Schedule No:	
Issues:	▪ Cost of Service ▪ Rate Design ▪ Weather Normalization ▪ Revenue Synchronization Adjustment ▪ Customer Annualization Adjustment ▪ Loss and Unaccounted for Gas
Witness:	Thomas J.Sullivan
Type of Schedule:	Direct Testimony
Sponsoring Party:	Aquila
Case No:	
Date Testimony To Be Filed:	August 1, 2003

MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. _____

DIRECT TESTIMONY

OF

THOMAS J. SULLIVAN

ON BEHALF OF

AQUILA, INC.
d/b/a
AQUILA NETWORKS – MPS
and
AQUILA NETWORKS – L&P

Kansas City, Missouri
August, 2003

7/18/2003

State of Kansas)
) ss
County of Johnson)

AFFIDAVIT OF THOMAS J. SULLIVAN

Thomas J. Sullivan, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony and schedules entitled "Direct Testimony of Thomas J. Sullivan"; that said testimony was prepared by him and/or under his direction and supervision; that if inquiries were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge, information, and belief.

Thomas J. Sullivan

Subscribed and sworn to before me this 18th day of July, 2003.

Grace B. Hartman
Notary Public

GRACE B. HARTMAN
NOTARY PUBLIC
OFFICIAL SEAL
STATE OF KANSAS
MY COMMISSION EXPIRES
March 24, 2006

My Commission expires:

March 24, 2006

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DIRECT TESTIMONY OF THOMAS J. SULLIVAN

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Thomas J. Sullivan, 11401 Lamar, Overland Park, Kansas 66211.

Q. WHAT IS YOUR OCCUPATION?

A. I am a Principal Consultant in the Enterprise Consulting Division of Black & Veatch Corporation.

Q. HOW LONG HAVE YOU BEEN WITH BLACK & VEATCH?

A. I have been employed with the firm since 1980.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I received a Bachelor of Science Degree in Civil Engineering Summa Cum Laude from the University of Missouri - Rolla in 1980 and a Master of Business Administration Degree in Business Administration from the University of Missouri - Kansas City in 1985.

Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER?

A. Yes, I am a Registered Professional Engineer in the State of Missouri.

Q. TO WHAT PROFESSIONAL ORGANIZATIONS DO YOU BELONG?

A. I am a member of the American Society of Civil Engineers.

Q. WHAT IS YOUR PROFESSIONAL EXPERIENCE?

A. As a Principal Consultant, Project Manager, and Project Engineer in the Enterprise Consulting Division of Black & Veatch, I have been responsible for the preparation of numerous studies for gas, electric, water, and wastewater utilities. Clients served include investor owned and publicly owned utilities and their customers. My responsibilities have included the preparation of

studies involving valuation and depreciation, cost of service, cost allocation, rate design, cost of capital, supply analysis, load forecasting, economic and financial feasibility, cost of gas and electricity recovery mechanisms, and other engineering and economic matters.

Prior to joining the Enterprising Consulting Division in 1982, I worked as a staff engineer in the firm's Power and Civil-Environmental Divisions.

Q. PLEASE DESCRIBE THE FIRM OF BLACK & VEATCH.

A. Black & Veatch Corporation has provided comprehensive construction, engineering, and management services to utility, industrial, and governmental clients since 1915. The Corporation specializes in engineering and construction associated with utility services including electric, gas, water, wastewater, telecommunications, and waste disposal. Service engagements consist principally of investigations and reports, design and construction, feasibility analyses, rate and financial reports, appraisals, reports on operations, management studies, and general consulting services. Present engagements include work throughout the United States and numerous foreign countries. Including personnel assigned to affiliated companies, we have a staff of approximately 7,000 people.

Q. HAVE YOU PREVIOUSLY APPEARED AS AN EXPERT WITNESS?

A. Yes. I filed expert witness testimony on behalf of Missouri Gas Energy (a division of Southern Union Company) in Case No. GR-2001-292 before the Missouri Public Service Commission. My testimony in that matter addressed the Company's depreciation rates and net salvage allowances. A complete

listing of the cases where I have filed expert witness testimony are listed in Schedule TJS-1.

Q. FOR WHOM ARE YOU TESTIFYING IN THIS MATTER?

A. I am testifying on behalf of Aquila, Inc. d/b/a Aquila Networks - MPS and Aquila Networks – L&P ("Aquila" or "Company").

Q. WHAT ISSUES WILL YOU ADDRESS IN YOUR PREPARED DIRECT TESTIMONY?

A. I will sponsor the Company's proposed:

1. Weather normalization adjustment.
2. Revenue synchronization adjustment.
3. Customer annualization adjustment.
4. Loss and unaccounted for gas ("L&U").
5. Class cost of service study.
6. Rates and rate design.

For all six of these items, I will sponsor separate analyses and schedules for Aquila Networks – MPS (the former Missouri Public Service division) and Aquila Networks – L&P (the former St. Joseph Light and Power Company).

Q. DO YOU SPONSOR ANY SCHEDULES WITH YOUR TESTIMONY?

A. Yes, I do:

Schedule TJS-1 Expert Witness Testimony of Thomas J. Sullivan

Schedule TJS-2 Weather Normalization Statistical Results - MPS

Schedule TJS-3 Calculation of Weather Normalization Adjustment – MPS

Schedule TJS-4 Weather Normalization Statistical Results – L&P

Schedule TJS-5 Calculation of Weather Normalization Adjustment – L&P

Schedule TJS-6 Adjusted Volumes Compared to Weather Variation from Normal - MPS

Schedule TJS-7 Adjusted Volumes Compared to Weather Variation from Normal – L&P

Schedule TJS-8 Revenue Synchronization Adjustment – Revenues Under Existing Rates – MPS

Schedule TJS-9 Revenue Synchronization Adjustment – Revenues Under Existing Rates – L&P

Schedule TJS-10 Customer Annualization Adjustment – MPS

Schedule TJS-11 Customer Annualization Adjustment – L&P

Schedule TJS-12 Loss and Unaccounted for Gas – MPS

Schedule TJS-13 Loss and Unaccounted for Gas – L&P

Schedule TJS-14 Class Cost of Service Study – MPS

Schedule TJS-15 Functionally Classified Cost of Service by Class – MPS

Schedule TJS-16 Class Cost of Service Study – L&P

Schedule TJS-17 Functionally Classified Cost of Service by Class – L&P

Schedule TJS-18 Proposed Rates – MPS

Schedule TJS-19 Revenues Under Proposed Rates - MPS

Schedule TJS-20 Proposed Rates – L&P

Schedule TJS-21 Revenues Under Proposed Rates – L&P

All of these schedules were either prepared by me or under my direct supervision.

Q. ARE THERE ANY SIGNIFICANT DIFFERENCES IN THE METHODOLOGY YOU USE TO DETERMINE THE WEATHER NORMALIZATION, REVENUE SYNCHRONIZATION, AND CUSTOMER ANNUALIZATION ADJUSTMENTS; LOSS AND UNACCOUNTED FOR GAS; AND COST OF SERVICE STUDIES FOR THE MPS AND L&P SYSTEMS?

A. No, there are not. While I have prepared separate and distinct adjustments and analyses for the MPS and L&P systems, the format and approaches used in the analyses and schedules I prepare for MPS and L&P are the same with the exception of rate design. Therefore, the discussions of the approach I use apply to both MPS and L&P except as noted. The differences in rate design are discussed in that section of my direct testimony.

Weather Normalization Adjustment

Q. WERE WEATHER CONDITIONS IN THE COMPANY'S MISSOURI SERVICE TERRITORY NORMAL DURING THE TEST YEAR ENDED DECEMBER 31, 2002?

A. No, they were not. Heating degree-days from the weather stations that I relied upon in my analysis varied from 3.7 to 10.8 percent warmer than normal for the 13-month period ending December 2002.

Q. IN YOUR OPINION, DID WEATHER CONDITIONS VARY ENOUGH FROM NORMAL TO WARRANT ADJUSTING SALES?

A. Yes, they did.

Q. PLEASE DESCRIBE THE RATIONALE FOR ADJUSTING VOLUMES TO REFLECT NORMAL WEATHER CONDITIONS.

A. Because proposed rates are based on test year volumes, test year volumes should be adjusted to reflect sales that would have been expected in an otherwise "normal" (typical) year. If rates are based upon volume levels that are inflated due to colder than normal conditions, the rates will be set too low and may cause an underrecovery of costs during periods of normal conditions. Similarly, if rates are based upon volumes that are too low due to warmer than normal conditions, the rates will be set too high and will more than likely overrecover costs. The most reasonable basis on which to set rates is on normal conditions. Over the long term, this eliminates a bias which may be introduced by using volume levels that are higher or lower than what would normally be expected. Thus, it is necessary to apply a weather

adjustment to actual sales to recognize what volumes would have been if conditions were normal.

Q. PLEASE OUTLINE YOUR PREPARED DIRECT TESTIMONY CONCERNING WEATHER NORMALIZATION.

A. I will:

1) Describe the methodology used to determine the relationship between volumes and weather.

2) Describe the weather stations and weather data used in the analyses.

3) Describe the analyses used to adjust volumes to reflect normal weather conditions.

4) Describe the results of the heating adjustment analyses.

Q. PLEASE SUMMARIZE THE METHODOLOGY YOU USE TO DETERMINE THE RELATIONSHIP BETWEEN SALES VOLUMES AND WEATHER.

A. I use multiple linear regression analysis to define the relationship between sales and variables that represent weather conditions. I use regression in order to predict the value of a dependent variable (such as use per customer) using multiple independent variables (such as heating degree-days). In this regard, the goal is to explain the dependent variable with reasonable accuracy using as few independent variables as possible.

Multiple linear regression yields an equation of the form:

$$Y = B + A_1X_1 + A_2X_2 + ... + A_KX_K$$

where

Y	is the dependent variable
$X_1...X_K$	are the independent variables
B	is the y-intercept (or constant)
$A_1...A_K$	are the regression coefficients

With respect to my use of multiple linear regression as a tool in developing adjustments to reflect normal weather conditions, the dependent variable (Y) is monthly use per customer, and I calculate it by dividing monthly volumes by monthly number of customers. I use monthly use per customer as the dependent variable instead of total monthly volumes because the per customer basis reduces the effect of changes in number of customers (particularly on a seasonal basis) or monthly deliveries. Independent variables ($X_1...X_K$) are typically weather variables such as heating degree-days. The intercept (B) is a monthly constant. The constant represents the average customer use that is not affected by the independent variables. This non-weather sensitive use is generally referred to as base use. The coefficients ($A_1...A_K$) are developed from the regression analysis based on the best fit (least squares), i.e. those coefficient values that best predict actual use.

Several statistics can be calculated in connection with a regression analysis to assist in the evaluation of the significance (degree to which the independent variables explain the dependent variable) of an analysis. In my analysis, I focus on the coefficient of determination (R-squared), F statistic,

and the significance of F in my evaluation of the significance of alternative regression analysis results.

Q. WHAT RATE SCHEDULES DO YOU PROPOSE TO ADJUST?

A. I propose to adjust sales under those rate schedules that demonstrate use that is sensitive to changes in winter temperature conditions. Customers served under these rate schedules typically use natural gas for space heating. Variation in monthly heating degree-days typically explains most of the variation in sales to customers who use gas in space heating applications. I am proposing no weather adjustment to rate schedules where usage does not reflect a strong correlation with heating degree-days. Typically, these customers use natural gas for purposes other than space heating.

For MPS, the rate schedules I adjust are the following:

Residential (MO001, MO002, MO003)

General Service (MO051, MO052, MO053)

Large Volume Transportation (MO501, MO502, MO503)

Special Contract Customers (MO522, MO523, MO524, MO530, MO531, MO533)

For L&P, the rate schedules I adjust are the following:

Residential General (MO004, MO005)

General Service (MO054, MO055)

Commercial Large Volume Firm (MO284)

Q. WHAT VARIABLES DID YOU DETERMINE BEST EXPLAIN THE VARIATION IN HEAT SENSITIVE SALES AND WHAT IS THE BASIS FOR YOUR RECOMMENDATION REGARDING THESE VARIABLES?

A. The correlation between heating degree-days and sales to space heating customers is quite high. Heating degree-days (HDD) are typically used as a basis to predict a customer's natural gas space heating requirement. The results of my analyses in this case confirm this fact.

A heating degree-day is defined as 65 degrees less average daily temperature where average daily temperature equals the average of the high and low temperatures on each day. Sixty-five degrees is typically used as the base temperature. If the average daily temperature exceeds 65 degrees, the HDD for that day is set equal to zero. The sum of the daily heating degree-days for a particular month is the monthly heating degree-days.

In my regression analyses, I include current and previous month's heating degree-days as well as a trend factor as independent variables. Because sales are based on the reading of a customer's meter which lags the customer's actual usage and the reading of meters for most customers is done on a cycle that does not correspond to a calendar month, heating degree-days for the previous month are included as a variable. The trend factor recognizes a long run change in use per customer that is not attributable to changes in weather conditions (due to factors such as conservation or changes in typical home size).

I have found that the use of the current month's and prior month's heating degree-days as independent variables to explain variation in monthly use per customer produces results comparable to using billing cycle data (use per customer) and billing cycle heating degree-days. As will be discussed later in my testimony, I perform my statistical analyses over multiple years. Use of cycle billing data over multiple years is generally not practical.

Q. PLEASE DESCRIBE THE WEATHER DATA YOU UTILIZE.

A. I use monthly actual heating degree-day data published by the National Oceanographic and Atmospheric Administration (NOAA) for the following 11 weather stations for the MPS system: Clinton, Kansas City (KCI), Lexington, Marshall, Nevada, Sedalia, Brookfield, Chillicothe, Salisbury, Spickard, and Rolla; and for the L&P system, Maryville.

The Company maintains sales data by town and I assigned each town to a weather station comparable to what has been done by the Staff in MPS' and L&P's last rate cases.

Q. WHAT IS THE SOURCE OF THE DATA YOU USE FOR NORMAL HEATING DEGREE-DAYS?

A. The monthly normals I use for each weather station are equal to the thirty year normals published by NOAA for the period 1971-2000.

Q. WHAT SALES AND CUSTOMER DATA DO YOU USE?

A. At my request, the Company provided monthly sales and number of customers for each rate schedule and town for the years 1995 through 2002.

My goal is to use a sufficiently long period of time such that the average heating-degree days over that period are approximately equal to normal.

Q. WHY DO YOU WANT TO PERFORM YOUR ANALYSES OVER A PERIOD OF TIME THAT RELECTS NORMAL WEATHER CONDITIONS?

A. In connection with the numerous studies that I have made over the years, I have observed several anomalies. One of these anomalies is that for a specific customer class, the relationship between sales and heating degree-days can appear to change substantially from year to year. In studying this question, I found that significant changes in the relationship generally correspond to years where weather conditions are more abnormal. I therefore prefer to examine conditions over a more extended period in order to insure that any weather adjustment I make truly reflects normal usage characteristics.

Q. PLEASE DESCRIBE YOUR REGRESSION RESULTS.

A. In order to identify anomalies in usage patterns over the 8-year period for which I have sales data, I performed regression analyses in decreasing blocks of time (1995-2002, 1996-2002, 1997-2002, etc.) for each rate schedule. In Schedule TJS-2, I summarize the results of each regression analysis for the MPS system and in Schedule TJS-4 for the L&P system. I evaluated the results of each of these time periods using five criteria to determine which period should be used as the basis to calculate my proposed adjustment. These five criteria are:

1. Consistency of predicted normal use per customer.

2. Average annual HDDs for the period evaluated being near normal.
3. R squared – values in the high 90 percent range are common for residential and small commercial customer classes.
4. F statistic – higher values equate to higher level of significance.
5. Obvious changes in database as reflected in coefficients and statistics.

For the residential and commercial general service customers on both the MPS and L&P systems, criteria 1, 3, and 4 were very consistent for most of the time periods analyzed, and since weather conditions over the 8-year period 1995-2002 for each weather station were generally the closest to the 30-year NOAA normals, I used the 8-year analyses as the basis for my recommended adjustment for these two classes.

For the industrial firm, large volume transportation, and special contract customers, no one time period consistently met the criteria for all the weather stations and customer classes, primarily due to the small number of customers in these classes, the entry and exit of customers over the time period, and large changes in use per customer (not likely attributable to changes in weather conditions). Therefore, I evaluated each weather station and customer class separately to determine which time period best satisfied the criteria.

Q. HOW DID YOU DETERMINE THE HEATING VOLUME ADJUSTMENTS?

A. These calculations are summarized in Schedule TJS-3 for the MPS system and Schedule TJS-5 for the L&P system. The heating adjustment per customer is the difference between normal and actual HDDs multiplied by its respective coefficients (current and prior months) for each month of the test year. Using coefficients from Schedules TJS-2 and TJS-4 and the NOAA HDD data, the heating adjustments per customer are determined.

After the monthly heating adjustment per customer (Mcf/customer) is calculated, I multiply each of these figures by the respective number of customers for each month to determine the total volumetric adjustment. As shown in Column K of Schedules TJS-3 and TJS-5, my recommended heating adjustments are an increase in test year sales of 261,937 Mcf for the MPS system and an increase in test year sales of 34,374 Mcf for the L&P system.

Q. HOW DOES THIS ADJUSTMENT COMPARE WITH THE DIFFERENCE IN NORMAL HEATING DEGREE-DAYS DISCUSSED EARLIER?

A. In Schedules TJS-6 and TJS-7, I compare adjusted volumes as a percent of total volumes to the variation of heating degree-days from normal for the MPS and L&P systems, respectively. As shown in Schedules TJS-6 and TJS-7, the percent adjustment is comparable to the actual HDD deviation from normal.

Q. HOW DO YOU DETERMINE THE REVENUE AND COST OF GAS ADJUSTMENTS FOR EACH OF THE RATE SCHEDULES YOU ADJUSTED?

A. The margin adjustments are equal to the margin rate (excluding gas cost) times the sales adjustment. The margin adjustments are shown in Column M of Schedules TJS-3 and TJS-5 and are calculated by multiplying Column K by Column L. As shown in Schedules TJS-3 and TJS-5, the total margin adjustments amount to an increase in test year margin for the MPS system of $488,989 and for the L&P system of $52,524.

The adjustments to cost of gas are also shown in Schedules TJS-3 and TJS-5. These adjustments, shown in Column O, are the product of Columns K and N. As shown in Column O of Schedule TJS-3, this adjustment results in an increase in test year cost of gas (and in revenues from cost of gas) of $1,419,662 for the MPS system, and as shown in Schedule TJS-5, and increase in test year cost of gas of $172,994 for L&P system. The total revenue adjustment (Column P) is equal to the sum of the margin adjustment (Column M) plus the cost of gas adjustment (Column O). The total revenue adjustment for the MPS system (shown in Schedule TJS-3) is an increase in test year revenues of $1,908,651, and for the L&P system (shown in Schedule TJS-5) is an increase in test year revenues of $225,518.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY REGARDING YOUR PROPOSED WEATHER NORMALIZATION ADJUSTMENTS?

A. Yes, it does.

Revenue Synchronization Adjustment

Q. PLEASE EXPLAIN THE REVENUE SYNCHRONIZATION ADJUSTMENT YOU ARE PROPOSING.

A. The adjustment I am proposing simply synchronizes test year revenues with per books billing units and test year gas costs. The revenue synchronization adjustment includes two principal components:

1. Synchronize sales margin.
2. Synchronize transportation margin.

Q. WHY ARE YOU PROPOSING TO SYNCHRONIZE SALES AND TRANSPORTATION MARGINS?

A. The primary reason is to provide an appropriate basis upon which to compare revenues under existing and proposed rates. The revenue synchronization adjustment I am proposing results in test year revenues that are equal to test year billing units times the applicable existing rates. I can therefore take the same test year billing units times the proposed rates and accurately measure the revenue impact of the rates I am proposing in this matter.

Q. HAVE YOU PREPARED ANY SCHEDULES SHOWING HOW THESE ADJUSTMENTS ARE CALCULATED?

A. Yes, the detailed calculations of these adjustments are shown in Schedules TJS-8 and TJS-9. As shown on Page 1 of Schedule TJS-8, the revenue synchronization adjustment to MPS sales margin increases test year sales margin by $70,891. The revenue synchronization adjustment to transportation margin shown on Page 2 of Schedule TJS-8 decreases MPS

test year transportation margin by $14,665. As shown on Page 1 of Schedule TJS-9, the revenue synchronization adjustment to L&P sales margin increases test year sales margin by $30,595. As shown on Page 2 of Schedule TJS-9, the revenue synchronization adjustment to transportation margin decreases test year L&P transportation margin by $3,707.

Q. HOW DO SCHEDULES TJS-8 AND TJS-9 RELATE TO YOUR PROPOSED WEATHER NORMALIZATION ADJUSTMENT, CUSTOMER ANNUALIZATION ADJUSTMENT, CLASS COST OF SERVICE STUDY, AND RATE DESIGN?

A. The revenues, cost of gas, and units of service (number of customers and volumes) contained in Schedules TJS-8 and TJS-9 represent test year figures. I add my proposed weather adjustments and customer annualization adjustments to revenues, cost of gas, and sales volumes after reflecting the synchronization adjustment to arrive at test year revenues under existing rates summarized in Schedules TJS-19 and TJS-21, Column R.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY REGARDING YOUR PROPOSED REVENUE SYNCHRONIZATION ADJUSTMENT?

A. Yes, it does.

Customer Annualization Adjustment

Q. PLEASE EXPLAIN THE CUSTOMER ANNUALIZATION ADJUSTMENT YOU ARE PROPOSING.

A. The adjustment I am proposing adjusts the number of customers to reflect the average number of customers that I project to be served during the 12 month period immediately preceding the date the rates are expected to go into effect. The net adjustment to number of customers is then multiplied by the weather normalized use per customer for the test year ended December 31, 2002 to determine the volumetric adjustment. The net number of customers and volumes are then multiplied by the appropriate customer and volumetric charges (margin and cost of gas) to determine the revenue (and cost of gas) adjustments due to annualization of customers.

Q. TO WHAT DATE DO YOU ANNUALIZE THE NUMBER OF CUSTOMERS?

A. I annualize the number of customers to the 12 month period ended September 30, 2003. The actual date that is ultimately used will be based on the date determined by the Commission for the true-up phase of the rate case.

Q. PLEASE OUTLINE THE APPROACH YOU USE TO ANNUALIZE THE NUMBER OF CUSTOMERS TO SEPTEMBER 30, 2003.

A. Using the historical monthly database of customers for the period 1995-2002, I project monthly number of customers by weather station for the residential and general service classes through December 2003 using seasonal decomposition to capture the effect of customer seasonality. I then averaged

the number of customers for the year ending September 2003. The difference between the average number of customers at September 2003 and December 2002 (per books) is the annualization adjustment. I did not make an annualization adjustment to large volume or transportation customers.

Q. HAVE YOU PREPARED SCHEDULES SHOWING HOW THE ADJUSTMENTS TO NUMBER OF CUSTOMERS ARE CALCULATED?

A. Yes, the detailed analyses are show in Schedules TJS-10 and TJS-11.

Q. PLEASE SUMMARIZE THE CUSTOMER ADJUSTMENTS YOU ARE PROPOSING.

A. The customer adjustment to MPS increases the test year number of customers by 202 customers. The customer adjustment to L&P decreases the test year number of customers by 15 customers. These adjustments are shown in Column I of Schedules TJS-10 and TJS-11, respectively.

Q. PLEASE DISCUSS HOW YOU DETERMINED THE VOLUMETRIC ADJUSTMENTS ASSOCIATED WITH THE NUMBER OF CUSTOMER ADJUSTMENTS.

A. The volumetric adjustment associated with the customer annualization adjustment is calculated by multiplying the weather normalized use per customer shown in Column H by the customer adjustment shown in Column I of Schedules TJS-10 and TJS-11. The volumetric adjustment to MPS increases test year throughput by 19,807 Mcf. The volumetric adjustment to L&P decreases test year throughput by 1,060 Mcf.

Q. PLEASE DISCUSS HOW YOU DETERMINED THE MARGIN AND COST OF GAS ADJUSTMENTS RELATED TO THE CUSTOMER ANNUALIZATION ADJUSTMENT.

A. The margin adjustment is determined by multiplying the customer adjustment times the respective customer charge plus the volumetric adjustment times the respective distribution charge. The cost of gas adjustment is determined by multiplying the volumetric adjustment times the average unit cost of gas. The annualization adjustment to MPS increases test year revenue by $207,506. The annualization adjustment to L&P decreases test year revenue by $8,214.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY REGARDING YOUR PROPOSED CUSTOMER ANNUALIZATION ADJUSTMENT?

A. Yes, it does.

Loss and Unaccounted For Gas

Q. WHY ARE YOU ADDRESSING LOSS AND UNACCOUNTED FOR GAS IN YOUR TESTIMONY?

A. According to Section 5.02 Measurement of Gas of MPS' Rules and Regulations, "…lost and unaccounted for factors should be maintained for informational purposes, and used to develop reasonable lost and unaccounted for percentages in the next Missouri Public Service rate case."

Q. HAVE YOU PERFORMED AN ANALYSIS OF THE COMPANY'S LOSS AND UNACCOUNTED FOR GAS?

A. Yes, I have. It is contained in Schedules TJS-12 and TJS-13 for the MPS and L&P systems, respectively.

Q. PLEASE DESCRIBE THE CONTENTS OF THESE SCHEDULES.

A. Schedule TJS-12 summarizes monthly purchases and billed sales for the MPS Southern, Northern, and Eastern systems for the 5-year period ending August 2002. Schedule TJS-13 summarizes monthly purchases and billed sales for the L&P system for the 12 month period ending August 2002. Ideally, I prefer at least five years of data to review trends in lost and unaccounted. For the MPS system, five years of data was available. For the L&P system, only one year was available for review.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY REGARDING LOSS AND UNACCOUNTED FOR GAS?

A. Yes, it does.

Class Cost of Service Study

Q. HAVE YOU PREPARED A CLASS COST OF SERVICE STUDY FOR AQUILA NETWORKS' MPS AND L&P SYSTEMS OPERATIONS?

A. Yes, I have. Schedules TJS-14 and TJS-16 contain the class cost of service studies for MPS and L&P, respectively. Schedules TJS-15 and TJS-17 contain the functionally classified cost of service by class for MPS and L&P, respectively.

Q. PLEASE BRIEFLY DESCRIBE THE CONTENTS OF SCHEDULES TJS-14 AND TJS-16.

A. Schedules TJS-14 and TJS-16 consist of 9 tables that develop cost of service (revenue requirement) by customer class. Class cost of service at the claimed rate of return is summarized in Table 1. Class rates of return under existing rates are shown in Table 2. Tables 3 and 4 show the allocation of plant, depreciation reserve, and other rate base items to customer classes. Table 5 shows the allocation of income taxes under existing rates to customer classes. Tables 6 and 7 show the allocation of operation and maintenance expenses, depreciation expenses, and taxes other than income taxes to customer classes. Table 8 shows the allocation of other operating revenues to customer classes. Table 9 shows the allocation factors used in the class cost of service study.

Q. HOW HAVE THE CLASSES BEEN DEFINED FOR PURPOSES OF THE COST OF SERVICE STUDY?

A. The customer classes I use in my class cost of service studies for each system generally follow the rate schedules under which the Company currently provides service. For the MPS system, the sales classes have been defined as Residential, General Service, and Large Volume. The transportation classes have been defined as Small Volume and Large Volume.

For the L&P system, the sales classes have been defined as Residential, General Service, and Large Volume Sales. There is only one transportation class, Large Volume.

Q. PLEASE DISCUSS THE PRINCIPAL ALLOCATIONS USED IN YOUR CLASS COST OF SERVICE STUDY.

A. The allocation bases used to allocate costs are identified on each line in Column (J) of Schedule TJS-14 and Column (I) of Schedule TJS-16. There are generally two types of allocation bases contained in my class cost of service study. There are internal allocation bases which include allocations where a cost item is allocated based on the results of the allocation of other cost items. For example, property taxes are allocated based on total plant in service less intangible plant. The second type of allocation bases is summarized in Table 9 of Schedules TJS-14 and TJS-16. These allocation bases represent either relative service characteristics of the various customer classes or relative costs of performing customer accounting functions.

Q. PLEASE DISCUSS EACH OF THE ALLOCATION BASES DEVELOPED IN TABLE 9.

A. There are six allocation bases developed in Table 9.

Throughput. This allocator is equal to the fully adjusted test year annual throughput (sales and transportation) associated with each customer class. This allocation basis is used to allocate costs that vary with annual volumes. This throughput allocator may also be referred to as a commodity allocator.

Sales. This allocator is equal to the fully adjusted test year sales associated with each sales customer class. This allocation basis is used to allocate costs that vary with annual purchased volumes.

Peak Day. This allocator is equal to the estimated peak day requirements for each customer class. This allocation basis is used to allocate costs that vary with the level of peak demand. This peak day allocator may also be referred to as a capacity allocator.

Services. This allocator is based on average number of customers weighted by the relative investment in services related costs (Account 380) for each customer class. This allocation basis is used to allocate services related costs. This allocation basis is also used for the customer component of mains related costs discussed later in my testimony.

Meters and Regulators. This allocator is based on the average number of customers weighted by the relative investment in meters

and regulators costs (Accounts 381 through 385) for each customer class. This allocation basis is used to allocate meters and regulators related costs.

Customer Accounts. This allocator is based on the number of bills weighted by the relative cost of customer accounting functions (meter reading, billing, customer accounting, etc.) for each customer class. This allocation basis is used to allocate costs related to billing and servicing customer accounts.

Q. PLEASE DISCUSS HOW YOU DETERMINED YOUR PEAK DAY REQUIREMENTS USED IN YOUR PEAK DAY ALLOCATION BASIS.

A. For the residential and general service classes, I calculated an estimated peak day load factor (average annual use divided by peak day use) based on the peak day requirements per customer. Peak day requirements are estimated by my use of regression results and peak heating degree-day. The peak heating degree-day for each weather station was determined by subtracting the coldest daily mean temperature during the 1971-2000 period from a base of 65 degrees. Annual throughput divided by 365 days divided by the load factor equals peak day requirements.

For MPS large volume and transportation customer classes, I estimated peak day load factor by summing their billed peak daily demands based on January 2002 for each customer and dividing it by average annual daily demand. Since billing peak demands were not available for L&P large volume and transportation customer classes, I computed peak day as 1/20th

of the January 2002 monthly volumes, which is consistent with MPS' existing tariff for the determination of billing demand.

Q. WHAT IS THE BASIS FOR YOUR ALLOCATION OF TRANSMISSION AND DISTRIBUTION MAINS?

A. The allocation of transmission and distribution mains that I use is based on a detailed study of the Company's investment and the relative capacity of the MPS and L&P facilities comparable to studies I have conducted in other Aquila jurisdictions. With regard to the MPS transmission mains related investment, I allocate 50 percent on the basis of peak demand and 50 percent on the basis of throughput. L&P has no transmission investment. With regard to distribution mains related investment on the MPS system, I allocate 45.4 percent on the basis of peak demand, 53.8 on the basis of services, and 0.8 percent on the basis of throughput. On the L&P system, I allocate 57.8 percent on the basis of peak demand, 28.4 on the basis of services, and 13.8 percent on the basis of throughput. The detailed analyses used to develop these allocations are in my filed workpapers.

Q. PLEASE EXPLAIN SCHEDULES TJS-15 AND TJS-17.

A. Schedules TJS-15 and TJS-17 develop functionally classified cost of service by customer class. The same costs and allocation bases that are used in Schedules TJS-15 and TJS-17 are used in Schedules TJS-14 and TJS-16; however, the cost of service is calculated in Schedules TJS-15 and TJS-17 so that the cost of each unbundled service provided by MPS and L&P can be

determined for each customer class. Schedules TJS-15 and TJS-17 can generally be referred to as unbundled cost of service studies.

The structure of Schedules TJS-15 and TJS-17 is similar to Schedules TJS-14 and TJS-16 except the cost of each cost function is determined first and then these functionalized costs are allocated to customer classes.

Q. PLEASE DEFINE THE COST FUNCTIONS USED IN SCHEDULES TJS-15 AND TJS-17.

A. The cost functions used in Schedules TJS-15 and TJS-17 generally parallel the allocation bases discussed in connection with Schedules TJS-14 and TJS-16 and include the following:

Commodity – costs that vary with the throughput of the system

Sales – costs that vary with the volume of gas sold

Transmission/Distribution – split between commodity, capacity, and customer related costs

Services – services (Account 380) related costs

Meters and Regulators – meters and regulators (Accounts 381-385) related functions

Customer Accounting – split between meter reading, customer accounting and other customer accounting related costs

Q. PLEASE INDICATE WHERE THE PRINCIPAL FINDINGS OF THE FUNCTIONALLY CLASSIFIED CLASS COST OF SERVICE STUDIES ARE SUMMARIZED.

A. The results of the unbundled cost of service studies are summarized in Table 9 of Schedules TJS-15 and TJS-17. This table shows not only the cost of providing each service to each customer class but also the unit cost of these services by customer class. These unit costs form another basis upon which to assess the existing and proposed customer charges and energy rates for each of the customer classes.

Q. DOES THIS COMPLETE YOUR PREPARED DIRECT TESTIMONY WITH REGARD TO YOUR CLASS COST OF SERVICE STUDY?

A. Yes, it does.

Proposed Rates

General Guidelines

Q. WHAT GENERAL GUIDELINES DID YOU FOLLOW IN THE DESIGN OF PROPOSED RATES?

A. I followed two broad guidelines in designing the rates I am proposing for MPS and L&P:

1) Modify existing rate structures so that the basic rate structures are the same for MPS and L&P.

2) Establish the rates for MPS and L&P separately based on the revenue requirements and class cost of service studies applicable to each.

Q. WHY ARE YOU PROPOSING THAT THE RATE STRUCTURES FOR THE MPS AND L&P SYSTEMS BE THE SAME?

A. In the short run, it simplifies administration of the rates. In addition, the structural changes I am recommending primarily impact the MPS system and are intended to move the structure in a direction that more closely reflects the rate structures that I am familiar with in the industry, in the other jurisdictions in which Aquila operates, and in Missouri for the other utilities regulated by the Commission. The L&P rate structure for the most part already meets these goals. In the longer run, if the relative cost structures change and/or the Commission determines that the same rates should be charged for all Aquila customers in the State of Missouri, having comparable structures already in place will simplify this transition.

Q. WHY ARE YOU PROPOSING TO BASE THE MPS AND L&P RATES ON THEIR SEPARATE REVENUE REQUIREMENTS AND CLASS COST OF SERVICES STUDIES?

A. It is my understanding that the Commission has orally communicated with the Company to provide separate revenue requirements and rates for each system.

Q. WHAT ARE THE MODIFICATIONS YOU ARE PROPOSING TO THE RATE STRUCTURES?

A. I am recommending the following changes to the MPS and L&P rate structures:

1) Eliminate the energy charge block rates on the MPS General Service rate.
2) Establish a Small Volume Firm sales rate for both MPS and L&P.
3) Eliminate the energy charge block rates on the MPS Large Volume sales and transportation rates and lower the availability threshold for the Large Volume rate.
4) Eliminate the energy charge block rates on the MPS Small Volume Transportation Rate and have this rate parallel the new Small Volume Firm sales rate.

Q. WHY ARE YOU PROPOSING TO ELIMINATE THE ENERGY CHARGE BLOCK RATES IN THE EXISTING MPS GENERAL SERVICE, LARGE VOLUME, AND SMALL VOLUME TRANSPORTATION RATES?

A. There are five primary reasons I am making this recommendation. First, the existing L&P rate structure does not include any block rates. Second, based

on my experience, the trend in establishing natural gas rates has been away from block rates. This is particularly true in the other jurisdictions where the Company provides natural gas service. Third, one of the rationales for block rates has historically been to recover customer related costs not recovered in a customer charge in a first rate block. Based on the trend in Missouri to establish customer charges for natural gas service that more closely match customer related costs, there is no need to establish a first block to collect these costs. Fourth, another rationale for block rates is to establish one rate that can be used to serve a fairly heterogeneous class of customers. For cost of service and rate administrative purposes, I believe that it is preferable to establish rates and cost of service analyses using groups of customers that are more homogeneous with regards to size and load characteristics. Finally, a flat energy charge is much easier for customers to understand and for the Company to administer.

Q. IS THERE ANOTHER MORE SPECIFIC CONCERN WITH THE EXISTING MPS BLOCK RATE STRUCTURE?

A. Yes. The change to the last block in all cases is very large. For example, the first three blocks of the existing General Service and Small Volume Transportation rates decline from $0.24008 per Ccf to $0.22208 per Ccf to $0.20405 per Ccf and then the fourth block drops to $0.07546 per Ccf (a decline of 63 percent). A similar decline occurs on the Large Volume Firm, Interruptible, and Transportation rates where the decline is from $0.02460 per

Ccf to $0.0100 per Ccf (a decline of 60 percent). A customer whose usage straddles these thresholds is given very conflicting price signals.

Q. HOW ARE YOU RECOMMENDING TO RESTRUCTURE THE EXISTING GENERAL SERVICE RATE?

A. I am recommending the existing General Service rate be restructured as Small Commercial and Small Volume rates and that the larger customers be transferred to the Large Volume rate.

Q. WHY ARE YOU PROPOSING A SMALL VOLUME RATE AND A REDUCTION IN THE THRESHOLD FOR THE LARGE VOLUME RATES?

A. These recommendations are made in conjunction with my recommendation to eliminate the energy charge block rates on the existing General Service rate. My analysis indicates that the existing General Service rate serves customers ranging in size from a residential customer all the way up to just below the current threshold for the existing Large Volume rate. It would not be reasonable to charge these customers the same flat energy charge. First, the cost of service is not the same. Second, some individual customers would see a significant rate decrease, while others would see a disproportionate rate increase.

Q. WHAT THRESHOLDS ARE YOU RECOMMENDING WITH REGARDS TO THE SMALL COMMERCIAL, SMALL VOLUME, AND LARGE VOLUME RATES?

A. I am recommending that the Small Commercial rate apply to customers whose annual usage is less than 5,000 Ccf and that the Large Volume rate

apply to customers whose annual usage is greater than 40,000 Ccf (compared to the existing threshold of 60,000 Ccf per year). Therefore, the Small Volume rate would apply to customers whose annual usage is between 5,000 Ccf and 40,000 Ccf.

Q. ON WHAT BASIS DID YOU ESTABLISH THESE THRESHOLDS?

A. There were four criteria I used in establishing these thresholds. First, I examined all the bills of the customers served under the existing General Service rates for MPS and L&P and created a frequency distribution showing how many customers fell into various annual consumption blocks. This type of analysis usually indicates concentrations of customers so that cut-off points can be established with less disruption and/or customers straddling the threshold. In this case, there were significant drops in the relative number of customers around the two thresholds: 5,000 Ccf and 40,000 Ccf per year. Second, I considered the thresholds used in other jurisdictions of the Aquila system and those of other utilities in Missouri. The thresholds recommended are comparable to those contained in Aquila tariffs in other jurisdictions and also to those of other Missouri gas utilities. Third, I determined the relationship between customer size (annual usage) and cost of service. This exercise was used primarily in designing the level of rates; however, it does provide valuable information such that thresholds are established that result in classes of customers whose cost characteristics are significantly different enough to warrant different rates. Finally, an additional consideration in establishing the actual level of proposed rates was the differences between

revenues under existing and proposed rates on a customer basis in order to mitigate disruption. In summary, I believe that the thresholds I am recommending provide a good balance between recognizing cost of service, minimizing disruption, and simplifying and standardizing the rate structures.

Q. ARE THERE ANY OTHER SPECIFIC GUIDELINES THAT YOU FOLLOW IN THE DESIGN OF PROPOSED RATES FOR MPS AND L&P?

A. Yes, these guidelines were followed:

1) Customer charges should more directly reflect customer related costs.
2) Margins for comparable sales and transportation services should be the same.
3) Rates should be based on class cost of service to the extent possible.

Proposed Rates - MPS

Q. WHAT IS THE OVERALL INCREASE THAT THE MPS PROPOSED RATES ARE DESIGNED TO PRODUCE?

A. Approximately $5.6 million.

Q. HAVE YOU DESIGNED A SET OF RATES FOR MPS REFLECTING THE GUIDELINES DISCUSSED EARLIER AND THE $5.6 MILLION INCREASE?

A. Yes. In Schedule TJS-18, I summarize the rates I am proposing for MPS. In Schedule TJS-19, I show a detailed calculation of revenues under existing and proposed rates for MPS.

Q. PLEASE DISCUSS YOUR SPECIFIC RATE DESIGN RECOMMENDATIONS FOR THE MPS RESIDENTIAL RATE.

A. I am recommending the Residential customer charge be increased from $9.00 per month to $15.00 per month and the energy charge be increased from $0.22295 per Ccf to $0.26825 per Ccf. The $15.00 per month customer charge is more in line with the customer related costs of $17.84 per bill determined in my class cost of service study. The $0.26825 per Ccf energy charge is the level required with the $15.00 per month customer charge such that the Company earns a rate of return of 9.74 percent on the Residential class, which is the Company's overall requested rate of return.

Q. PLEASE DISCUSS YOUR SPECIFIC RATE DESIGN RECOMMENDATIONS FOR THE REMAINING MPS NON-RESIDENTIAL RATES.

A. The existing General Service customer charge is $15.00 per month. I am recommending that the Small Commercial (usage less than 5,000 Ccf per year) customer charge set at $25.00 per month and the energy charge be set at $0.26200 per Ccf. For the Small Volume customers (Firm and Transportation), I am recommending that the customer charge be set at $50.00 per month and the energy charge be set at $0.19200 per Ccf. For the Large Volume customers (Firm, Interruptible, and Transportation), I am recommending no change to the existing customer charge of $215.00 per month, that the energy charge be increased to $0.03790 per Ccf, and that the demand charge be increased to $0.40000 per Ccf of billing demand per month.

Q. HOW DO THESE PROPOSED CUSTOMER CHARGES COMPARE TO YOUR COST OF SERVICE STUDY?

A. My functionally classified cost of service study (Schedule TJS-15, Table 9, Line 10, Column D) indicates that customer related costs for the Residential class equal $17.84 per month which is significantly greater than the current customer charge of $9.00 per month. An increase from the existing $9.00 per month to the proposed $15.00 per month moves the rate in the direction of actual cost. The customer related costs for the existing General Service class equals $41.26 per month (Line 11) which is significantly greater than the existing $15.00 per month customer charge. I am proposing a $25.00 per month customer charge for the Small Commercial rate and a $50.00 per month customer charge for the Small Volume rate. These customer charges more reasonably reflect cost. The customer related costs for the Large Volume and Transportation classes equals $187.43 per month (Lines 12 through 14). I am recommending no change to the existing customer charge of $215.00 since the customer charge is currently set near its actual cost.

Q. WHAT IS THE BASIS FOR YOUR RECOMMENDED ENERGY CHARGES FOR MPS' NON-RESIDENTIAL CUSTOMERS?

A. The energy charges recognize the relative differences in cost of service of the three groups of customers (Small Commercial, Small Volume, and Large Volume) relative to each other and the Residential class and the overall cost of service of the non-residential customer classes such that the Company earns its requested rate of return of 9.74 percent on this group. Another

consideration in the design of the Small Volume and Large Volume rates was to mitigate the magnitude (either up or down) of the impact of the proposed rates.

Proposed Rates – L&P

Q. WHAT IS THE OVERALL INCREASE THAT THE L&P PROPOSED RATES ARE DESIGNED TO PRODUCE?

A. Approximately $0.8 million.

Q. HAVE YOU DESIGNED A SET OF RATES FOR L&P REFLECTING THE GUIDELINES DISCUSSED EARLIER AND THE $0.8 MILLION INCREASE?

A. Yes. In Schedule TJS-20 I summarize the rates I am proposing for L&P. In Schedule TJS-21 I show a detailed calculation of revenues under existing and proposed rates for L&P.

Q. ARE YOU RECOMMENDING THAT EXISTING LOWER RESIDENTIAL AND GENERAL SERVICE CUSTOMER CHARGES FOR FAIRFAX, ROCKPORT, AND TARKIO BE RETAINED?

A. No, I am not.

Q. PLEASE DISCUSS YOUR SPECIFIC RATE DESIGN RECOMMENDATIONS FOR THE L&P RESIDENTIAL RATE.

A. I am recommending that the Residential customer charge be increased from $6.66 per month ($5.65 per month for Fairfax, Rockport, and Tarkio) to $10.00 per month and the energy charge be increased from $0.16350 to $0.22950 per Ccf. The $10.00 per month customer charge is more in line

with the customer related costs of $13.38 per bill determined in my class cost of service study. The $0.22950 per Ccf energy charge is the level required with the $10.00 per month customer charge such that the Company earns a rate of return of 10.08 percent on the Residential class, which is the Company's overall requested rate of return.

Q. PLEASE DISCUSS YOUR SPECIFIC RATE DESIGN RECOMMENDATIONS FOR THE REMAINING L&P RATES.

A. The existing General Service customer charge is $12.31 per month ($9.39 per month for Fairfax, Rockport, and Tarkio). I am recommending that the Small Commercial (usage less than 5,000 Ccf per year) customer charge be set at $20.00 per month and the energy charge be set at $0.20650 per Ccf. For the Small Volume customers (Firm and Transportation), I am recommending that the customer charge be set at $40.00 per month and the energy charge be set at $0.17150 per Ccf. For the Large Volume customers (Firm, Interruptible, and Transportation), I am recommending a customer charge of $200.00 per month, that the energy charge be set at $0.03500 per Ccf, and that the demand charge be set at $0.40000 per Ccf of billing demand per month.

Generally, these recommendations parallel the rates I am proposing for the MPS system, reflecting the lower relative revenue requirement and lower relative cost of service for L&P. In addition, I am recommending that rates be established for L&P to mirror MPS even though there may not

currently be any customers that would be served under some of the rates for L&P.

The energy charges recognize the relative differences in cost of service of the three groups of customers (Small Commercial, Small Volume, and Large Volume) relative to each other and the Residential class and the overall cost of service of the non-residential customer classes such that the Company earns a rate of return of 10.09 percent on this group, which is very close to the Company's overall requested rate of return of 10.08 percent. Another consideration in the design of the Small Volume and Large Volume rates was to mitigate the magnitude (either up or down) of the impact of the proposed rates.

Q. HOW DO THESE PROPOSED CUSTOMER CHARGES COMPARE TO YOUR COST OF SERVICE STUDY?

A. My functionally classified cost of service study (Schedule TJS-17, Table 9, Line 9, Column D) indicates that customer related costs for the Residential class equal $13.38 per month which is significantly greater than the current customer charge of $6.66 per month ($5.65 per month for Fairfax, Rock Port, and Tarkio). An increase from the existing $6.66 per month to the proposed $10.00 per month moves the rate in the direction of actual cost. The customer related costs for the existing General Service classes equals $35.57 per month (Line 10) which is significantly greater than the existing $12.31 per month customer charge ($9.39 per month for Fairfax, Rock Port, and Tarkio). I am proposing a $20.00 per month customer charge for the Small

Commercial rate and a $40.00 per month customer charge for the Small Volume rate. These customer charges more reasonably reflect cost. The customer related costs for the Large Volume and Transportation classes equal $109.77 and $130.00 per month, respectively, (Lines 11 through 12). Currently, Large Volume customers are charged a $184.53 per month customer charge. In addition to this charge, Transportation customers are being charged $47.25 per month for each meter. I am recommending a slight increase to the customer charge to $200 per month and the elimination of the transportation per meter charge.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY?

A. Yes, it does.

State of _____)
) ss
County of _____)

AFFIDAVIT OF THOMAS J. SULLIVAN

Thomas J. Sullivan, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying testimony and schedules entitled "Direct Testimony of Thomas J. Sullivan"; that said testimony was prepared by him and/or under his direction and supervision; that if inquiries were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge, information, and belief.

_____

Subscribed and sworn to before me this _____ day of July, 2003.

_____
Notary Public

My Commission expires:

_____

Expert Witness Testimony of Thomas J. Sullivan

- *Peoples Natural Gas Company of South Carolina, South Carolina Public Service Commission Docket No. 88-52-G (1988).* Natural gas utility revenue requirements and rate design.

- *Peoples Natural Gas (UtiliCorp United, Inc.), Iowa Utilities Board Docket No. RPU-92-6 (1992).* Natural gas utility class cost of service study and peak day demand requirements.

- *Peoples Natural Gas (UtiliCorp United, Inc.), Kansas Corporation Commission Docket No. 193,787-U (1996).* Natural gas utility class cost of service study, rate design, and peak day demand requirements.

- *Southern Union Gas Company, Railroad Commission of Texas Gas Utilities Docket No. 8878 (1998).* Natural gas utility depreciation rates.

- *Southern Union Gas Company, City of El Paso (1999).* Natural Gas utility depreciation rates.

- *UtiliCorp United, Inc., Kansas Corporation Commission Docket No. 00-UTCG-336-RTS (1999).* Natural gas utility weather normalization, class cost of service, and rate design.

- *Philadelphia Gas Works, Pennsylvania Public Utility Commission Docket No. R-00006042 (2001)*. Natural gas utility revenue requirements.

- *Missouri Gas Energy, Missouri Public Service Commission Docket No. GR-2001-292 (2001).* Natural gas utility depreciation rates.

- *Aquila Networks, Iowa Utilities Board Docket No. RPU-02-5 (2002).* Natural gas utility class cost of service study, rate design, and weather normalization adjustment.

- *Aquila Networks, Michigan Gas Utilities, Michigan Public Service Commission Case No. U-13470 (2002).* Natural gas utility class cost of service study, rate design, and weather normalization adjustment.

- *Aquila Networks, Nebraska Public Service Commission Docket No. NG-0001, NG0002, NG0003 (2003).* Natural gas utility weather normalization adjustment.