BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Atmos Energy Corporation's Tariff Revision Designed to Consolidate Rates and Implement a General Rate Increase for Natural Gas Service in the Missouri Service Area of the Company.	))))	**Case No. GR-2006-0387**

AFFIDAVIT OF BARBARA A. MEISENHEIMER

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Barbara A. Meisenheimer, of lawful age and being first duly sworn, deposes and states:

1. My name is Barbara A. Meisenheimer. I am Chief 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 1-8.

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.

Barbara A. Meisenheimer

Subscribed and sworn to me this 30th day of June 2006.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 10, 2009
Cole County
Commission #05754036

Jerene A. Buckman
Notary Public

My Commission expires August 10, 2009.

DIRECT TESTIMONY
OF
BARBARA A. MEISENHEIMER

ATMOS ENERGY CORPORATION

(RATE DESIGN)

CASE NO. GR-2006-0387

Introduction and Summary

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

A. Barbara A. Meisenheimer, Chief Utility Economist, Office of the Public Counsel (OPC or Public Counsel), P. O. Box 2230, Jefferson City, Missouri 65102. I am also employed as an adjunct Economics and Statistics Instructor for William Woods University.

Q. HAVE YOU TESTIFIED PREVIOUSLY IN THIS CASE?

A. No.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In this testimony I will present Public Counsel's recommendations regarding rate design and class cost of service. I will also discuss the economic basis and development of the allocation factor for transmission and distribution mains that I used in the class cost of service study.

Q. DID THE COMPANY PREPARE A CLASS COST OF SERVICE STUDY (CCOS) IN THIS CASE OR DEVELOP REASONABLY COMPREHENSIVE DISTRICT SPECIFIC COST MEASURES?

A. No. The Company has requested substantial changes to both intraclass and interclass rates with little, if any, cost support for its proposals. In response to a number of data requests that I sent to the Company requesting district and class specific cost and cost causative information, I received numerous responses stating that the information was "not readily available."

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

A. A CCOS study provides the Commission with a general guide for a service based on costs to determine the just and reasonable rate. Other relevant factors must also be considerated when setting rates, such as the value of a service, the affordability of service, the rate impact, and rate continuity, to highlight a few. The Commission must on a case by case basis balance the results of a cost of service study with other relevant factors that go into the rate making decision process. The company has failed to affirmatively address this vital factor or its rate case. It failed to conduct a CCOS or show sufficient data to support its rate proposals.

Rate Design

Q. WHAT IS YOUR PRIMARY RECOMMENDATION WITH RESPECT TO RATE DESIGN IN THIS CASE?

A. Without district specific class cost of service information it is difficult to evaluate if the changes in the relative class revenue responsibility (either within or across districts) are reasonable. Atmos controls properties previously owned by at least three different gas companies. The service area previously served by Greeley Gas has never had a Missouri rate review. The service areas previously owned by United Cities Gas have not had the rates reviewed since about 1994. The properties previously owned by Associated Natural Gas have not had rates review since about 1997. The Commission should reject the Company's proposal and any other proposals to realign base rates among classes within a district or to blend district rates without an adequate cost based showing that such changes are warranted. Issues of class shifts within a district or potential district consolidations should be addressed in a separate rate design case in which the Company should develop and present comprehensive cost support and customer impact analyses.

Q. DO YOU PROPOSE ANY CHANGE IN THE RESIDENTIAL CUSTOMER CHARGE?

A. No. The lack of district specific information such as the actual cost of meters by customer type and district specific actual service cost by customer type provide insufficient support for altering the existing customer charge rates.

Q. IN ABSENSE OF THIS DISTRIC SPECIFIC INFORMATION, WOULD IT BE REASONABLE TO IMPLEMENT ANY CHANGES IN DISTRICT REVENUE REQUIREMENTS AS AN EQUAL PERCENTAGE CHANGE TO ALL OTHER RATE ELEMENTS?

A. Yes. Because the Company provided inadequate support for its proposed rate design so an across the board adjustment by district seems reasonable as the best option.

Class Cost of Service Studies

Q. IF THE COMMISSION DECIDES TO IMPLEMENT CLASS COST OF SERVICE ADJUSTMENTS IN THIS CASE, DO YOU HAVE CLASS COST OF SERVICE STUDIES AND A RATE DESIGN RECOMMENDATION FOR THE COMMISSION TO CONSIDER?

A. Yes, I have prepared CCOS studies and formulated a rate designed recommendation. Although I think that a greater level of cost detail is needed prior to realigning class rates, I developed class cost of service studies for the districts using the information that is currently available. With respect to rate design, these studies should be used as a guide and must be weighed against considerations of customer rate impact and affordability.

Q. WHAT CONCLUSIONS ARE SUGGESTED BY PUBLIC COUNSEL'S COST OF SERVICE STUDY?

A. Based on the results of my class cost of service studies, (BAM DIRECT Schedule 1 through BAM DIRECT Schedule 7), the following conclusions can be drawn,

the Residential class ranges from about 2.79% above cost of service in the United Cities district to about 17% below cost of service in the Greeley district.

The Small General Service class ranges from about 4 ½ % above cost of service in the Kirksville district to about 35% above cost of service in the Greeley district.

Large customers, including the Large General Service and Large Volume classes, range from about 50% below cost of service in the Palmyra district to 40% above cost of service in the Greeley district.

Special Contract customers in the SEMO and United Cities districts appear to be paying substantially below cost of service.

The percent above or below cost of service is shown for each class, by district on Line 27 in schedules BAM DIRECT Schedule 1 through BAM DIRECT Schedule 7.

Q. WHAT RATE DESIGN WOULD YOU PROPOSE BASED ON YOU CCOS STUDY RESULTS?

A. Where the existing revenue structure departures greatly from the class cost of service, the Commission should impose, at a maximum, class revenue shifts equal to one half of the "revenue neutral shifts" indicated by Public Counsel's class cost of service study. Revenue neutral shifts are shifts that hold overall company revenue at the existing level but allow for the share attributed to each class to be adjusted to reflect the cost responsibility of the class. In addition to moving half way to the revenue neutral shifts, I recommend that if the Commission determines that an overall increase in revenue requirement is necessary, then no customer

class should receive a net decrease as the combined result of: (1) the revenue neutral shift that is applied to that class, and (2) the share of the total revenue increase that is applied to that class. Likewise, if the Commission determines that an overall decrease in revenue requirement is necessary, then no customer class should receive a net increase as the combined result of: (1) the revenue neutral shift that is applied to that class, and (2) the share of the total revenue decrease that is applied to that class.

Q. IF THE COMMISSION DETERMINES IT REASONABLE IN THIS CASE, CAN YOUR RATE DESIGN METHODOLOGY BE APPLIED TO DIFFERENT REVENUE REQUIREMENTS?

A. Yes, it can. This method could be utilized to calculate class revenue requirements for any practical level of overall revenue requirement.

Class Cost of Service Studies

Q. WHAT IS THE REGULATORY PURPOSE OF A CLASS COST OF SERVICE STUDY?

A. A Class COS Study is a tool used by regulators to aid in determining an appropriate rate structure. A class cost of service study can be used as a guide in identifying, on a cost causative basis, the cost of serving a particular group of customers. A Class COS Study can also be used to evaluate the relative cost of service among classes. This comparison of relative cost is the focus of Public Counsel's study and is reflected in the study assumption that the company's revenue requirement is equal to the level of current revenue.

Q. WHAT ARE THE REPRESENTATIVE CLASSES INCLUDED IN PUBLIC COUNSEL'S CLASS COS STUDY?

A. In performing a Class COS Study, customers are grouped into "classes" based on type of customer and utilization patterns. Public Counsel's Class COS Study identifies five distinct classes of customers: Residential, Small General Services, Large General Services, Large Volume and Special Contract. These are the same classes identified by Staff in its Class COS Study with the exception of the Special Contract class.

Q. WHAT DISTRICTS ARE USED IN YOUR STUDIES?

A. I prepared a class cost of service study for the Butler, Greeley, Kirksville, Neelyville, Southeast MO (SEMO), Palmyra, and United Cities Districts.

Q. PLEASE DESCRIBE THE ASSIGNMENT OF COST TO THE CUSTOMER CLASSES.

A. The assignment of costs to customer classes is a three-step process in which costs are first functionalized, then classified, and finally allocated. Public Counsel's Class COS Study primarily reflects the booked cost incurred through the test year.

Q. PLEASE DESCRIBE THE FUNCTIONALIZATION OF COSTS.

A. Functionalization is achieved by categorizing cost accounts by associated function. Functional categories include; Production, Storage, Transmission, Distribution, Customer Accounts and Administrative and General (A&G). Some functional categories contain accounts that are identifiable as being directly or

jointly caused by particular customer classes. Other functional categories contain costs associated with common facilities or common overheads.

Q. PLEASE DESCRIBE THE CLASSIFICATION OF COSTS.

A. Classification is achieved by further categorizing costs into customer related, commodity related, demand related or "other related" costs.

Q. PLEASE DESCRIBE CUSTOMER RELATED COSTS.

A. Customer related costs vary directly with the number of customers served. Examples of customer related costs include: expenses associated with metering, reading, billing, and the costs associated with metering equipment and service connections

Q. PLEASE DESCRIBE COMMODITY RELATED COSTS.

A. Commodity related costs vary with the quantity of gas purchased. Historically, commodity related costs primarily have included purchased gas cost. Today local distribution companies recover purchased gas cost through the PGA but other plant accounts may still be categorized as commodity related.

Q. PLEASE DESCRIBE DEMAND RELATED COSTS.

A. Demand related costs vary with the capacity requirement of plant or equipment. They are related to the maximum system requirements that reflect the capacity necessary to serve demand during peak periods. Demand related costs include: production, transmission and storage costs and expenses associated with these

types of plant. In addition, some distribution plant and related expenses are demand related costs.

Q. PLEASE DESCRIBE THE ALLOCATION PROCESS.

A. Following functionalization and classification, allocation factors are applied to distribute a reasonable share of jurisdictional costs to each customer class. Some allocation factors are based on a simple ratio of a particular class' share of total costs. Other allocation factors are based on usage, sales, or weighted share of customers. Allocation factors are designed to reflect the appropriate classification in allocating costs.

Q. ARE PURCHASED GAS COSTS TREATED DIFFERENTLY THAN OTHER COSTS?

A. Yes. The Company's base tariff rates recover only its non-gas or margin costs. A purchased gas adjustment cost factor is used to recover gas costs. The cost of service study will develop the non-gas or margin costs incurred by the LDC in delivering gas from the city-gate to its customers.

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 were the source of most of the financial data that I utilized in preparing my studies. Most of the billing determinant information that I utilized was also provided by the Commission Staff. This data is from the year ending Sept, 30, 2005. I have also utilized data received from Atmos in response to Public Counsel's Data Requests. My use of this information should not be viewed as an endorsement of either Staff's or the

Company's methods for calculating accounting costs, billing determinants or peak demands. I have used this information because it contained the best level of detail available to perform my studies.

Q. IS THERE IS POSSIBILITY THAT SOME INFORMATION USED IN YOUR STUDY WILL BE UPDATED AND REVISED AS THIS CASE PROGRESSES?

A. Yes. I will update my studies to reflect any significant changes.

Q. HOW ARE INTANGIBLE PLANT ACCOUNTS ALLOCATED?

A. Intangible plant accounts include expenses related to organizing the enterprise, obtaining franchise and consent and other miscellaneous items. These costs are not attributable to a particular subset of customer classes, instead they are considered to be common costs and are allocated on the basis of the portion of total non-general plant cost assigned to each customer class.

Q. HOW ARE GAS STORAGE COSTS ALLOCATED?

A. Gas storage costs are allocated on the basis of weather normalized sales volumes.

Q. HOW ARE TRANSMISSION PLANT ACCOUNTS ALLOCATED?

A. Transmission plant is allocated on the basis of the modified RSUM allocation factor discussed in this testimony.

Q. HOW ARE DISTRIBUTION PLANT ACCOUNTS ALLOCATED?

A. Land and Land Rights, Structures and Improvements, and Mains Plant (Accounts 374, 375, and 376) are allocated on the basis of a distribution mains allocator.

Measuring and Regulating Station Equipment (Accounts 378 and 379) are classified as commodity related and allocated on the basis of annual margin sales. Accounts 380 through 386 are customer related. The following summary identifies the allocation factor for each account.

Table 1.

Account	Description	Allocator
380	Services	Services Allocator
381	Meters	Meter Allocator
382	Meter Installations	Meter Allocator
383	House Regulators	Regulator Allocator
384	House Regulators Installation	Regulator Allocator
385	Meas. and Reg. Station Equip. - Industrial	Commercial and Industrial Customers

Q. HOW ARE GENERAL PLANT ACCOUNTS ALLOCATED?

A. General plant accounts are allocated on the basis of the overall class cost of service.

Q. PLEASE DESCRIBE HOW OPERATION AND MAINTENANCE EXPENSES ARE ALLOCATED?

A. For allocating most of the accounts in this category, I used the "expenses follow plant principle".

Q. HOW ARE CUSTOMER ACCOUNTS, CUSTOMER SERVICE, AND SALES PROMOTION EXPENSES ALLOCATED?

A. Customer service expenses are customer related and are allocated on the basis of number of customer bills. Sales promotion expenses are allocated on the basis of the overall class cost of service and the following summary outlines the allocation of customer accounts expenses.

Table 2.

Account	Description	Allocator
901	Supervision	Meter Weighted Customers Allocator
902	Meter Reading Expenses	Meter Reading Weighted Customers
903	Customer Records and Collections	Meter Weighted Customers Allocator
904	Uncollectible Accounts	Class Cost of Service
905	Misc. Customer Accounts	Meter Weighted Customer Allocator

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

A. Property insurance (Account 924) is allocated on the basis of gross non-general plant. Injuries and damages and employee pensions and benefits (Accounts 925 and 926) are allocated on the basis of payroll. The remainder of A & G expenses are allocated on the basis of the overall class cost of service.

Q. HOW ARE TAXES ALLOCATED?

A. Property taxes are allocated on the basis of the total plant previously allocated to each class. Franchise taxes are allocated on the basis of rate base. Payroll taxes are allocated as a function of payroll expense. Income taxes are allocated according to the rate base attributable to each class.

Mains Cost Economies of Scale Factor

Q. WHAT ARE THE CHARACTERISTICS OF MAINS COST?

A. Mains are "shared" in the sense that they are facilities generally available and used to provide service to multiple customers and customer classes. Therefore, from an economic perspective, they should be treated as a shared cost recovered from all customers and classes that benefit from the facilities availability. Local distribution companies (LDCs) are generally believed to be natural monopolies. For natural monopolies, operation of fewer producers tends to result in the most cost effective market structure for providing service. One such cost reducing characteristic typical to natural monopolies such as LDCs is called "economies of scope". The term "economies of scope" refers to the ability to achieve cost

savings by utilizing the same equipment, facilities and/or expertise to provide multiple products at lower cost than if the products were produced on a stand-alone basis. In this case, the Company's investment in transmission and distribution mains provides the Company with the means to deliver natural gas to the locations of all customer classes in response to its customers' year-round demands for natural gas or have it available as a back-up fuel sources.

Another such cost reducing characteristic typical to natural monopolies such as LDCs is the presence of "economies of scale." The term "economies of scale" describes the phenomenon where larger scale production can achieve cost savings. In this case, the average cost of producing goods or services declines as the output level increases. According to various flow formulas, with other factors held constant, a 4" pipe has a flow capacity of about 6 times of that of a 2" pipe while, the per foot cost to install the 4" pipe may be less than 2 times the cost to install the 2" pipe. This means that the cost of the incremental capacity needed to serve during higher demand periods (peak periods) is less expensive than the average cost of capacity. Taking advantage of economies of scale benefits the utility by increasing use of facilities and in turn increasing revenues. It benefits those who do not use the system as much in peak periods because any revenue generated above incremental cost helps offset costs that would otherwise have to be recovered during normal use periods. It can also benefit the peak period user if some of the cost savings are reflected as per unit rate reductions. The cost study OPC has prepared and submitted includes an adjustment to allocating mains cost

to reflect the economies of scale inherent in providing service during peak periods.

Since all customers benefit from the existence of the system, all customers should contribute to the recovery of the cost of the system. Economic theory suggests that if each customer or class of customers is responsible for at least the incremental cost that this customer brings to the system, and that if no customer or class of customers is responsible for more than the stand alone cost that would be needed to serve this customer individually, then there is no cross-subsidy and the allocation of cost can be acceptable. However, both the incremental cost and the stand-alone cost of each customer class are hard to measure or determine. To accurately pinpoint the cost responsibility of each specific customer class is inherently impossible.

Q. HOW SHOULD ECONOMIES OF SCOPE RELATED TO THE COST OF MAINS BE REFLECTED IN THE ALLOCATION OF MAINS?

A. When economies of scope are present, the total cost of the transmission and distribution system for delivering gas to the residential, commercial and industrial classes would be less than the sum of the stand-alone costs of the separate distribution systems for delivering gas to each of the customer classes. Generally, when allocating the shared cost of joint production, the general principle is that no cross subsidization should be present. The term cross subsidization, in this context, describes a situation where the revenue earned on part of the total output of the industry is more than the stand-alone production cost of that part. This general principle attempts to ensure that no group of customers should pay more than they would have paid if they were to provide their own products and services

using the best available production technique. Similarly, for utilities that are "one-way" in nature, the revenue requirement for any customer class should be at least as large as the incremental cost to provide services to this class because otherwise somebody else will be forced to pay for more than its stand-alone cost.

The implication of this characteristic is that a just and reasonable cost allocation to a customer class ranges from the incremental cost to the stand-alone cost of providing services to that class. A judgment call is required to determine which point along this range is the most appropriate cost allocation. In fact, different viewpoints about whether the stand alone cost, the incremental cost, or a cost that is somewhere in the middle should be allocated to a product or a customer is one of the main reasons why different parties have different cost of service study results and different rate designs to recover the costs. However, absent other policy considerations, a just and reasonable solution should ask each customer class to pay for more than their respective incremental cost. The total cost will not be covered if each class only pays for its incremental cost.

Q. HOW SHOULD ECONOMIES OF SCALE RELATED TO THE COST OF MAINS BE REFLECTED IN THE ALLOCATION OF MAINS?

A: When economies of scale are present, there is not a one-to-one relationship between the incremental cost burden that the system peak load imposes upon the transmission and distribution system and that imposed by the average load. Therefore, we should not allocate cost corresponding to demand as if there is a direct one to one relationship between costs and the level of demand. Instead, we need to develop an allocation of mains costs that reflects an appropriate non-linear relationship. For example, if the peak demand is twice the average demand,

simply allocating half of the total cost of mains to customers who use natural gas at the peak period and half to customers who use at the base period does not reasonably apportion the per unit savings associated with production levels that achieve economies of scale. A better method would be to estimate the cost that are incurred to satisfy the increment of peak demand over average demand and allocate that portion of cost to those customers who use natural gas in the peak period. In this manner they receive an offsetting cost benefit associated with driving the system to higher use where economies of scale are achieved.

Q. PLEASE DISCUSS THE ORIGIN AND OF OPC'S NON-LINEAR ECONOMIES OF SCALE FACTOR USED IN THE ALLOCATION OF MAINS?

A. Barry Hall, an engineer that worked for our office during the 1990s, initially developed the basis for OPC's non-linear allocator. Using Company data, and mathematical and engineering relationships, he identified a nonlinear relationship between capacities and cost which he attributed to economies of scale.

Q. HAVE YOU UPDATED OPC'S NON-LINEAR ECONOMIES OF SCALE FACTOR FOR USE IN THIS CASE?

A. Yes, I have. For this case, I have performed a study to update OPC's economies of scale factor using information provided by the Staff and Company. The result of my study is an economies of scale factor of .24, which I used in OPC's cost of service study. Appendix 1 contains a description of the methods used to estimate this factor. Plots of the data points illustrating the declining cost per capacity unit and the functional form of the cost equation related to Appendix 1 are provided in BAM DIRECT Schedule 8.

Appendix 1

Q. Please describe the mathematical and engineering relationships relied upon to develop the economies of scale factor.

A. Based on page 6 of the direct testimony of Barry Hall in Case No. GR-97-393, the flow capacity (Q) of a pipe is related to the diameter (d) according to the equation;

(1) $Q= 28.05[(p_i^2-p_o^2)d^{5.33}/sL]^{.5}$

where L is the pipe length, p_i and p_o are the inlet and outlet pressures respectively and s is the gravity of the gas. Assuming the inlet and outlet pressures, and the length and gravity of the gas are constants the flow capacity in (1) can be expressed as;

(2) $Q=\alpha\ d^{2.665}$

where α is a constant.

Based on review of data plots of the general relationship between capacity and cost, I relied on an equation of the following form to fit a curve to express cost as a function of capacity;

(3) $C(Q_o) = \beta * Q_o^{r}$;

β is a constant.

From (2) we know $Q_o=\alpha\ d^{2.665}$. Since α is a constant, it is the exponent r that causes differences in the relative costs at different diameters and in turn causes different capacity levels. Therefore, the exponent r embodies the "economies of

scale" effect that causes cost to increase at a decreasing rate. In order to determine r it is acceptable to use the simplifying assumption $d^{2.665} = Q$.[1] This yields the equation;

(4) $C(Q) = bQ^r$

where $Q = d^{2.665}$.

In order to estimate r, since equation (4) is non-linear, I applied the natural log (Ln), which allows for estimation of r based on a linear regression;

(5) $\text{Ln } C(Q) = \text{Ln}\{bQ^r\}$ or $\text{Ln } C(Q) = \text{Ln } b + r \text{ Ln } Q$.

This is a linear equation of the form;

(6) $y = a + mx$

where a is a constant and m=r.

I performed two regressions utilizing data on steel and PE mains. I n averaged the two r values to obtain r=.24 which is the factor I used in my class cost of service study.

[1] $C(d) = a\alpha^r * (d^{2.665})^r = b_1 * (d^{2.665})^r$. A constant b exists such that C(d) =C(Q) when $Q = d^{2.665}$.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.