

1 DIRECT TESTIMONY
2 OF
3 MICHAEL S. PROCTOR
4 MISSOURI PIPELINE COMPANY
5 CASE NO. GR-92-314

6 Q. Please state your name and business address.

7 A. My name is Michael S. Proctor and my business
8 address is P. O. Box 360, Jefferson City, Missouri 65102.

9 Q. What is your present position with the
10 Missouri Public Service Commission?

11 A. I am Chief Economist in the Economic Analysis
12 Department.

13 Q. Will you please review your educational
14 background and work experience.

15 A. I have Bachelors and Masters of Arts Degrees
16 in Economics from the University of Missouri at Columbia
17 and a Ph.D. in Economics from Texas A&M University. My
18 previous work experience has been as an Assistant Professor
19 of Economics at Purdue University and at the University of
20 Missouri at Columbia. Since being on the Staff of the
21 Missouri Public Service Commission from June 1, 1977, I
22 have presented testimony on the issues of class cost-of-
23 service, rate design, load forecasting, capacity expansion
24 planning, and phase-in.

25 Q. What is the purpose of your direct testimony?

26 A. My direct testimony is on the design of the
27 rates for Missouri Pipeline Company. I will address the

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1 question of whether or not there should be distance related
2 rates.

3 Q. What are distance related rates?

4 A. Distance related rates have been used for
5 pipelines by the Federal Energy Regulatory Commission as a
6 way to equitably allocate costs to users who "caused" those
7 costs to be incurred. The principle is that certain costs
8 are related to the distance which the natural gas must
9 travel from its source to its destination, and these costs
10 increase the further the user is from the source.

11 Distance related rates have taken two basic
12 forms: mileage rates; and zone rates. Mileage rates are
13 charged on an MMBtu-mile basis depending on the demands and
14 volumes (MMBtu's) and the distance (miles) at each take
15 point along the pipeline. Zone rates are separate charges
16 for MMBtu's specified for each of several zones along the
17 pipeline; i.e., zones which are further from the source are
18 charged higher rates, and every take point within a zone
19 pays the same rate.

20 Q. What is your recommendation concerning
21 distance related rates for Missouri Pipeline Company?

22 A. I am recommending two zones for Missouri
23 Pipeline Company's rates. The first zone includes the
24 delivery points of St. Charles, West Alton and just south
25 of Washington where Laclede is proposing to join a lateral
26 line running to Ellisville. The second zone includes the

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1 delivery points of Union, St. Clair and Sullivan. A
2 schematic layout of the Missouri Pipeline system and the
3 proposed zones is shown on my Schedule 1, which is attached
4 to my direct testimony.

5 Q. Why are you recommending zoned rates?

6 A. The primary reason for recommending zoned
7 rates is that the customers served by Missouri Pipeline
8 north of the point at which Laclede is proposing to join a
9 lateral line do not benefit from that portion of the
10 pipeline which runs south to Sullivan Missouri. Since
11 these customers do not benefit from that portion of the
12 pipeline, they should not be required to pay the cost of
13 the line beyond that point.

14 Q. Why did you include the newer portion of the
15 pipe running from Old Monroe to Washington in the same zone
16 as the older portion of the pipe which runs from Old Monroe
17 to West Alton?

18 A. Because Laclede is joining a lateral to the
19 new line which runs back into its old service territory,
20 the extension of the pipeline from Old Monroe down to
21 Washington provides a means by which Laclede can more
22 effectively serve that service area. This means that
23 customers throughout Laclede's old service area benefit
24 from the extension.

25 In addition, the distance running south from Old
26 Monroe to just south of Washington is almost equal to the

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1 distance running east from Old Monroe to the West Alton
2 receipt point. Thus, on a distance basis these two
3 segments of pipeline should have the same rates.

4 Finally, the prices all along this portion of the
5 system should be the same in order that any decisions about
6 which receipt point to use is determined by operational
7 needs and not by an artificial price signal. Thus, the
8 fact that the newer line is more expensive than the older
9 line should not be a factor in the determination of the
10 rates along these two segments.

11 Q. Is there any other reason for dividing
12 between the two zones at the point just south of Washington
13 where Laclede is proposing to join a lateral line?

14 A. Yes, there is. South of the point where
15 Laclede is proposing to join a lateral line, the diameter
16 of Missouri Pipeline's pipe decrease from 16 inches to 10½
17 inches. This reduction in pipe size corresponds to a
18 reduction in pipe capacity. Had the line from Old Monroe
19 running south to this point only been installed to meet
20 load further south, then that portion of the newly
21 installed pipeline would not have been sized at the larger
22 diameter. Thus, the decrease in pipe size represents a
23 significant change in who can potentially be served from
24 the pipeline.

25 Q. Are there any other reasons for your
26 recommendation for zoned rates?

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1 A. Yes, there is one. Missouri Gas Company is
2 proposing an extension of the pipeline from Sullivan to
3 Fort Leonard Wood. So while it might be argued that
4 Sullivan is not that much further in distance, it is
5 important that zoned rates be put in place at this time to
6 send customers distance related price signals which they
7 ultimately should pay on this pipeline system.

8 Q. Have you calculated the rates for the two
9 zones?

10 A. Yes, I have. These calculations are found in
11 the schedules attached to my direct testimony.

12
13 Schedule 2 Calculation of Cost Weighted Distances by Zone
14 Schedule 3 Calculation of Billing Units by Zone
15 Schedule 4 Staff's Classified Cost-of-Service
16 Schedule 5 Staff's Proposed Rates
17
18

19 Q. What do you mean by "diameter weighted miles"
20 as shown on Schedule 2.

21 A. Diameter weighted miles are calculated as the
22 diameter of the pipe over a segment times the length of
23 that segment.

24 Q. Why are diameter weighted miles an
25 appropriate measure to associate with distance related
26 costs?

27 A. If the pipe was the same diameter throughout
28 the system, then distance related cost would be
29 proportional to miles, and mileage would be the appropriate
30 measure. For example, if the natural gas would travel

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1 twice as far to serve customers in one zone than the other,
2 then the customers in the zone furthest from the source are
3 responsible for twice the distance related cost and the
4 distance related component of their rate should be twice
5 that of the corresponding rate component for customers in
6 the nearest zone.

7 In this case, which is typical of pipeline
8 design, the pipe narrows or telescopes down in size as it
9 runs downstream from its initial source to its final
10 destination. As stated previously, the most dramatic
11 change in pipe size occurs just south of Washington past
12 the point of the proposed Laclede lateral where the pipe
13 drops from 16 inches to 10 $\frac{1}{2}$ inches in diameter. This
14 decrease in pipe size corresponds to a decrease in pipe
15 cost as well as pipe capacity. In order to properly
16 reflect these changes in costs, the miles in each zone
17 should be multiplied by the pipe's diameter.

18 Q. Are all distance related costs proportional
19 to the pipe's diameter?

20 A. No, there are distance related costs incurred
21 by the pipeline which have nothing to do with the size of
22 the pipe. Typical among these costs are right-of-way and
23 some portion of installation costs. It is primarily the
24 cost of the pipe itself which varies with pipe diameter.
25 Distance related costs which are not related to pipe size

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1 should be allocated to zones based on the mileage within
2 each zone not on the basis of diameter weighted miles.

3 Q. What is the difference between straight miles
4 and diameter weighted miles for the two zones?

5 A. The calculations for both are shown on my
6 Schedule 2. If straight miles are used, the rates in zone
7 2 should be 26.18% higher than in zone 1. If diameter
8 weighted miles are used, the rates in zone 2 should be
9 30.76% higher than in zone 1. A 36-64 average of these two
10 gives a factor of 29.10% which is applied to the zone 2
11 rates.

12 Q. Why did you use a 36-64 average of the two
13 ratios?

14 A. Accounts 365 (RIGHT-OF-WAY), 366 (STRUCTURES
15 AND IMPROVEMENTS) and 367 (MAINS) include the costs which I
16 have functionalized as distance related. Of these three
17 accounts I have included only account 367 as related to
18 pipe size, and this account makes up 64% of the total from
19 the three accounts.

20 Q. How did you apply this ratio of 1.2910 in
21 your design of zone rates?

22 A. First, I used this ratio to weight the
23 billing demand and volumes in zone 2. Then, dividing
24 distance related costs by these weighted units produces the
25 zone 1 rate. Multiplying the zone 1 rate by the ratio
26 gives the zone 2 rate.

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1 Schedule 3 gives the billing units, Schedule 4
2 gives the Staff's functionalized cost-of-service and
3 Schedule 5 gives the rates which result.

4 Q. Regarding Schedule 3, how were demands
5 determined for each zone?

6 A. Laclede's contract calls for a reservation
7 demand of 55,000 MMBtu per day. All but a small portion
8 (the demands going to St. Clair and Union) of this total
9 were assigned to zone 1. The remaining demands which make
10 up the total 80,000 MMBtu per day were assigned to zone 2.

11 In his direct testimony, Mr. Craig Jones of the
12 Staff has made recommendations regarding interruptible
13 volumes. To derive interruptible demands I am using the
14 100% load factor assumption which is consistent with FERC
15 determination of interruptible rates. All but 2,450 MMBtu
16 per day of interruptible demand were assigned to zone 1.
17 The 2,450 MMBtu per day is the difference between Fort
18 Leonard Wood's expected daily demand of 7,000 MMBtu per day
19 and the firm demand of 4,550 MMBtu per day.

20 Q. Regarding Schedule 3, how were firm volumes
21 determined for each zone?

22 A. For the firm portion of load, Mr. Jones is
23 recommending the use of company's proposed 75% load factor
24 to determine volumes. Taking 75% times peak demand gives
25 the average MMBtu's per day. Multiplying the average
26 MMBtu's per day by 365 days gives the annual volumes.

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1 Q. Regarding Schedule 3, how were distance
2 weighted demands and volumes calculated?

3 A. In zone 2, total demand and volumes were
4 multiplied by the factor 1.2910. These are then added to
5 zone 1 demands and volumes.

6 Q. Regarding Schedule 3, why were distance
7 weighted demands and volumes calculated?

8 A. First, recall that the cost weighted ratio
9 for all distance related costs of 1.2910 represents the
10 fact that on an equivalent cost basis the distance required
11 to serve a customer in zone 2 is 29.10% further than what
12 is required to serve a customer in zone 1. Thus, in terms
13 of the distance related component of the rate, the zone 2
14 rate should be 1.2910 times the zone 1 rate. Letting the
15 symbol X represent the zone 1 rate, the zone 2 rate is
16 equal to 1.2914(X). Multiplying the units in each zone by
17 the rate and adding gives

18 $(X)(\text{Units Zone 1}) + (1.2914X)(\text{Units Zones 2}).$
19 Factoring out the zone 1 rate and setting this expression
20 equal to distance related costs gives

$$\begin{aligned} &X [\text{Units Zone 1} + (1.2914)(\text{Units Zone 2})] \\ &= \text{Total Distance Related Costs} \end{aligned}$$

21 The expression in the brackets represents the distance
22 weighted units which are shown on Schedule 3. When total
23 distance related costs are divided by distance weighted
24 units, the result will give the zone 1 rate.
25
26
27

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1 Q. Regarding Schedule 4, what is the source of
2 the cost-of-service revenue requirement for Missouri
3 Pipeline?

4 A. The total column on Schedule 4 comes from the
5 Staff's cost-of-service study. I have split the rate of
6 return into the debt and equity components based on the
7 Staff's recommended capital structure and rates of return.

8 Q. Regarding Schedule 4, how did you classify
9 costs as being either demand or commodity related?

10 A. Commodity related transmission expenses are
11 set at 1 cent per MMBtu which has been used since the first
12 Missouri Pipeline case. The commodity component of the
13 return on investment is the equity component plus income
14 taxes. This follows the FERC modified fixed and variable
15 rate design. All other costs were classified as demand
16 related.

17 Q. Regarding Schedule 4, how did you classify
18 costs as being either related to distance or not?

19 A. As stated previously, accounts 365, 366 and
20 367 were designated as distance related. These three
21 accounts make up 53.56% of total plant in service. Thus
22 53.56% of depreciation, taxes and return on rate base
23 (items 5 through 9 in Schedule 4) were classified as being
24 distance related. These three accounts also make up 53.94%
25 of total transmission plant. I therefore classified 53.94%
26 of total transmission expense (items 1 on Schedule 4) as

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1 being distance related. Neither Customer Accounting and
2 Services nor Administrative and General expense (items 2
3 through 4 on Schedule 4) are distance related.

4 Q. Regarding Schedule 5, how were firm rates
5 calculated for each zone?

6 A. For the firm load customers, distance related
7 demand costs were divided by distance weighted demands to
8 derive the distance component of the zone 1 demand rate.
9 Then this rate was multiplied by the ratio 1.2910 to derive
10 the distance component of the zone 2 demand rate. Non-
11 distance related demand costs were divided by total
12 unweighted demands and added to the distance related demand
13 rates to derive the overall demand rates shown on Schedule
14 5. A similar process was used for the commodity related
15 costs to derive the commodity rates.

16 Q. Regarding Schedule 5, how were interruptible
17 rates calculated for each zone?

18 A. The firm demand rates for each zone were
19 converted to commodity rates by multiplying these rates by
20 interruptible 100% load factor demands and then dividing by
21 interruptible volumes. These were then added to the firm
22 commodity rates to derive the overall interruptible rates
23 shown on Schedule 5. Schedule 5 also shows that these
24 rates collect the same total revenue requirement that
25 appears on Schedule 4.

26 Q. Does this conclude your direct testimony?

27 A. Yes, it does.

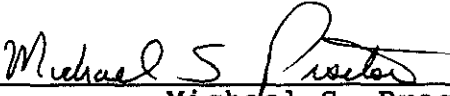
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the matter of Missouri Pipeline Company)
for authority to file tariffs increasing)
rates for gas transportation services to) CASE NO. GR-92-314
customers within its service area.)

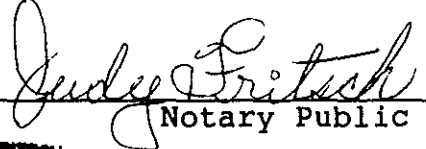
AFFIDAVIT OF MICHAEL S. PROCTOR

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Michael S. Proctor, of lawful age, on his oath states: that he has participated in the preparation of the foregoing written testimony in question and answer form, consisting of 11 pages of testimony to be presented in the above case, that the answers in the attached written testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

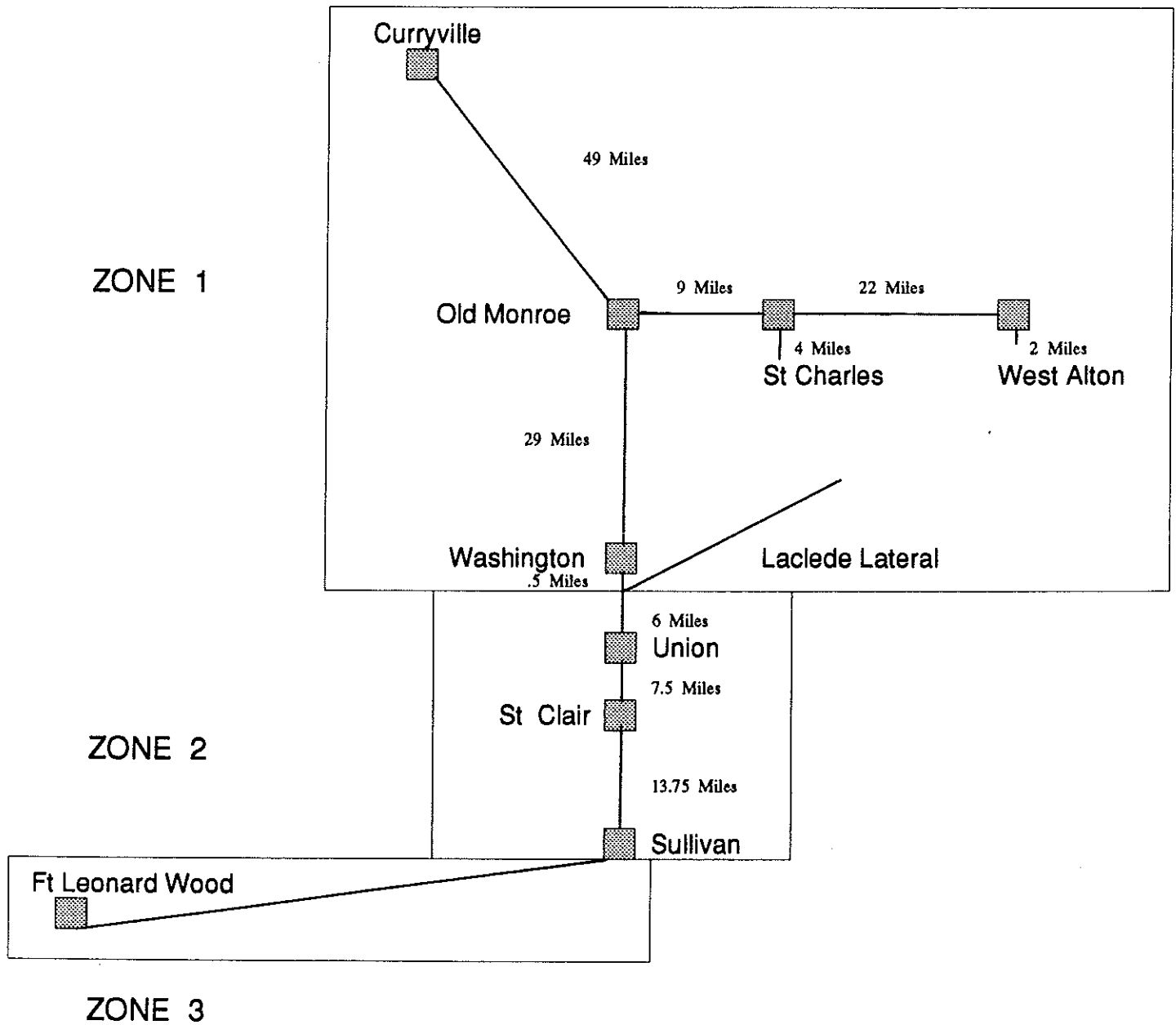

Michael S. Proctor

Subscribed and sworn to before me this 10th day of December, 1992.


Notary Public

My commission expires _____
JUDY FRITSCH
NOTARY PUBLIC STATE OF MISSOURI
COLE COUNTY
MY COMMISSION ENDS AUG. 15, 1993

SCHEMATIC LAYOUT FOR MISSOURI PIPELINE



CALCULATION OF COST WEIGHTED DISTANCES BY ZONE

TAKE POINTS	MILES	ZONE 2 ADDED MILES	AVG PIPE DIAM	DIA-WGT MILES ZONE 1	ADDED DIA-WGT MILES ZONE 2	TOTAL DIA-WGT MILES
1 St Charles	62.00		12.26	760		760
2 West Alton	82.00		12.00	984		984
3 Washington	78.50		13.50	1,060		1,060
ZONE 1	222.50			2,804		2,804
4 Union	84.00	5.50	10.75	1,060	59	1,119
5 St Clair	91.50	13.00	10.75	1,060	140	1,200
6 Sullivan	105.25	26.75	10.75	1,060	288	1,348
ZONE 2	280.75	45.25		3,180	486	3,666

RATIO 1 1.261798

RATIO 2 1.307574

PERCENT OF NON-PIPE SIZE RELATED COSTS	36.29% x	1.261798
PERCENT OF PIPE SIZE RELATED COSTS	63.71% x	1.307574
COST WEIGHTED RATIO FOR ALL DISTANCE RELATED COSTS	=	1.290963

Notes:

- (1) MILES = total mileage from Curryville to specified take points, including spurs running from the main pipeline to St Charles and West Alton.
- (2) Average pipe diameters in Zone 1 are based on averaging the diameter miles over the various segments of the lines.
- (3) Diameter weighted miles = miles x diameter.
- (4) Diameter weighted miles from zone 1 to the beginning of zone 2 are equal to the diameter weighted miles to the Washington take point of 1,060.
- (5) Ratios = Zone 2 miles (or diameter weighted miles) / Zone 1 miles (or diameter weighted miles).

CALCULATION OF BILLING UNITS BY ZONE

		ZONE 1		ZONE 2		TOTAL	
		Pipeline Flows MMBtu/day	Billing Units MMBtu's	Pipeline Flows MMBtu/day	Billing Units MMBtu's	Pipeline Flows MMBtu/day	Billing Units MMBtu's
FIRM DEMANDS LOAD FACTOR 75.00% VOLUMES		<u>Peak</u>		<u>Peak</u>		<u>Peak</u>	
		54,501	654,017	25,499	305,983	80,000	960,000
		<u>Average</u>		<u>Average</u>		<u>Average</u>	
		40,876	14,919,755	19,124	6,980,245	60,000	21,900,000
INTERRUPTIBLE VOLUMES LOAD FACTOR 100.00% DEMANDS		<u>Average</u>		<u>Average</u>		<u>Average</u>	
		9,049	3,302,750	2,450	894,250	11,499	4,197,000
		<u>Peak</u>		<u>Peak</u>		<u>Peak</u>	
		9,049	108,584	2,450	29,400	11,499	137,984
TOTAL UNWEIGHTED DEMANDS VOLUMES		<u>Peak</u>		<u>Peak</u>		<u>Peak</u>	
		63,550	762,600	27,949	335,383	91,499	1,097,984
		<u>Average</u>		<u>Average</u>		<u>Average</u>	
		49,925	18,222,505	21,574	7,874,495	71,499	26,097,000
TOTAL WEIGHTED	WEIGHTS		1.0000		1.2910		
DEMANDS			762,600		432,968		1,195,568
VOLUMES			18,222,505		10,165,684		28,388,189

Notes:

- (1) St. Clair and Union volumes are included in Zone 2 with demands at a 75% load factor.
- (2) Interruptible volumes in Zone 2 are based on average daily demands of 2,450 MMBtu from Fort Leonard Wood.
- (3) FIRM
 - (a) Demand Billing Units = 12 x Peak MMBtu/day
 - (b) Average MMBtu/day = 75% x Peak MMBtu/day
 - (c) Volume Billing Units = 365 days x Average MMBtu/day
- (4) INTERRUPTIBLE
 - (a) Average MMBtu/day = Volume Billing Units / 365 days
 - (b) Peak MMBtu/day = Average MMBtu/day
 - (c) Demand Billing Units = 12 x Peak MMBtu/day
- (5) Zone 2 wgt. billing units = 1.290963 x unweighted billing units.

STAFF CLASSIFIED COST-OF-SERVICE

DEMAND / COMMODITY CLASSIFICATION

	<u>TOTAL</u>	<u>DEMAND</u>	<u>COMMODITY</u>
1 TRANSMISSION EXPENSE	\$707,045	\$446,075	\$260,970
2 CUSTOMER ACCOUNTING	\$0		
3 CUSTOMER SERVICE	\$0		
4 ADMINISTRATIVE & GENERAL	\$513,577	\$513,577	
5 DEPRECIATION & AMORT.	\$896,994	\$896,994	
6 TAXES OTHER THAN INCOME	\$563,726	\$563,726	
7 INCOME TAXES	\$435,074		\$435,074
8 INTEREST ON DEBT	\$1,458,763	\$1,458,763	
9 <u>RETURN ON EQUITY</u>	<u>\$2,039,950</u>		<u>\$2,039,950</u>
10 <u>COST-OF-SERVICE</u>	<u>\$6,615,130</u>	<u>\$3,879,135</u>	<u>\$2,735,994</u>
		58.64%	41.36%

DISTANCE / NON-DISTANCE CLASSIFICATION

	<u>% DIST</u>	<u>DEMAND</u>		<u>COMMODITY</u>	
		<u>DISTANCE</u>	<u>NON-DIST</u>	<u>DISTANCE</u>	<u>NON-DIST</u>
1 TRANSMISSION EXPENSE	53.94%	\$240,620	\$205,455	\$140,771	\$120,199
2 CUSTOMER ACCOUNTING	0.00%				
3 CUSTOMER SERVICE	0.00%				
4 ADMINISTRATIVE & GENERAL	0.00%		\$513,577		
5 DEPRECIATION & AMORT.	53.56%	\$480,429	\$416,565		
6 TAXES OTHER THAN INCOME	53.56%	\$301,931	\$261,795		
7 INCOME TAXES	53.56%			\$233,025	\$202,049
8 INTEREST ON DEBT	53.56%	\$781,312	\$677,452		
9 <u>RETURN ON EQUITY</u>	<u>53.56%</u>			<u>\$1,092,595</u>	<u>\$947,356</u>
10 <u>COST-OF-SERVICE</u>	<u>49.44%</u>	<u>\$1,804,291</u>	<u>\$2,074,844</u>	<u>\$1,466,391</u>	<u>\$1,269,603</u>
		46.51%	53.49%	53.60%	46.40%

MISSOURI PIPELINE COMPANY STAFF PROPOSED RATES

\$/MMBtu	FIRM		
DEMAND	RATE	UNITS	REVENUES
ZONE 1	\$3.3988	654,017	\$2,222,895
ZONE 2	\$3.8379	305,983	\$1,174,347
TOTAL	\$3.5388	960,000	\$3,397,242

\$/MMBtu	FIRM		
COMMODITY	RATE	UNITS	REVENUES
ZONE 1	\$0.1003	14,919,755	\$1,496,517
ZONE 2	\$0.1153	6,980,245	\$805,060
TOTAL	\$0.1051	21,900,000	\$2,301,577

INTERRUPTIBLE		
RATE	UNITS	REVENUES
\$0.2120	3,302,750	\$700,338
\$0.2415	894,250	\$215,973
\$0.2183	4,197,000	\$916,311

\$/MMBtu	FIRM		
AVERAGE	RATE	UNITS	REVENUES
ZONE 1	\$0.2493	14,919,755	\$3,719,412
ZONE 2	\$0.2836	6,980,245	\$1,979,407
TOTAL	\$0.2602	21,900,000	\$5,698,819

INTERRUPTIBLE		
RATE	UNITS	REVENUES
\$0.2120	3,302,750	\$700,338
\$0.2415	894,250	\$215,973
\$0.2183	4,197,000	\$916,311

TOTAL		
RATE	UNITS	REVENUES
\$0.2425	18,222,505	\$4,419,750
\$0.2788	7,874,495	\$2,195,380
\$0.2535	26,097,000	\$6,615,130