Exhibit No.:	
Issue(s):	Cost of Service; Rate Design
Witness/Type of Exhibit:	Hong Hu/Direct
Sponsoring Party:	Public Counsel
Case No.:	GR-99-315

DIRECT TESTIMONY

OF

HONG HU

Submitted on Behalf of the Office of the Public Counsel

LACLEDE GAS COMPANY

Case No.: GR-99-315

July 6, 1999

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of Laclede Gas Company's)
tariff to revise natural gas rate schedules.) Case No. GR-99-315

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 20 and Schedules DIR HH-1 through DIR HH-5.

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 6th day of July, 1999.

Mary S. Koestner

Mary S. Koestner, Notary Public

My Commission expires August 20, 2001.

DIRECT TESTIMONY

OF

HONG HU

LACLEDE GAS COMPANY

CASE NO. GR-99-315

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 (OPC) since March 1997.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THIS COMMISSION?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I will present OPC's Class Cost of Service (COS) Study and the basis for OPC's rate design recommendations for this case. My testimony will describe how the Class COS

results were derived and explain the rationale behind OPC's rate design recommendations.

I. CLASS COST OF SERVICE STUDY

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

A. The main purpose of a Class COS Study is to provide an estimate of the cost of providing service to each of the customer classes to be used as a basis for setting rates to the extent allowed by other rate design goals of the Commission. The three primary steps that must be taken in order to perform a Class COS Study are 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 Local Distribution Company (LDC) functions of which they are a part. The FERC system of accounts is the starting point in functionalizing accounts since it already has most accounts grouped by functional area.

Once costs have been functionalized, they are classified as being customer (related to the number of customers), demand (related to the class portion of peak usage), commodity (related to annual throughput), or "other" related, depending on the classification with which they are most closely associated. For example, meter, regulator, and service line expenses are considered customer-related, since a certain amount of meter, regulator, and service line expense will be incurred solely for hooking a customer up to the LDC.

Finally, after classifying costs, the analyst chooses allocation factors that will distribute a fair share of jurisdictional costs to each customer class. Allocation factors are based on ratios that reflect the proportion of total units (total number of customers, total annual throughput, 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?

A. I have used the following customer rate classes: Residential General Service (Residential), Commercial and Industrial General Service (C&I), Large Volume (LV), Interruptible, Firm Sales and Transportation (Firm), Basic Sales and Transportation (Basic), L.P. Gas (LP) and Unmetered Gas Lights (UMGL).

Q. ON WHAT DATA IS YOUR CLASS COS STUDY BASED?

A. The Missouri Public Service Commission Staff (Staff) Accounting Schedules that were filed with the Staff's non-rate design testimony on June 29, 1999 were the source of most of the financial data that I utilized in my COS study. This data is from the year ending December 31, 1998 and updated through March 31, 1999. Most of the billing determinant information that I utilized was also provided by the Commission Staff. I have also utilized data received from Laclede in response to OPC Data Requests. My use of this information should not be viewed as an endorsement of either Staff's or Laclede's methods for calculating accounting costs or billing determinants. I have used this information because it was readily available and contains the level of detail necessary to perform a COS study.

Q. PLEASE DISCUSS THE METHODS THAT YOU USED TO ALLOCATE FUNCTIONALIZED COSTS. FIRST, HOW DID YOU ALLOCATE PLANT AND EXPENSE ACCOUNTS ASSOCIATED WITH MANUFACTURED GAS AND GAS STORAGE FACILITIES?

A. I allocated gas production costs on the basis of estimated peak day coincident sales demand since manufactured gas facilities are used primarily during periods of peak system demand. Gas storage costs were allocated on the basis of weather normalized winter sales volumes. LP gas customers do not benefit from either manufactured gas or gas storage facilities so none of these costs were allocated to them.

Q. HOW DID YOU ALLOCATE UNSUCCESSFUL EXPLORATION AND DEVELOPMENT (E & D) COSTS AND OTHER UTILITY PLANT (ACCOUNTS 338 AND 118.3)?

A Since the amounts in these accounts arise from Laclede's E & D efforts to reduce per unit gas costs, I allocated both of them on a commodity basis (annual gas sales).

Q. PLEASE DESCRIBE HOW OPC ALLOCATED TRANSMISSION PLANT.

A. Transmission plant was allocated to all classes except for LP Gas based on the modified relative system utilization method (RSUM) allocator. This allocator is developed on the basis of weather-normalized class monthly peak day demands. The underlying data is provided by the Staff. I have chosen to use the allocator that was developed by former OPC engineer Barry Hall in Case No. GR-98-374 since the Staff has indicated that the peak demand data underlying the Mr. Hall's allocator has not been updated. The result is shown in Schedule DIR HH-1. I have also included a separate section in this testimony to explain the rationale of this method.

Q. HOW WERE LAND AND LAND RIGHTS, STRUCTURES AND IMPROVEMENTS, AND MAINS PLANT (ACCOUNTS 374, 375, AND 376) ALLOCATED?

A. The Distribution mains account was allocated to all classes except for LP Gas based on the modified RSUM allocator. Unlike transmission mains that are considered to be shared by all customer classes other than the LP class, for the distribution mains, a reasonable distinction can be drawn between mains which serve predominately the smaller usage customers and those mains which serve all customer classes in common. Based on Mr. Hall's study of Laclede trended costs from the prior Laclede case, GR–96–193, I have apportioned a percentage of the costs based on main diameter (mains 2" or less in diameter which accounted for almost 60% of the total length) to be used only by those smaller usage customers, namely residential and C&I general service customers. Thus about 27% of the costs are split between these two customer classes based on each class' RSUM allocator. The remaining 73% of costs is split between all the customer classes according to the RSUM allocators. The results of this allocation methodology are shown in Schedule DIR HH-1.

The costs associated with the land and land rights account and the structures and improvements account are mains-related costs and thus are allocated on the same basis as the mains account.

Q. HOW DID YOU ALLOCATE ACCOUNTS 380 THROUGH 383 (SERVICES, METERS, AND REGULATORS)?

A. Service lines, meters and regulators are generally classified as customer related cost since additional cost in these accounts is incurred with the addition of every customer. However, since larger customers generally use larger and more costly services, meters and regulators, a weighted customer allocation rather than a simple customer allocation is

appropriate. The weight should reflect different unit costs of services, meters and regulators, different lengths of service lines, and different numbers of meters or service lines each customer uses for different customer classes. To develop the appropriate weight, I have utilized a sample that the Company prepared pursuant to the Stipulation and Agreement reached in Case No. GR-94-220. The allocators developed based upon this sample are shown at Schedule DIR HH-2.

Q. PLEASE DESCRIBE THE ALLOCATORS THAT YOU APPLIED TO THE REMAINING DISTRIBUTION ACCOUNTS.

A. I used total annual throughput to allocate Measuring and Regulating Station Equipment (Accounts 378 and 379). I allocated Other Equipment (Account 387) based on the allocation of all other previously allocated distribution plant.

Q. HOW DID YOU ALLOCATE GENERAL PLANT?

A. All General Plant accounts were allocated on the basis of each class' proportion of total non-general net plant.

Q. LET'S TURN NOW TO THE ALLOCATION OF OPERATION AND MAINTENANCE EXPENSES. HOW DID YOU ALLOCATE GAS DISTRIBUTION EXPENSES?

A. I used the "expenses follow plant principle" for allocating most of the accounts in this category. For example, the allocator that I applied to Mains plant (Account 376) was also applied to Mains maintenance (Account 887).

Q. HOW DID YOU ALLOCATE METER READING EXPENSES?

A. I used an allocator based on a weighted customer allocator that the Staff developed. The weights developed were 3.42 for Small General Service and 9.04 for all the other large customers.

Q. HOW WERE CUSTOMER SERVICE AND SALES PROMOTION EXPENSES ALLOCATED?

A Customer Service accounts were allocated on the basis of unweighted customer numbers and Sales Promotion expenses were allocated based on my COS allocator. I chose to use the COS allocator for Sales Promotion expenses since these costs are incurred for the purpose of lowering the average margin cost (by increasing sales) of providing service to customers in each of the customer classes. The amount by which customers in each class benefit from a lower average cost will be proportional to the share of overall costs of service per customer that they are responsible for incurring.

Q. HOW DID YOU ALLOCATE ADMINISTRATIVE AND GENERAL (A & G) EXPENSES?

A. I divided these expenses into three categories. I allocated Property Insurance expense (Account 924) on the basis of net plant since this expense is linked to the amount of plant that the Company requires in order to serve each customer class. Injuries and Damages and Employee Pensions and Benefits (Accounts 925 and 926) are both payroll related expenses so they were allocated on the basis of the amount of payroll expense that I had previously allocated to each class. I believe all of the remaining A & G accounts represent expenditures that support the Company's overall operation, so I have allocated them on the basis of each class's share of total Company COS.

Q. HOW DID YOU ALLOCATE PROPERTY AND PAYROLL TAXES?

A. Property taxes were allocated on the basis of the amount of total plant that I had previously allocated to each class. Payroll taxes were allocated on the basis of the amount of payroll expenses that I had previously allocated to each class.

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

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

II. ALLOCATION OF MAINS COST - THE MODIFIED RELATIVE SYSTEM UTILIZATION METHOD

Q. WHAT ARE THE CHARACTERISTICS OF MAINS COST?

A. First, mains cost is a shared cost. The Company's investment in mains provides the Company with the means to deliver the gas to its customers' locations in response to customers' year-round demands for natural gas. All customers benefit from the existence of mains on every day that they use gas.

The second characteristics of mains cost is the presence of economies of scale. According to various flow formulas, a 4" pipe has a flow capacity of about 6 times of that of a 2" pipe. On the other hand, the per foot cost to install the 4" pipe may be less than 2 times of the cost to install the 2" pipe. This means that cost of the incremental capacity needed to serve the peak is less than the average cost of capacity.

Q. PLEASE COMMENT ON TRADITIONAL MAIN ALLOCATION METHODS.

A. There are a wide variety of alternative methods for allocating and determining capacity cost such as mains cost and they produce drastically different cost assignments to different customer classes. A method that is commonly used by industrial users is to allocate the main costs on coincident or noncoincident peak demand. This method fails to reflect the fact that the utility system is built to satisfy the customers' daily demand for gas, not only the demand on the peak day. A clear example of the shortcoming of a peak demand allocation is that no cost will be allocated to the interruptible class because theoretically they would be off the system during the peak period. In other words, these interruptible customers would be receiving a "free ride" to use the system without paying a fair share of costs.

Another commonly used method is called the average and peak demand (A&P) method. This method attempts to account for the energy supply needs of the company in addition to the capacity needs. Total mains cost are multiplied by the system's load factor to arrive at the capacity costs attributed to average use and these capacity costs are apportioned to the various customer classes on an annual energy usage basis. The rest of the costs are considered to have been incurred to meet the individual peak demands of the various classes of service.

Both peak demand methods and the A&P method allocate too much cost to peak users because they fail to consider economies of scale.

Q. PLEASE EXPLAIN THE MODIFIED RELATIVE SYSTEM UTILIZATION METHOD.

A. The RSUM method was developed by Charles Laderoute at the 1988 NARUC Biennial Regulatory Information Conference and modified by former OPC economist Philip Thompson at the 1992 NARUC Biennial Regulatory Information Conference. The

modified RSUM method attempts to account for both economies of scale and the fact that all users who receive benefits from the system should share its cost. The basic idea is to identify the portion of capacity that is corresponding to each month's demand, and allocate the corresponding cost to customers who use gas in the month that this portion of the system is used. For example, if 75% of capacity is used in 12 months of the year and 80% of capacity is used in 11 months, the extra 5% of capacity is not utilized in, say, July, then the cost corresponding to 75% of capacity is allocated to every month, and customers who use gas in every month but July will also receive a share of the cost that is corresponding to the additional 5% capacity.

Q. PLEASE PROVIDE A STEP BY STEP DESCRIPTION OF THE MODIFIED RELATIVE SYSTEM UTILIZATION METHOD.

A. Please refer to Schedule DIR HH-3.1. The first column of this schedule contains the sum of weather-normalized monthly peak day demands for all customer classes sorted in descending order. This information was provided by Staff witness Beck in Case No. GR–98–374.

In the next column (Months % of Annual Peak) the peak day demands are converted to percentages of the maximum monthly peak day demand. For instance, the month having the second highest peak day demand has a peak that is 91.34% of the maximum peak day demand. Another way of stating this is that there is an 8.66% increment of demand separating the two months.

In the third column, the percentages of peak day are converted to percentages of total capacity costs by raising the capacity percentages to the *r*th power. The factor *r* is a measurement of the degree of the economies of scale. There will be no economies of scale if *r* equals to 1. Here, Mr. Hall chose *r* to be 0.3 per his research. Considering the

second and third columns it is easy to state what is indicated by the mathematical relationship here. The first 11.50% of capacity requires an expenditure of more than 52% of the costs of the system, i.e. there are substantial fixed costs involved. Likewise, 50.19% or approximately half of the capacity requires over 81% of the total costs to supply. Conversely, adding roughly the last 50% of the capacity accounts for less than 20% of the costs.

The fourth column simply calculates successive differences in percentages of costs from the third column. The top figure is the difference in percentage costs incurred to supply the additional capacity in moving from the second highest monthly peak to the maximum monthly peak day demand. The second figure in this column is the same difference, only moving from the third highest monthly peak to the second highest monthly peak.

The adjacent column depicts the number of months over which that cost increment should be spread. The first (highest or top increment) cost increment, occurring only on the peak day of one month is only spread to that month. The next increment of cost/capacity is utilized for two months. The last or base increment is utilized in all the months. Each cost increment is divided by the number of months in which the corresponding capacity increment is utilized.

In the last column partial sums are formed for the cost increments utilized in each month. For instance, the peak month sums all the increments of costs in the previous column, since all increments of capacity are used in that month. The next partial sum for the next lowest month omits the top cost increment in its sum and so on. The result is the percentage of capacity costs attributable to each month.

Refer to Schedule DIR HH–3.2. The top block of numbers is the class peak day demands by month. In the block below, class peaks have been converted to percentages of the sum of peak day demands for all the classes each month.

Summing the product of the class share of monthly peaks on Schedule DIR HH–3.2 and the portion of total capacity costs in each month in the last column on Schedule DIR HH–3.1 gives the RSUM allocators at the bottom of Schedule DIR HH–3.2. These are allocators that are applicable to the 'common' portion of the distribution mains.

III. CLASS COST OF SERVICE STUDY RESULTS

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

A. Schedule DIR HH-4 shows the results of OPC's Class COS Study which was based on the assumption that total company revenues remain constant. It is important to note that all of the numbers appearing in this testimony's tables and the attached schedules are in thousands (e.g. $10,000 in testimony tables is actually $10,000,000.) The fourth line from the bottom of this schedule (line number 37) shows the percentage by which margin 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. The fifth line from the bottom of this schedule (line number 36) shows the revenue shifts that would be needed to equalize class rates of return. The information from lines 36 and 37 of Schedule 1 is summarized below in Table 1 for the reader's convenience.

Table 1 – COS Indicated Class Revenue Shifts (000)

	Residential	Com. & Ind.	Large Volume	Inter-ruptible	Firm	Basic	LP	UMGL
Class Shifts	(15,874)	13,428	1,183	175	326	758	2	1
% Change	-9.81%	42.57%	47.66%	56.28%	9.81%	14.21%	5.06%	16.08%

As line 19 on Schedule DIR HH-4 indicates, the margin rate level for the Residential class is currently producing returns that exceed the total company return. Conversely, the Commercial and Industrial GS, Large Volume, Interruptible, Firm, and Basic classes are currently producing a return below the level of the total company return. The results that my study shows for UMGL, LP, and to a lessor extent for Interruptible, should be interpreted with caution since these classes are very small. This class rate of return information is summarized below in Table 2.

Table 2 – COS Indicated Customer Class Returns

	Residential	Com. & Ind.	Large Volume	Inter-ruptible	Firm	Basic	LP	UMGL
Returns	13.22%	-3.03%	-2.77%	-3.69%	5.61%	4.35%	6.75%	4.17%

I will furnish the more detailed workpapers that support OPC's COS study to any party requesting them.

Q. HOW WOULD YOU CHARACTERIZE THE REVENUE DEFICIENCIES THAT ARE INDICATED BY OPC'S STUDY FOR THE COMMERCIAL AND INDUSTRIAL GENERAL SERVICE, LARGE VOLUME, INTERRUPTIBLE CLASSES?

A. I would characterize these revenue deficiencies as very significant relative to each classes' total cost of service (revenue requirement). Table 1 shows that the rate levels for these classes are well below the level required to recover the costs associated with serving these classes.

IV. RATE DESIGN RECOMMENDATIONS

Q. WHAT IS THE RELATIVE IMPORTANCE OF CLASS COS STUDY RESULTS IN RATE DESIGN?

A. I believe that even the most meticulously conducted COS study, based on accurate and thorough data, requires judgment and involves arbitrary allocations of numerous common costs or shared costs, so that the results of such studies are, at best, imprecise and may vary substantially from reality. Given this inherent imprecision, plus any imprecision brought about by the possible inaccuracy and unavailability of data, COS study results should be used only as a general guide for the allocation of costs among customer classes and the design of rates. The Commission should decide a rate design that reflects both the underlying cost structure of a LDC and the considerations of affordability, rate impact and rate continuity.

Q. WHAT RATE DESIGN CHANGES IS OPC PROPOSING BASED ON THE REVENUE SHIFTS NEEDED TO EQUALIZE CLASS RATES OF RETURN INDICATED IN TABLE1?

A. OPC recommends that the Commission adopt a rate design that balances movement towards cost of service with rate impact and affordability considerations. To reach this balance, OPC believes that the Commission should impose, at a maximum, revenue shifts equal to one half of the revenue neutral shifts indicated by OPC's CCOS study.

Q. WHAT REVENUE NEUTRAL CLASS REVENUE SHIFTS IS OPC RECOMMENDING IN THIS CASE?

A. These shifts are shown in lines 39 and 40 of Schedule DIR HH-4 and have also been summarized below in table 3.

Table 3 – OPC Recommended Class Revenue Shifts (000)

	Residential	Com. & Ind.	Large Volume	Inter-ruptible	Firm	Basic	LP	UMGL
Class Shifts	(7,937)	6,714	591	88	163	379	1	1
% Change	-4.90%	21.28%	23.83%	28.14%	4.90%	7.11%	2.53%	8.04%

Q. PLEASE DESCRIBE THE INFORMATION CONTAINED IN SCHEDULE DIR HH-5 AND EXPLAIN HOW IT WAS CALCULATED.

A. Schedule DIR HH-5 shows the combined impact of spreading the various potential revenue requirement increase or reduction amounts to customer classes and the revenue neutral class revenue shifts recommended by OPC. Lines 14 through 19 of this Schedule show how the different revenue requirement increases or reduction have been spread to the various customer classes. The spread of these revenue requirement increase or reduction amounts are based on the percentages that appear in line 12 of Schedule DIR HH-5.

Q. HOW WERE THE RECOMMENDED REVENUE PERCENTAGES IN LINE 12 OF SCHEDULE DIR HH-5 CALCULATED?

A. These percentages were calculated by taking the recommended revenue neutral shifts that appear in line 10 of Schedule DIR HH-5 (also in line 39 of Schedule DIR HH-4) and adding them to total current class revenues (line 12 of Schedule DIR HH-4). This percentage is equal to the ratio of the sum of these two amounts to the amount of total company non-gas revenues (see line 12 of Schedule DIR HH-4).

Q. PLEASE EXPLAIN HOW THE COMBINED IMPACT AMOUNTS THAT APPEAR IN LINES 21 THROUGH 26 OF SCHEDULE DIR HH-5 WERE CALCULATED.

A. For various revenue requirement increase levels, the combined impact was derived by adding each classes' share of the overall revenue requirement increase to the revenue neutral shifts that OPC has recommended for each class. For example, under the residential column in line 16, we see the $11,261 (actually $11,261,000) that results from spreading a revenue requirement increase of $15,000,000 to the residential class. This $11,261 amount is then added to the negative $7,937 revenue neutral shift amount for the residential class that appears in line 10. The sum of these two amounts, $3,324, appears in line 23 under the residential column and represents OPC's recommendation (prior to adjustment for rate impact considerations) for the combined impact of revenue neutral shifts and share of overall revenue requirement increase that should be reflected in rates resulting from this case if the overall revenue requirement is increased by $15 million.

Q. PLEASE EXPLAIN HOW THE COMBINED IMPACT AMOUNTS THAT APPEAR IN LINES 35 THROUGH 47 OF SCHEDULE DIR HH-5 WERE CALCULATED.

A. Based on rate impact and equity considerations, I believe that no customer class should receive a net class rate revenue increase when there is an overall revenue requirement reduction and no customer class should receive a net class revenue decrease when there is an overall revenue requirement increase. The combined impact of revenue increase/decrease and OPC's revenue neutral shift numbers are thus adjusted further to reflect this consideration. For example, for the $10 million reduction case, line 26 of Schedule DIR HH-5 shows that the spread of the overall revenue reduction to C&I, LV, Interruptible, and Basic is too small to offset the revenue neutral shift thus they end up with a net increase. In this case I recommend: (1) keeping the current class rate revenue requirement for these classes unchanged; (2) giving the Firm class and LP class their

share of the reduction ($7,000 and $1,000, respectively); and (3) reducing the reduction in the residential class rate revenue by an amount equals to the sum of net increases for C&I, LV, Interruptible, and Basic classes that were eliminated. Lines 42 though 47 showed the revenue percentage results for each case.

Q. YOU JUST NOTED THAT RATE IMPACT AND EQUITY CONSIDERATIONS SHOULD BE TAKEN INTO ACCOUNT IN DETERMINING ANY APPROPRIATE INTERCLASS REVENUE SHIFTS THAT WOULD BE PART OF THE RATE DESIGN RESULTING FROM THIS CASE. PLEASE EXPLAIN HOW THIS CONSIDERATION SHOULD BE APPLIED.

A. As I pointed out earlier in this testimony, OPC's class COS study in this docket demonstrates that there are some significant interclass subsides incorporated in the Company's rate design. In other words, the class revenues that are being collected from each of the classes as a result of the currently tariffed margin rates are causing certain classes to make payments for service that greatly exceed the cost of the service that is being provided to them. For the most part, OPC's results are not showing anything significantly different than OPC's class COS study showed in the most recent Laclede rate case, GR-98-374.

There is, however, one significant difference between the studies that OPC has performed for both this case and GR-98-374 and the current rate structure. That difference is the separation of the GS class into a Residential portion and a Commercial and Industrial portion. This separation is long overdue, especially in light of the intra-class subsidies that have been revealed by OPC's study.

OPC has recommended that the Commission adopt a rate design that only goes, at most, half-way towards our study results, due to rate impact, equity, and affordability considerations. The Commission could reasonably determine that even going half-way

towards OPC's study results is too big of a jump to make in one step due to these same considerations.

Q. PLEASE SUMMARIZE OPC'S RATE DESIGN RECOMMENDATION FOR THE CLASS REVENUE REQUIREMENTS THAT SHOULD RESULT FROM ANY INCREASE OR REDUCTION IN OVERALL REVENUE REQUIREMENT THAT THE COMMISSION DETERMINES TO BE REASONABLE IN THIS CASE.

A. In this testimony, OPC has proposed and illustrated the application of a method for increasing or decreasing **class** revenue requirements to go along with any increase or reduction 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 is ultimately decided in this case. Schedule DIR HH-5 shows the result of applying OPC's recommended method for determining class revenue requirements to a range of potential revenue requirement increase levels. OPC could supply similar calculations to the Commission for any other amounts of change in the overall revenue requirement if requested to do so.

Q. DID YOU PERFORM ANY ANALYSIS TO SEE IF LACLEDE'S PROPOSED RESIDENTIAL CUSTOMER CHARGE INCREASE IS JUSTIFIED BASED ON THE CUSTOMER-RELATED COSTS THAT ARE ATTRIBUTABLE TO THE RESIDENTIAL CLASS?

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 $6.30. My customer-related cost calculation was based on the assumption that Laclede's costs are accurately reflected in the accounting schedules contained in the Staff's direct testimony filing.

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

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

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

A. OPC recommends decreasing the residential customer charge from its current level of $12.00 to $8.50. Reducing Laclede's residential customer charge to this level would put this charge more in line with the residential customer charges of other Missouri LDCs. Laclede's residential customer charge is currently the highest for any Missouri LDC and may be one of the highest in the nation. The rest of residential class rate revenue requirement should be recovered from the commodity charge. We are not making any recommendations at this time regarding rate components for the other customer classes.

Q. BASED ON THE INTRA-CLASS SUBSIDIES REVEALED BY YOUR CLASS COS STUDY IN THIS CASE WHERE YOU SEPARATED THE RESIDENTIAL CUSTOMERS FROM THE REST OF THE GS CUSTOMERS, DO YOU BELIEVE IT IS POSSIBLE TO HAVE A COST STUDY ON WHICH INFORMED RATE DESIGN RECOMMEDATIONS CAN BE MADE FOR LACLEDE'S RESIDENTIAL CUSTOMERS WITHOUT TREATING RESIDENTIAL CUSTOMERS AS A SEPARATE CLASS?

A. Definitely not. My experience from treating residential customers as a totally separate class in the class COS study that I performed for this case leads me to believe that any Residential rate design recommendations that are made without the important information provided by a class COS study that treats residential customers as a totally separate class should be treated with great skepticism.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Main Diameter	Trended Costs
1	$1,132,399
2	$292,051,465
3	$12,658,477
4	$149,670,636
5	$677,506
6	$183,460,977
8	$111,203,417
10	$20,141,949
12	$79,288,752
13	$1,074,615
14	$12,080
16	$60,742,330
18	$639,098
20	$53,295,276
22	$11,077,286
24	$64,293,784
26	$8,235,984
30	$22,213,196
	$1,071,869,226

Lower Usage Customers (Residential & Gen C&I)

Common System

		Residential	General C&I	Large Volume	Interruptible	Firm Trans	Basic Trans	LP Gas	Unmtrd GL
RSUM Allocators (Transmission Mains)		**58.186 %**	**22.497 %**	**3.009 %**	**0.468 %**	**5.778 %**	**10.038 %**	**0.015 %**	**0.010 %**
"Direct Assign"	$293,183,864	$211,434,792	$81,749,071						
Common System	$778,685,362	$453,084,370	$175,180,376	$23,431,008	$3,644,601	$44,989,835	$78,162,680	$115,100	$77,393
Sum	$1,071,869,226	$664,519,162	$256,929,448	$23,431,008	$3,644,601	$44,989,835	$78,162,680	$115,100	$77,393
Composite Allocator (Distribution Mains)		**61.996 %**	**23.970 %**	**2.186 %**	**0.340 %**	**4.197 %**	**7.292 %**	**0.011 %**	**0.007 %**

Meters and Meters Installations

	Residential	Comm&Ind GS	LV	Interruptible	Firm	Basic	LP Gas	UMGL	Total
Number of Customers	588,008	39,230	138	15	57	91	240	121	627,900
Meter/Customer Ratio	1.00	1.00	1.17	1.17	1.17	1.17	1.00	-	
Estimated Number of Meters	588,008	39,230	162	17	67	107	240	-	
Meter/Regulator Cost	$93.54	$721.27	$17,060.81	$17,060.81	$17,060.81	$17,060.81	$93.54		
Weight	1.00	7.71	182.39	182.39	182.39	182.39	1.00	-	
Weighted Meter Count	588,008	302,501	29,557	3,134	12,268	19,461	240	-	955,169
Meter Allocation Factor	61.56%	31.67%	3.09%	0.33%	1.28%	2.04%	0.03%	0.00%	100%

Services and Services Installations

	Residential	Comm&Ind GS	LV	Interruptible	Firm	Basic	LP Gas	UMGL	Total
Number of Customers	588,008	39,230	138	15	57	91	240	121	627,900
Service Cost	$820.84	$1,641.98	$ 5,737.81	$ 5,737.81	$ 5,737.81	$ 5,737.81	$820.84	$410.42	
Weight	1.00	2.00	6.99	6.99	6.99	6.99	1.00	0.50	
Weighted Service Count	588,008	78,474	967	103	401	637	240	60	668,890
Service Allocation Factor	87.91%	11.73%	0.14%	0.02%	0.06%	0.10%	0.04%	0.01%	100%

Economy of Scale Factor[1]
***r* = 0.3**

Montly Sums of Class Peaks	Months % of Annual Peak	% of Cost To Satisfy	% Cost Increment in Month Over Prev	No. Months w/ Increment	Increment/ Months Occuring	Sum Cost Increments Occurring Each Month
9,638,161	100.00%	100.00%	2.68%	1	2.68%	15.41%
8,803,787	91.34%	97.32%	1.53%	2	0.76%	12.73%
8,352,018	86.66%	95.79%	6.70%	3	2.23%	11.97%
6,558,419	68.05%	89.09%	2.54%	4	0.64%	9.74%
5,955,060	61.79%	86.55%	5.23%	5	1.05%	9.10%
4,837,805	50.19%	81.32%	5.03%	6	0.84%	8.05%
3,911,168	40.58%	76.29%	5.37%	7	0.77%	7.22%
3,066,930	31.82%	70.93%	6.43%	8	0.80%	6.45%
2,234,560	23.18%	64.50%	6.90%	9	0.77%	5.65%
1,532,085	15.90%	57.60%	4.31%	10	0.43%	4.88%
1,182,457	12.27%	53.29%	1.02%	11	0.09%	4.45%
1,108,485	11.50%	52.27%	52.27%	12	4.36%	4.36%

Notes:
1 Each months percentage of annual peak is raised to the ***rth*** power to convert succesive monthly increments of capacity to increments of costs.

Calculation of RSUM Allocators (Cont.)

	Residential (therms/day)	General C&I (therms/day)	Large Volume (therms/day)	Interruptible (therms/day)	Firm Trans (therms/day)	Basic Trans (therms/day)	LP Gas (therms/day)	Unmetered GL (therms/day)	System Total
Jan	6,090,421	2,329,648	247,226	35,887	363,823	569,115	1,666	375	9,638,161
Feb	5,566,975	2,131,411	216,458	31,692	330,260	525,294	1,323	375	8,803,787
Dec	5,228,030	2,022,420	215,388	31,546	329,093	523,771	1,395	375	8,352,018
Mar	4,056,797	1,540,011	177,254	26,347	287,495	469,460	679	375	6,558,419
Nov	3,615,927	1,403,471	170,059	25,366	279,645	459,212	1,005	375	5,955,060
Apr	2,929,190	1,103,207	134,331	20,495	240,671	408,326	1,210	375	4,837,805
Oct	2,245,637	885,084	127,730	19,595	233,471	398,926	349	375	3,911,168
May	1,725,939	643,941	104,889	16,481	208,555	366,396	354	375	3,066,930
Sep	1,161,925	472,981	78,267	12,851	179,514	328,479	168	375	2,234,560
Jun	737,939	281,753	54,369	9,593	153,445	294,443	169	375	1,532,085
Jul	473,891	196,158	54,369	9,593	153,445	294,443	183	375	1,182,457
Aug	416,532	179,572	54,369	9,593	153,445	294,443	155	375	1,108,485

Percentage of System Total for Each Month

Jan	63.19%	24.17%	2.57%	0.37%	3.77%	5.90%	0.02%	0.00%	100.00%
Feb	63.23%	24.21%	2.46%	0.36%	3.75%	5.97%	0.02%	0.00%	100.00%
Dec	62.60%	24.21%	2.58%	0.38%	3.94%	6.27%	0.02%	0.00%	100.00%
Mar	61.86%	23.48%	2.70%	0.40%	4.38%	7.16%	0.01%	0.01%	100.00%
Nov	60.72%	23.57%	2.86%	0.43%	4.70%	7.71%	0.02%	0.01%	100.00%
Apr	60.55%	22.80%	2.78%	0.42%	4.97%	8.44%	0.03%	0.01%	100.00%
Oct	57.42%	22.63%	3.27%	0.50%	5.97%	10.20%	0.01%	0.01%	100.00%
May	56.28%	21.00%	3.42%	0.54%	6.80%	11.95%	0.01%	0.01%	100.00%
Sep	52.00%	21.17%	3.50%	0.58%	8.03%	14.70%	0.01%	0.02%	100.00%
Jun	48.17%	18.39%	3.55%	0.63%	10.02%	19.22%	0.01%	0.02%	100.00%
Jul	40.08%	16.59%	4.60%	0.81%	12.98%	24.90%	0.02%	0.03%	100.00%
Aug	37.58%	16.20%	4.90%	0.87%	13.84%	26.56%	0.01%	0.03%	100.00%

	Residential	General C&I	Large Volume	Interruptible	Firm Trans	Basic Trans	LP Gas	Unmetered GL	System
RSUM Allocators	**58.19%**	**22.50%**	**3.01%**	**0.468%**	**5.78%**	**10.04%**	**0.015%**	**0.010%**	**100.00%**

TOTAL COST OF SERVICE SUMMARY (000)		TOTAL	GS RESIDENTIAL	GS COM. & INDUSTRIAL	LARGE VOLUME	INTER-RUPTIBLE	FIRM	BASIC	LP	UMGL
1 O & M Expenses		103,218	74,142	22,789	1,712	223	1,620	2,701	26	4
2 Depreciation Expenses		21,666	15,618	4,495	381	49	413	703	5	1
3 Taxes		37,054	26,089	8,161	711	96	744	1,243	8	2
4										
5 TOTAL - Expenses and Taxes		161,938	115,849	35,445	2,804	368	2,777	4,648	39	8
6										
7 Current Revenue (non-gas)										
8 Rate Revenue (non-gas)		204,905	161,850	31,544	2,482	311	3,326	5,336	47	9
9 Late Payment Charges	20	3,020	2,151	662	54	7	54	90	1	0
10 Other Revenue (reverse S6.5)	20	(946)	(674)	(207)	(17)	(2)	(17)	(28)	(0)	(0)
11										
12 TOTAL - Current Revenues		206,979	163,327	31,999	2,519	316	3,363	5,398	47	9
13 Current Revenue Percentage		100.00%	78.91%	15.46%	1.22%	0.15%	1.62%	2.61%	0.02%	0.00%
14										
15 OPERATING INCOME		45,041	47,478	(3,446)	(285)	(52)	586	750	8	1
16		45,041								
17 TOTAL RATE BASE		512,141	359,061	113,570	10,266	1,409	10,438	17,251	114	32
18										
19 Implicit Rate of Return (ROR)		8.79%	13.22%	-3.03%	-2.77%	-3.69%	5.61%	4.35%	6.75%	4.17%
20										
21 OPC Recommended Rate of Return		8.34%	8.34%	8.34%	8.34%	8.34%	8.34%	8.34%	8.34%	8.34%
22										
23 Recommended Operating Income With										
24 Equalized (OPC) Rates of Return		42,713	29,946	9,472	856	118	871	1,439	9	3
25		42,713								
26 Class COS at OPC's Recommended Rate of Return		204,651	145,795	44,916	3,660	485	3,648	6,086	49	11
27 Revenue Percentage		100.00%	71.24%	21.95%	1.79%	0.24%	1.78%	2.97%	0.02%	0.01%
28										
29 Allocation of Difference Between Current										
30 Revenue and Recommended Revenue	20	(2,328)	(1,658)	(510)	(42)	(6)	(42)	(70)	(1)	(0)
31		(2,328)								
32 Margin Revenue Required to Equalize										
33 Class ROR - Revenue Neutral		206,979	147,453	45,427	3,702	491	3,689	6,156	49	11
34 Revenue Percentage		100.00%	71.24%	21.95%	1.79%	0.24%	1.78%	2.97%	0.02%	0.01%
35		206,979								
36 Rev. Neutral Shift to Equalize Class ROR		(0)	(15,874)	13,428	1,183	175	326	758	2	1
37 Rev. Neutral Shift Percentage to Equalize Class ROR			-9.81%	42.57%	47.66%	56.28%	9.81%	14.21%	5.06%	16.08%
38										
39 Recommended Revenue Neutral Shift = 1/2 indicated shift			(7,937)	6,714	591	88	163	379	1	1
40 OPC Recommended Revenue Neutral Shift Percentage			-4.90%	21.28%	23.83%	28.14%	4.90%	7.11%	2.53%	8.04%
41 Class Revenue Percentages After Rec. Rev. Neutral Shift			75.08%	18.70%	1.50%	0.19%	1.70%	2.79%	0.02%	0.00%

	Rate Design Analysis (000)	TOTAL	GS RESIDENTIAL	GS COM. & INDUSTRIAL	LARGE VOLUME	INTER-RUPTIBLE	FIRM	BASIC	LP	UMGL
1	Revenue Neutral Shifts (RNS) to Equalize Class									
2	Rates of Return (ROR)	($0)	($15,874)	$13,428	$1,183	$175	$326	$758	$2	$1
3										
4	Percentage Revenue Change to Equalize Class ROR	0.00%	-9.81%	42.57%	47.66%	56.28%	9.81%	14.21%	5.06%	16.08%
5										
6	Current Class Revenue Percentages	100.00%	78.91%	15.46%	1.22%	0.15%	1.62%	2.61%	0.02%	0.00%
7										
8	COS Indicated Class Revenue Percentages	100.00%	71.24%	21.95%	1.79%	0.24%	1.78%	2.97%	0.02%	0.01%
9										
10	**OPC's Recommended Revenue Neutral Shifts**	$ -	$ (7,937)	$ 6,714	$ 591	$ 88	$ 163	$ 379	$ 1	$ 1
11										
12	OPC's Recommended Revenue Percentages	0.00%	75.08%	18.70%	1.50%	0.19%	1.70%	2.79%	0.02%	0.00%
13										
14	**Spread of Proposed Revenue Requirement Increases/Reductions**									
15	$0 Revenue Requirement Increase	-	-	-	-	-	-	-	-	-
16	$15 Million Revenue Requirement Increase	15,000	11,261	2,806	225	29	256	419	3	1
17	$30 Million Revenue Requirement Increase	30,000	22,523	5,611	451	58	511	837	7	1
18	$5 Million Revenue Requirement Reduction	(5,000)	(3,754)	(935)	(75)	(10)	(85)	(140)	(1)	(0)
19	$10 Million Revenue Requirement Reduction	(10,000)	(7,508)	(1,870)	(150)	(19)	(170)	(279)	(2)	(0)
20										
21	**Combined Impact of Revenue Increase/Reduction and OPC's RNS**									
22	Combined Impact $0 Increase and OPC Shifts	-	(7,937)	6,714	591	88	163	379	1	1
23	Combined Impact $15 Million Increase and OPC Shifts	15,000	3,324	9,520	817	117	419	798	5	1
24	Combined Impact $30 Million Increase and OPC Shifts	30,000	14,586	12,325	1,042	146	674	1,216	8	2
25	Combined Impact $5 Million Reduction and OPC Shifts	(5,000)	(11,691)	5,779	516	78	78	240	0	0
26	Combined Impact $10 Million Reduction and OPC Shifts	(10,000)	(15,445)	4,844	441	68	(7)	100	(1)	0
27										
28	**Percentage Change in Class Rate Revenue**									
29	Combined Impact $0 Increase and OPC Shifts	0.00%	-4.86%	20.98%	23.47%	27.70%	4.85%	7.02%	2.50%	7.95%
30	Combined Impact $15 Million Increase and OPC Shifts	7.25%	2.04%	29.75%	32.42%	36.95%	12.45%	14.78%	9.93%	15.77%
31	Combined Impact $30 Million Increase and OPC Shifts	14.49%	8.93%	38.52%	41.37%	46.21%	20.05%	22.54%	17.36%	23.59%
32	Combined Impact $5 Million Reduction and OPC Shifts	-2.42%	-7.16%	18.06%	20.49%	24.62%	2.32%	4.44%	0.03%	5.34%
33	Combined Impact $10 Million Reduction and OPC Shifts	-4.83%	-9.46%	15.14%	17.51%	21.53%	-0.22%	1.85%	-2.45%	2.73%
34										
35	**Adjusted Impact of Revenue Increases/Reductions and OPC's RNS**									
36	Combined Impact $0 Increase and OPC Shifts	-	(7,937)	6,714	591	88	163	379	1	1
37	Combined Impact $15 Million Increase and OPC Shifts	15,000	3,324	9,520	817	117	419	798	5	1
38	Combined Impact $30 Million Increase and OPC Shifts	30,000	14,586	12,325	1,042	146	674	1,216	8	2
39	Combined Impact $5 Million Reduction and OPC Shifts	(5,000)	(5,000)	-	-	-	-	-	-	-
40	Combined Impact $10 Million Reduction and OPC Shifts	(10,000)	(9,992)	-	-	-	(7)	-	(1)	-
41										
42	**ADJUSTED REVENUE PERCENTAGE**									
43	Combined Impact $0 Increase and OPC Shifts	100.00%	75.08%	18.70%	1.50%	0.19%	1.70%	2.79%	0.02%	0.00%
44	Combined Impact $15 Million Increase and OPC Shifts	100.00%	75.08%	18.70%	1.50%	0.19%	1.70%	2.79%	0.02%	0.00%
45	Combined Impact $30 Million Increase and OPC Shifts	100.00%	75.08%	18.70%	1.50%	0.19%	1.70%	2.79%	0.02%	0.00%
46	Combined Impact $5 Million Reduction and OPC Shifts	100.00%	78.39%	15.84%	1.25%	0.16%	1.67%	2.67%	0.02%	0.00%
47	Combined Impact $10 Million Reduction and OPC Shifts	100.00%	77.84%	16.24%	1.28%	0.16%	1.70%	2.74%	0.02%	0.00%