferson City, Missouri 65102.

Q. Please summarize your educational and employment background.

A. I have a B.A. in economics from Kent State University and a Ph. D. in economics from the University of Arizona. My graduate fields of study were Industrial Organization and Econometrics. I also taught various economics courses while at Arizona and participated in research projects investigating several aspects of the nuclear fuel cycle.

From 1982 to 1984 I was a visiting instructor in the economics department at Texas A&M University. I began my employment with the Office of the Public Counsel in 1984 as a Public Utility Economist. In 1986, I became Chief Public Utility Economist, the position I now hold. During my tenure with the Office of the Public Counsel, I have attended numerous conferences and seminars on a variety of topics related to public utility regulation, and I have made presentations at several such conferences. I currently serve as the Chair of the

Economics and Finance Committee of the National Association of State Utility Consumer Advocates.

Q. Have you previously testified before this Commission?

A. Yes. I have testified in over forty cases. The topics on which I have testified include jurisdictional and class cost allocations, rate design, adjustments to test year consumption data, applied industrial organization theory (factors affecting the degree of competition in a market), the appropriateness and proper form of economic development rate discounts, the proper disposition of Take-or-Pay costs, regulatory approaches to natural gas bypass and fuel switching, the effect of nuclear plant ownership on the cost of capital of an electric utility, and the recovery of COS-related revenue losses. I have testified in cases involving gas, electric, telecommunications, and water companies.

Q. What is the purpose of your testimony?

A. My testimony will cover several areas in this general rate case for Missouri Public Service (MPS or Company), a division of Utilicorp United. First I will describe how I developed the load (demand) data that serves as the basis for the allocation factor applied to the costs associated with distribution mains. Public Counsel witness Mr. Ryan Kind used the data to develop the mains allocator. Then I will describe and support the class cost allocation method I developed for use on costs related to the transmission function and to distribution

mains; Mr. Kind used this method to calculate the transmission/mains allocator he used in his cost of service study. Next, I will present Public Counsel's proposals regarding the spread of the revenue increase resulting from this case along with our recommendation regarding residential rates. Finally, I will provide a discussion of some issues associated with the special contract between MPS and Marshall Municipal Utilities.

DATA DEVELOPMENT AND SOURCES

Q. What load data have you developed to use in this case?

A. I developed weather normalized class monthly peak day demands measured in mcf, or thousand cubic feet. If we assume that class monthly peaks occur on the same day, we can then derive system monthly and annual peak day demands by summing class demands. Mr. Kind used this data to develop class allocation factors for distribution mains and transmission plant and related expenses.

Q. Please describe how you developed weather normalized class monthly peak load data.

A. I began with the Company's split of actual annual usage by class into weather sensitive and non-weather sensitive portions. MPS used a simple procedure to accomplish this split. First, MPS calculated annual non-weather sensitive usage by summing July, August, and September volumes for each class and multiplying these sums by four. The resulting figure was then subtracted from total annual

volumes to arrive at an estimate of weather sensitive volumes. These estimated weather sensitive volumes were then divided by the actual number of heating degree days for the year ending May 31, 1992, to get an estimate of annual class weather sensitive usage per heating degree day. (Heating degree days, or HDD, are measured as the difference between the daily average temperature and 65 degrees. A day with an average temperature of 30 degrees would thus have 35, or 65 minus 30, HDD.) Finally, annual non-weather sensitive sales were divided by 365 to get average daily non-weather sensitive volumes for each customer class. This procedure yielded consumption equations for each class: class daily volumes = (daily non-weather sensitive volumes) + [(weather sensitive volumes per HDD) x (normal HDD)].

I then used these relationships to derive class monthly peaks using the following method. From the Staff of the PSC I obtained a thirty year average of the monthly peak day HDD (i.e., the maximum daily HDD value for each month) for each weather station used by Staff. I then inserted the average (across weather stations) maximum monthly HDD figures into the consumption equations to obtain monthly class peaks. I gave these monthly class peaks to Mr. Kind for use in his allocation study.

Q. Does your use of the Company's weather-consumption relationships mean that you endorse the Company's method?

A. No. My purpose was merely to derive rough estimates of weather normalized class peak day demands for use in OPC's cost of service study, while paralleling MPS's study so that reasonable comparisons can be made. The procedure used by MPS to derive the weather-consumption relationships is somewhat rough and should not be used in the accounting determination of MPS's revenue requirement in this case.

Q. Did you follow the same peak estimation procedure for all classes?

A. No. I used the same procedure for four of the five classes--Residential, Commercial Firm and Interruptible, and Industrial Firm. I used a different approach to estimate monthly peaks for the Industrial Interruptible class.

Q. Please describe that different procedure.

A. Since MPS found that the Industrial Interruptible class was not weather sensitive, the Company assumed a 100% annual load factor (based on November volumes) for this class to determine its annual peak. Instead of adopting the Company's estimate, I assumed a 100% load factor within each month, and then based each month's peak demand on that month's total Industrial Interruptible volumes. For example, the January peak demand was estimated by dividing January volumes by 31, the number of days in the month.

Q. Please describe Schedule 1.

A. Schedule 1 contains my estimates of weather normalized monthly peak day demands for each class.

THE ALLOCATION OF COSTS ASSOCIATED WITH DISTRIBUTION MAINS

Q. Why must the cost of distribution mains be allocated?

A. These are common costs. A given length of distribution main provides service to customers from several classes and therefore cannot be directly assigned to any one class. In this section of my testimony I will describe how each class's share of distribution related costs should be derived. I directed Mr. Kind to use the method I describe here to calculate the allocation factors for distribution mains and transmission costs.

Q. What allocation method have you used to calculate these class shares?

A. I based my approach on the Relative System Utilization Method, or RSUM, which was developed by Charles D. Laderoute, who discussed it in a paper he presented at the Sixth NARUC Biennial Regulatory Information Conference in Columbus, Ohio, in September 1988. The paper appears on pages 273-283 of the conference proceedings, and is entitled "The Relative System Utilization Method For Time Differentiated Natural Gas Utility Cost Allocation Studies."

I modified Mr. Laderoute's version of RSUM to account for the fact that there are economies of scale (capacity) in the construction of distribution mains, and to use monthly peaks instead of monthly

average volumes as the allocation basis. I call this version the Relative Incremental System Utilization Method (RISUM), since it allocates the cost associated with each monthly increment of demand according to each class's contribution to that monthly increment.

Q. Why have you chosen to use the RISUM approach?

A. This approach accounts for two basic aspects of the use and cost of distribution mains. First, it accounts for the fact that some portions of distribution mains capacity are needed in most or all months of the year, while other increments of capacity are used in only one or a few months. Second, by accounting for the existence of scale economies, this approach reflects the true differences between the cost of units of capacity used year-round and the cost of peak capacity.

Q. Let's examine the second point first. Please explain why there are economies of scale.

A. The installed cost of pipe is roughly proportional to the diameter of the pipe. This is because the circumference determines the amount of material (plastic or steel) needed for a given length of pipe, and circumference is proportional to diameter. The capacity of the pipe, which is roughly proportional to the area of the pipe's cross section, is proportional to the square of the diameter. Doubling the diameter of the pipe doubles its cost, but quadruples its capacity. Put another way, cost is proportional to the square root of capacity.

In a more formal equation, this appears as:

$$C = a * Q^b ;$$

where C is cost, a is the proportionality constant, * indicates multiplication, Q is the capacity of the pipe, and b is the economies of scale factor. In the simple case we have been discussing, b takes on the value .5. (A number raised to the .5 power is its square root; for example, $4^{.5} = 2$.) Any value of b less than one implies the existence of economies of scale; as b rises toward one, the degree of scale economies decreases.

Q. Why do you refer to the case you describe as "simple"?

A. My example is based on two simplifying assumptions, neither of which is quite correct. I assume that pipe cost is proportional to pipe diameter, and that pipe capacity is proportional to the square of pipe diameter.

Q. Why do you say these assumptions are incorrect?

A. First, I have done several empirical studies of cost-diameter relationships for Missouri gas companies. These studies yielded a wide range of estimates of the impact of pipe diameter on cost, which indicated that cost could rise either more or less than proportionately with diameter. Second, engineering principles tell us that capacity rises faster than the square of diameter. The PSC Staff has used a diameter-capacity scale relationship of .375 (rather than .5, which would imply a square root relationship). (See, for example, Dr. Eve

Lissik's direct testimony in Laclede Gas Company, Case No. GR-92-165.)

Q. Have you done a cost-diameter study in this case?

A. Yes. Based on the data available in this case, I have found that installed pipe costs appear to increase more slowly than pipe diameter.

Q. What value of "b", from your earlier cost equation (page 7 above), should be used in this case?

A. I believe that .5 is a reasonable value for "b." Based on my recommendation, Mr. Kind has used this value to calculate the allocation factor for distribution mains and transmission.

Q. Why do you believe .5 to be a reasonable value for "b"?

A. If we use the .375 factor for the relationship between diameter and capacity, and combine it with a value less than one for the cost-diameter relationship, we would arrive at a value for "b" that is less than .375. (We multiply the two factors to obtain their combined impact.) Using .5 as the "b" value is therefore conservative in the sense that it likely errs on the side of overestimating peak related incremental costs, while underestimating base demand related incremental capacity costs.

Q. Now let's discuss the RISUM approach. Please give a simple description of the method.

A. The procedure under RISUM is to first assign costs to monthly increments of demand, and then to allocate these monthly incremental costs to the classes using class contributions to the monthly incremental peak demands as allocation factors.

The assignment of costs to demand increments is accomplished through a sequence of steps. The cost of capacity sufficient to serve the peak demand of the month with the lowest peak is assigned to the initial increment of demand. The additional cost associated with expanding capacity to meet the second smallest monthly peak is assigned to the second demand increment. The process continues until we get to the highest peak demand; the cost of additional capacity needed to serve only the peak month is assigned to this final increment.

Q. How should the incremental costs be allocated to the classes?

A. Factors based on each class's contribution to the relevant monthly incremental peak demand should be used. Incremental demand contributions are calculated by arranging the months in ascending order according to total system peak demands, and determining each class's contribution to that increment. Generally speaking, each class's monthly demands rise continuously with the system demands, but if a class has a negative incremental contribution to demand (i.e., its demand falls while the system demand is rising), a value of

zero should be assigned to that class's incremental demand in that month. Furthermore, no additional incremental demand should be assigned to such a class unless its demand during higher system peak months exceeds its demands during lower system peak months. No negative incremental contributions should be permitted, nor should any class be allocated costs twice for a given unit of incremental demand.

Q. Could you please provide a simple illustration of the RISUM procedure?

A. Yes. Schedule 2 contains a numerical example, based on three customer classes and two time periods. Table 1 contains each class's peak day demand in each period.

Columns (1)-(4) below Table 1 contain the calculations made to determine each demand increment's share of costs. Column (1) displays each period's peak day demand as a percentage of the overall peak day demand. Column (2) shows the cost of serving the demand of a given period, expressed as a percentage of total cost (the cost to serve the overall peak demand). This cost is calculated based on the economies of scale factor value of .5. Column (3) is the marginal cost column corresponding to Column (2). Column (4) shows the assignment of incremental cost to each period; these are simply the marginal costs associated with each period.

Table 2 is derived from Table 1 and contains each class's incremental peak demands. Table 3, which is derived from Table 2,

shows the class shares of incremental demand. For example, Class C is responsible for 2/3 (66.7%) of the total incremental demand for Period 2. Each entry in this table is multiplied by the appropriate period's cost assignment percentage in Column (4) to derive the class cost allocations shown in Table 4. For example, Class A is responsible for 33.3% of the period 1 incremental cost, which in turn is equal to 70.71% of total cost. The 23.57% figure in Table 4 is equal to 33.3% times 70.71%. Finally, summing down the columns of Table 4 yields each class's share of the total cost being allocated.

Q. Is this the same basic procedure that Mr. Kind used?

A. Yes. The only differences between the example and Mr. Kind's application of the method are the number of classes (five instead of three) and the number of incremental time periods (twelve instead of two).

PUBLIC COUNSEL CLASS REVENUE SPREAD RECOMMENDATION

Q. Please describe Public Counsel's proposal regarding the spread of any increase granted MPS as a result of this case.

A. Public Counsel is proposing a movement toward the results of Mr. Kind's class cost of service study. My Schedule 3 contains those results and our proposal based thereon. The proposal is in two parts-- a revenue neutral shift to move toward equal rates of return across classes, and a subsequent equal percentage increase to

account for any revenue increase granted the Company in this proceeding.

Generally speaking, the results of the study indicate that on a revenue neutral basis (i.e., before considering the effect of any overall revenue increase granted in this case), Residential and Industrial Firm rates are slightly too high, Commercial Firm and Commercial rates are significantly too high, and Large Volume rates are substantially below the appropriate level. See the Table 1 on Schedule 3-1; these figures are taken directly from Mr. Kind's Schedule 1.

Q. How did you arrive at the recommended "No Overall Revenue Increase" revenue shifts appearing in Table 2 of Schedule 3-2?

A. First I determined that, given the results of Mr. Kind's study, a reasonable result would be to leave Residential revenues unchanged, assuming no overall revenue increase. I reached the same conclusion for the Industrial Firm class.

I determined that a movement of roughly halfway to the cost of service for the other three classes would be appropriate in order to mitigate the impact of the rate increase on the Industrial Interruptible customers. First I cut the dollar cost of service decrease (shown in Table 1 of Schedule 3-1) for the two commercial classes in half and reduced the Industrial Interruptible increase by that same amount. I further reduced the increase for Industrial Interruptibles by the cost of service decrease shown in Table 1 (Schedule 3-1) for

the Residential and Industrial Firm classes. The resulting proposed dollar and percentage shifts are shown in Table 2 of Schedule 3-2. It should be noted that the true total percentage rate increase for the Industrial Interruptible class will be lower than the figures reported here since most of these volumes are transported and, therefore, the associated gas costs do not show up in this data.

Q. How would class revenues be adjusted to account for any rate increase that might be granted in this case?

A. Once the aforementioned shifts are accounted for, any increase the Company is granted in this case should be generated by equal percentage increases in the class revenues from Table 2 (Schedule 3-2). Table 3 on Schedule 3-3 shows this calculation for the overall revenue increase shown in Mr. Kind's Schedule 2 I believe this to be a reasonable proposal.

Q. Please describe Schedule 4.

A. Schedule 4 contains our proposal for Residential rates, given the rate increase assumed in Table 3 on Schedule 3-3. Mr. Kind is sponsoring the proposed $9.00 customer charge, which I recommend be established unless the overall revenue increase resulting from this case is very small. If the rate increase is very small, a customer charge of $8.50 or $8.75 would probably be more appropriate. Once the customer charge is established, the non-gas commodity rate falls out as a residual, given a set of billing determinants. I have used

the Company's billing determinants in Schedule 4, but my use of them should not be considered an endorsement thereof.

SPECIAL CONTRACT BETWEEN MPS AND MARSHALL MUNICIPAL UTILITIES

Q. Why are you discussing the special contract between MPS and Marshall Municipal Utilities (MMU)?

A. In Case No. GO-93-146, the Commission approved MPS's 1st Revised Sheet No. 18, which lowered the minimum allowable charge under MPS's Flexible Rate Tariff from $0.10 to $0.01 per mcf. This permitted MPS to charge MMU a special contract rate that was below the original tariffed minimum rate. In its Order Approving Stipulation and Agreement, the Commission stated, "The Commission would emphasize, however, that the issues surrounding this tariff and MPS's practices in gas transportation rate contracts should be subject to scrutiny by the parties in the currently pending MPS rate case." (Order dated January 15, 1993, pages 2-3.) This case is the "currently pending" case to which the Commission referred.

Q. Please summarize the discussion you will present on this issue.

A. First I will discuss the general principles that should serve as a basis for evaluating the appropriateness of a special contract rate. Then I will attempt to evaluate the MPS-MMU contract on those principles. Finally, I will recommend that the Commission require MPS to

conduct, for each of its special contracts, certain cost studies that will permit the Commission and other interested parties to determine the reasonableness of allowing MPS to offer the special rates in question.

Q. Please discuss the general principles that should serve as a basis for evaluating the appropriateness of a special contract rate.

A. The first principle is that a local distribution company (LDC) should retain all load that it is economically appropriate to retain, since doing so will result in lower rates for all affected parties while allowing the LDC the opportunity to earn a reasonable rate of return. In this context, "economically appropriate" means that the rate should equal or exceed the LDC's long run marginal cost of service, or LRMC. The LDC should be permitted to charge a discounted rate in order to prevent the construction of bypass facilities if the rate exceeds the LRMC of serving the customer in question. Put another way, if the cost of bypass facilities exceeds the LRMC, bypass should be prevented through the use of special rates, but if the bypass facility is less costly than the LRMC of serving the customer through LDC facilities, the bypass should be permitted.

A second general principle is that the discounted rate should be no lower than is required to retain the customer. That is, the rate should serve as an incentive for the customer to stay on the LDC's system, but should be set as close as possible to the cost of bypass.

A third general principle is that the rate charged should be no lower than the short run marginal cost (SRMC) of the LDC. If the rate is above LRMC, this requirement would be automatically satisfied, since SRMC is less than LRMC. There may be a situation during which the LRMC principle may be violated for a short period of time (please see a later discussion of this point on page 21 below), but the LDC should never charge a rate that is less than SRMC.

These principles allow us to draw some conclusions about the appropriate minimum rate that should appear in a flexible (anti-bypass) rate tariff, such as the one MPS currently offers. Regulators can take two approaches to setting the minimum.

Q. Please describe these two approaches to setting the minimum rate.

A. Under the first approach, the minimum rate would be set above the highest LRMC among the customers who may contemplate bypassing the LDC. Doing so would ensure that the LRMC principle could never be violated, but such a high minimum rate would probably result in bypass projects that should not be undertaken, a situation known as uneconomic bypass.

The second approach would be to set the minimum at the LDC's SRMC. This approach would block all uneconomic bypass, but would run the risk of blocking bypass projects that should be undertaken, since an LDC could price above the minimum but still be below LRMC.

Q. Does Public Counsel favor either of these approaches to setting the minimum charge?

A. Public Counsel believes that the second approach is more practical, so long as it is accompanied by a clear statement by the Commission that sets forth the other principles I have discussed here. Setting a relatively low minimum rate would eliminate the need for filings such as the one MPS made, which resulted in the establishment of Case No. GO-93-146. Regulatory burdens outside of a rate case would thus be reduced.

Public Counsel cannot, however, overemphasize the importance of having the Commission establish clear guidelines under which rate case evaluations of special contract rates are to take place. OPC's proposed approach would allow the LDCs to manage their own affairs between rate cases without having to come to the Commission every time a customer requests a special rate. Yet, through the strict enforcement of the other principles, OPC's suggested approach would ensure that other ratepayers are not disadvantaged by the offering of a particular special contract rate. The result would be that the LDC would be permitted wide latitude in setting special contract rates after being advised of a clear set of rules under which its pricing decision would be evaluated.

On page 2 of its Order approving the decrease in MPS's minimum rate from $0.10 to $0.01 per mcf, the Commission expressed "some reservation in regard to the range and discretion allowed by the minimum and maximum transportation charges set out in the tariff

sheet..." Public Counsel believes that such concerns are justified, but that they could be alleviated to a large extent by enunciating a general policy regarding the evaluation of such rates in a rate case.

Q. Please summarize Public Counsel's recommendation regarding a general policy statement on this issue.

A. The Commission should make it clear to Missouri LDCs that it will follow a particular set of standards when evaluating the reasonableness of a discounted rate. Public Counsel recommends that the following criteria be included in that set of standards:

1) Each LDC will be required to submit, during each of its general rate proceedings, a study that estimates the LRMC of serving each customer taking service under a discounted special rate. Failure to file such studies along with the rate request would result in the imputation of revenues for the customer(s) in question at the maximum applicable tariff rate.

2) At the same time, each LDC should be required to submit a study of each discount customer's cost of bypassing the LDC. Failure to file such studies along with the rate request would result in the imputation of revenues for the customer(s) in question at the maximum applicable tariff rate.

3) If the discounted rate being charged at the time of a rate case is below either the LRMC or the cost of bypass for the customer, revenues for that customer would be imputed to the level of LRMC or the cost of bypass, whichever is higher.

4) An LDC should not be prevented from charging a rate less than LRMC or the cost of bypass so long as the rate exceeds the minimum allowed rate.

5) The minimum rate should be set at or just above SRMC, but a rate will not be judged to be just and reasonable simply because it is in excess of the minimum.

Q. How should these criteria, or guidelines, be applied in the case of the MPS-MMU contract?

A. Since these criteria have not yet been officially enunciated, MPS should not be held to all of them for either of its special contracts (the other contract is with Owens Corning). Some of these guidelines should have been self evident, however, and they can certainly be applied here without concern that the Commission is somehow engaging in the application of "20/20 hindsight."

Q. Which principles should not apply in this case?

A. Although it can be argued that MPS should know that it should not charge a rate that is less than the LRMC of serving a particular customer, OPC does not believe that it would be fair to apply the first guideline and impute revenues to the level of the maximum rate even though MPS has performed no LRMC studies. (See also the direct testimony of OPC witness Ryan Kind regarding the availability of LRMC data for MPS.) The Company should, however, be ordered to complete such a study for each of its special rate customers within six months of the date of the report and order approving tariffs resulting from this case.

Similarly, the part of the third criterion requiring imputation if the rate in question is below LRMC should not be applied either. This is because there are no LRMC studies, either for specific customers or for a typical customer, on which to base a judgement in this case.

Q. Which principles should be applied in this case?

A. All of the remaining guidelines (2, 4, 5, and part of 3) either are being or should be applied. OPC believes that the change in the minimum rate that occurred in Case No. GO-93-146 has resulted in compliance with the fifth principle; $0.01 is a reasonable estimate of SRMC.

With respect to the second principle and the part of the third that deals with the cost of bypass, MPS made available in GO-93-146 a study showing the cost of bypass for MMU. The rate being charged appears to exceed the cost of bypass as shown in that study. The Company should not be penalized for not filing a bypass cost study for Owens Corning, but should be required to do so within six months of the date of the report and order approving tariffs resulting from this case.

The Commission can apply the fourth principle by simply doing nothing in this case. This is because between rate cases, the Company absorbs any difference between the rate charged and the rate that should be charged.

Q. Does this conclude your direct testimony?

A. Yes.

THOMPSON DIRECT
Case No. GR-93-172

MISSOURI PUBLIC SERVICE

WEATHER ADJUSTED CLASS PEAK DAY MCF

MONTH	RESIDENTIAL	COMMERCIAL FIRM	COMMERCIAL INTERRUPT.	INDUSTRIAL FIRM	INDUSTRIAL INTERRUPT.	TOTAL
Jun-91	4,613	2,648	194	273	7,779	15,507
Jul-91	2,775	1,693	149	218	9,699	14,532
Aug-91	3,425	2,031	165	237	9,638	15,496
Sep-91	9,266	5,066	308	413	10,530	25,583
Oct-91	15,422	8,266	458	599	6,956	31,700
Nov-91	23,736	12,588	662	849	8,143	45,979
Dec-91	31,891	16,826	862	1,095	7,842	58,516
Jan-92	34,917	18,399	936	1,186	8,753	64,191
Feb-92	31,918	16,840	862	1,096	9,960	60,677
Mar-92	24,840	13,161	689	882	9,070	48,642
Apr-92	17,364	9,276	506	657	6,503	34,305
May-92	10,091	5,495	328	438	7,909	24,261
SYSTEM PEAK DAY DEMANDS	34,917	18,399	936	1,186	8,753	64,191

SCHEDULE 1

THOMPSON DIRECT
Case No. GR-93-172

SAMPLE CALCULATIONS: RELATIVE INCREMENTAL SYSTEM UTILIZATION METHOD

Table 1: Period Peak Demands by Class				
	Class A	Class B	Class C	TOTAL
Period 1	1	1	1	3
Period 2	1	2	3	6

Column:	(1) Percent of Peak Demand	(2) Percent of Cost To Serve Peak	(3) Marginal Cost as a % of Peak Cost	(4) Cost Assigned to Increment of Demand
Period 1	50.00%	70.71%	70.71%	70.71%
Period 2	100.00%	100.00%	29.29%	29.29%
Note: b =	0.50000			

Table 2: Period Incremental Peak Demands by Class				
	Class A	Class B	Class C	TOTAL
Period 1	1	1	1	3
Period 2	0	1	2	3

Table 3: Class Proportion of Period Incremental Peak Demands				
	Class A	Class B	Class C	TOTAL
Period 1	0.333	0.333	0.333	1.000
Period 2	0.000	0.333	0.667	1.000

Table 4: Class Cost Allocation Percentages				
	Class A	Class B	Class C	TOTAL
Period 1	23.57%	23.57%	23.57%	70.71%
Period 2	0.00%	9.76%	19.53%	29.29%
TOTAL	23.57%	33.33%	43.10%	100.00%

SCHEDULE 2

THOMPSON DIRECT
Case No. GR-93-172

TABLE 1 — OPC CLASS COST OF SERVICE RESULTS -- NO OVERALL REVENUE INCREASE

	TOTAL	RESIDENTIAL	COMMERCIAL FIRM	COMMERCIAL INTERRUPT.	INDUSTRIAL FIRM	INDUSTRIAL INTERRUPT.
CURRENT REVENUES						
GAS	$15,983,571	9,692,076	5,323,649	39,264	441,001	487,581
NON-GAS	$15,648,631	9,610,732	4,303,954	120,559	226,158	1,387,228
TOTAL	$31,632,202	$19,302,808	$9,627,603	$159,823	$667,159	$1,874,809
COST OF SERVICE STUDY RESULTS						
GAS	$15,983,571	9,692,076	5,323,649	39,264	441,001	487,581
NON-GAS	$15,648,631	9,446,391	3,056,342	107,170	214,943	2,823,785
TOTAL	$31,632,202	$19,138,467	$8,379,991	$146,434	$655,944	$3,311,366
COST OF SERVICE DOLLAR SHIFTS						
GAS	$0	$0	$0	$0	$0	$0
NON-GAS	$0	($164,341)	($1,247,612)	($13,389)	($11,215)	$1,436,557
TOTAL	$0	($164,341)	($1,247,612)	($13,389)	($11,215)	$1,436,557
COST OF SERVICE PERCENTAGE CHANGES						
GAS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NON-GAS	0.00%	-1.71%	-28.99%	-11.11%	-4.96%	103.56%
TOTAL	0.00%	-0.85%	-12.96%	-8.38%	-1.68%	76.62%

SCHEDULE 3-1

THOMPSON DIRECT
Case No. GR-93-172

TABLE 2 — OPC PROPOSED CLASS REVENUE SHIFTS — NO OVERALL REVENUE INCREASE

	TOTAL	RESIDENTIAL	COMMERCIAL FIRM	COMMERCIAL INTERRUPT.	INDUSTRIAL FIRM	INDUSTRIAL INTERRUPT.
PROPOSED CLASS REVENUES						
GAS	$15,983,571	$9,692,076	$5,323,649	$39,264	$441,001	$487,581
NON-GAS	$15,648,631	$9,610,732	$3,680,148	$113,864	$226,158	$2,017,729
TOTAL	$31,632,202	$19,302,808	$9,003,797	$153,128	$667,159	$2,505,310
PROPOSED DOLLAR SHIFTS						
GAS	$0	0	0	0	0	0
NON-GAS	$0	0	(623,806)	(6,695)	0	630,501
TOTAL	$0	$0	($623,806)	($6,695)	$0	$630,501
PROPOSED PERCENTAGE SHIFTS						
GAS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NON-GAS	0.00%	0.00%	-14.49%	-5.55%	0.00%	45.45%
TOTAL	0.00%	0.00%	-6.48%	-4.19%	0.00%	33.63%

SCHEDULE 3-2

THOMPSON DIRECT
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TABLE 3 — OPC PROPOSED CLASS REVENUE CHANGES — INCREASE TO ACHIEVE OPC PROPOSED ROR

	TOTAL	RESIDENTIAL	COMMERCIAL FIRM	COMMERCIAL INTERRUPT.	INDUSTRIAL FIRM	INDUSTRIAL INTERRUPT.
PROPOSED CLASS REVENUES						
GAS	$15,983,571	$9,692,076	$5,323,649	$39,264	$441,001	$487,581
NON-GAS	$18,055,744	$11,089,080	$4,246,238	$131,379	$260,946	$2,328,101
TOTAL	$34,039,315	$20,781,156	$9,569,887	$170,643	$701,947	$2,815,682
PROPOSED DOLLAR CHANGES						
GAS	$0	0	0	0	0	0
NON-GAS	$2,407,113	1,478,348	566,090	17,515	34,788	310,372
TOTAL	$2,407,113	$1,478,348	$566,090	$17,515	$34,788	$310,372
PROPOSED PERCENTAGE CHANGES						
GAS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NON-GAS	15.38%	15.38%	-1.34%	8.97%	15.38%	67.82%
TOTAL	7.61%	7.66%	-0.60%	6.77%	5.21%	50.19%

SCHEDULE 3-3

THOMPSON DIRECT
Case No. GR-93-172

PUBLIC COUNSEL RESIDENTIAL RATE RECOMMENDATION

BILLING UNITS	
Annual Bills	431,303
Volumes (mcf)	3,377,274

CURRENT NON-GAS RATES AND REVENUES		
	RATES	REVENUES
Customer Charge	$7.50	$3,234,773
Non-gas Margin	$1.8879	$6,375,956
TOTAL		$9,610,728

PROPOSED NON-GAS RATES AND REVENUES		
	RATES	REVENUES
Customer Charge	$9.00	$3,881,727
Non-gas Margin	$2.1341	$7,207,440
TOTAL		$11,089,167
Percentage Increase in Margin Revenue		15.38%
Percentage Increase in Total Revenue		7.66%

SCHEDULE 4