Exhibit No.:
Issue: Weather Normalized Sales,
Witness: Henry E. Warren
Sponsoring Party: MO PSC Staff
Type of Exhibit: Direct Testimony
Case No.: GR-99-315

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

DIRECT TESTIMONY

OF

HENRY E. WARREN, PhD

LACLEDE GAS COMPANY

CASE NO. GR-99-315

Jefferson City, Missouri
June 1999

DIRECT TESTIMONY

OF

HENRY E. WARREN

LACLEDE GAS COMPANY

CASE NO. GR-99-315

Q. Please state your name and business address.

A. My name is Henry E. Warren and my business address is P. O. Box 360, Jefferson City, Missouri, 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission (PSC or Commission) as a Regulatory Economist in the Gas Department of the Utility Operations Division.

Q. How long have you been employed by the Commission?

A. I have worked at the Commission six years.

Q. What is your educational and professional background?

A. I received my Bachelor of Arts and my Master of Arts in Economics from the University of Missouri-Columbia, and a Doctor of Philosophy (PhD) in Economics from Texas A&M University. Prior to joining the PSC Staff (Staff), I was an Economist with the U.S. National Oceanic and Atmospheric Administration (NOAA). At NOAA I conducted research on the economic impact of climate and weather. I began my employment at the Commission on October 1, 1992 as a Research Economist in the Economic Analysis

Department. My duties consisted of calculating weather normalization adjustments to test year volumes, and I also assisted in the review of Electric Resource Plans for investor owned utilities in Missouri. Since December 1, 1997, I have been a Regulatory Economist II in the Tariffs/Rate Design Section of the Commission's Gas Department where my duties include reviewing tariff filings, applications and various other maters relating to regulated gas utilities in Missouri. I also compute weather normalization adjustments to test year volumes in gas rate cases.

Q. Are you a member of any professional organizations?

A. Yes, I am a member of the International Association for Energy Economics and the Western Economics Association.

Q. Have you previously filed testimony before the Commission?

A. Yes, I have testified in the cases listed in Schedule 1 attached to this testimony.

Q. What is the purpose of your direct testimony?

A. My direct testimony covers two areas. The first is the adjustment of test year volumes for gas use for water heating. The inputs and results of the regression and this procedure are shown in Schedule 2-1 for residential customers and Schedule 2-2 for commercial general service customers.

Second, I did the billing unit allocation for weather normalized therms computed by Staff Witness James Gray in the test year for Laclede's general service rate classes. The initial inputs, computed adjustments and the final results of this weather normalization are shown on Schedule 3 for the Laclede Division; Schedule 4 for the Missouri Natural and

Franklin County Divisions combined; Schedule 5, for the Midwest Division; and Schedule 6 for the St. Charles Division.

ADJUSTMENT TO TEST YEAR VOLUMES FOR WATER HEATING

Q. Does the Company account for seasonal differences in the use of gas for water heating in its weather normalization procedure?

A. Yes, in the 1990-91 *NAF Study* (Normalization Adjustment Factor) the Company presents a method in a study conducted by the Company and provided to the Staff,. This study estimates the gas required to heat a gallon of water in the non-heating season compared to the gas required to heat a gallon of water in the heating season. The Company identifies a subset of residential and commercial customers though a process of screening monthly, seasonal and annual customer bills. This process has the goal of identifying customers that use gas for water heating but not for space heating. The Company uses the monthly therms of this subset to compute its adjustment of 1.35 as the annualized differential between gas used for water heating in the non-heating season vs the heating season. The Company postulates that the primary determinant of the temperature of water entering the water heater is the temperature of the water at its source. For most of the service territory the source is the Missouri River.

Q. Are river water temperatures available for the Company Service Territory?

A. Yes, Dennis Patterson of the Staff obtained daily Missouri River water temperatures since 1986 from the U.S. Army Corps of Engineers (USACE). Most of the

customers located within the Company's service territory use water taken from the Missouri River. Most of the remaining territory customers in the service obtain water from the nearby Mississippi River or Meramec River. It is assumed that the daily Missouri River water temperature is a reasonable proxy for the water in other nearby rivers.

Q. How are these data on daily river water temperatures used by the Staff in the analysis of gas use for water heating?

A. Dennis Patterson of the Staff used the daily average water temperatures (T_w) to compute a daily series of Water Heating Degree Days (WHDD) to the industry standard base temperature of 140°F (WHDD = 140 - T_w). Mr. Patterson also estimated a set of normal WHDD. The procedures and results are presented in his testimony. The WHDD are used in models of gas use for water heating and in the normalization procedure.

Q. Has the Staff investigated the seasonal difference in the use of gas for water heating?

A. Yes in a prior Laclede Rate Case (GR-92-165) Staff Witness Dennis Patterson presented a method different from the NAF method used by the Company. Subsequent to that case, the Company agreed to supply data for an updated period (July 1992-June 1993). Working with Mr. Patterson and Mr. Gray of the Staff, I have made an evaluation of various methods for estimating and normalizing water heating use. These are the methods: 1) Laclede's NAF method with alternatives that allow for normalization of water heating use; 2) Staff's water heating degree day method using WHDD from the Missouri River; and 3) End-Use methods including models from both Laclede and the Gas Research Institute (GRI)

Q. What are the results of your evaluation of these various methods?

A. The primary result is that there is a clear and strong correlation between water heating use and WHDD. This has two major implications for a rate case. First, to properly estimate water heating use for a test year, WHDD from that *same* test year must be used as a basis for the estimate. Second, because water heating degree days can vary significantly from year-to-year, water heating use should be normalized for these variations.

Q. In this case, what method did you use to adjust the test year volumes for variations in gas use for water heating?

A. I used the same method as in a previous Laclede Rate Case (GR-94-220) which is similar to the method developed by Dennis Patterson of Staff in Laclede Rate Case No. GR-92-165.

Q. Will you briefly describe the procedure?

A. Yes, the procedure uses estimates from the Company's NAF study data over the period July 1992 through June 1993. I used the monthly therms and customers from the subset to quantify the relationship between the monthly therms for water heating and the WHDD computed by Dennis Patterson. The results for residential customers are in Schedule 2-1, and for commercial customers in Schedule 2-2.

Q. How are these results used in the normalization process?

A. The WHDD coefficients, (0.01159, for residential and 0.04590 for commercial) are used by Staff Witness Jim Gray, in the normalization of volumes for Laclede's general service customers. Using the monthly WHDD for the test year estimates the portion of

average daily therms per customer each month used for water heating. Mr. Gray subtracts the estimated volumes for water heating from the daily usage per customer in each month of the test year. The remainder of the daily therms per customer for the month are normalized for space heating using Heating Degree Days (HDD) as described in the testimony of Mr. Gray.

GENERAL SERVICE BILLING DETERMINANTS

Q. What are the billing determinants established for the general service class by the current rate design and how are Mr. Grays normalized volumes allocated according to these billing determinants?

A. Laclede's current rates for the GS class are differentiated by two blocks and two seasons. The *first block* contains the first 65 therms per month and the *second block* contains all therms over 65 therms per month. The two seasons are the *heating season*, November through April and the *non-heating* season, May through October. In order for Staff witness Ms Arlene Westerfield to compute the revenues associated with the normalized volumes these volumes must be properly allocated to the block and season to determine the rate at which they would be billed.

Q. What data are used to compute these billing determinants?

A. The Company provided Staff with bill frequency runs for rate codes and customer classes served on the General Service (GS) tariff. I used the Company's bill frequency runs (March 1998-February 1999) to determine the percentage of usage falling into each rate

block for each month. Because the rates are the same for all divisions, the monthly data were aggregated over the divisions for the GS rate codes -- residential, commercial, and industrial.

Q. How did you use that data to determine normalized billing determinants for the test year?

A. For each customer class the monthly bill frequency data and the percent of use in the initial block is highly correlated with the monthly average use per customer per day. I used regressions to estimate an equation that quantified the relationship between the percentage of use in a given block in a month and the average use per customer per month. I used this in order to estimate actual and normal billing units in each month, the normal usage per customer in each of the four divisions was substituted for actual in the estimated regression equations. This was applied in each division separately because the use per customer varies between divisions. The difference between the predicted normal therms and predicted actual therms gives an estimated adjustment for each month for the first block and the adjustment in the second block is set equal to the total minus initial block adjustment.

In each month the block adjustments are restricted so the blocks cannot go in a different direction than the total adjustment. If the block adjustments initially have opposite signs, the adjustment of the therms in the first block is set to zero. The second block is then equal to the total adjustment. The monthly adjustments to Test Year volumes in the blocks are in the center column of the Tables in Schedules 3, 4, 5, and 6. The monthly adjustments are summed into an Annual total and Seasonal totals. The Seasonal totals are a heating

season (November-April) and a non-heating season (May-October). To produce consistent seasonal totals for use by the Accounting Staff, the seasonal totals are also balanced for consistency. The annual totals are not affected. The normalized billing units for the GS class are obtained by adding the Test Year Adjustments to the Test Year Actual Volumes.

Q. In computing the billing determinants were any adjustments necessary to reconcile the monthly therms in the Company's bill frequency analysis with the monthly therms from Jim Gray computed from the Company's billing cycle data?

A. Yes, because in some months the first block therms calculated by Laclede in their bill frequency analysis were greater than the total therms reported in their billing cycle data. The bill frequency data in the first block were adjusted back to the total reported therms for the month in the billing cycle data.

Q. What is the Staff's recommendation for weather adjusted gas usage for the GS residential, commercial, and industrial customer classes?

A. Schedule 3 through 6 show the adjustment therms for each billing month during the test year. The total adjustment for all divisions for all customer classes is 115,274,273 therms. This therms were allocated to the blocks and seasons for the customer classes as shown in Schedules 3 through 6 and was supplied to Staff witness Ms. Arlene S.Westerfield for use in revenue normalization. Ongoing refinement of the normal temperature time series at Lambert International Airport by Dr. Steve Qi Hu, a consultant appearing on behalf of the Staff, has resulted in an additional adjustment to HDD by Staff witness Mr. Dennis Patterson. This occurred so recently that it was not possible for Mr. Gray to revise his

computations of weather normalized therms and consequently not in time for me to compute the billing determinants. Preliminary estimates indicate that the normal HDD will be increased and that the total therm adjustment to normal across all divisions for the three GS customer classes will increase by approximately 15.1 million therms. Schedules 3 through 6 in my direct testimony will be updated when the computation is finalized by Mr. Gray.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does. However, my schedules 3 through 6 will be updated to reflect the revisions by Mr. Gray, Mr. Patterson, and Dr. Steve Qi Hu a consultant appearing on behalf of the Staff.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Laclede Gas Company's Tariff to Revise Natural Gas Rate Schedules	))))	Case No. GR-99-315

AFFIDAVIT OF HENRY E. WARREN

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

Henry E. Warren, is, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form, consisting of 9 pages to be presented in the above case; that the answers in the foregoing Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

HENRY E. WARREN

Subscribed and sworn to before me this 25th day of June 1999.

Notary Public

SHARON S WILES
NOTARY PUBLIC STATE OF MISSOURI
COLE COUNTY
MY COMMISSION EXP. AUG. 23,2002

My Commission Expires: _____

LACLEDE GAS COMPANY

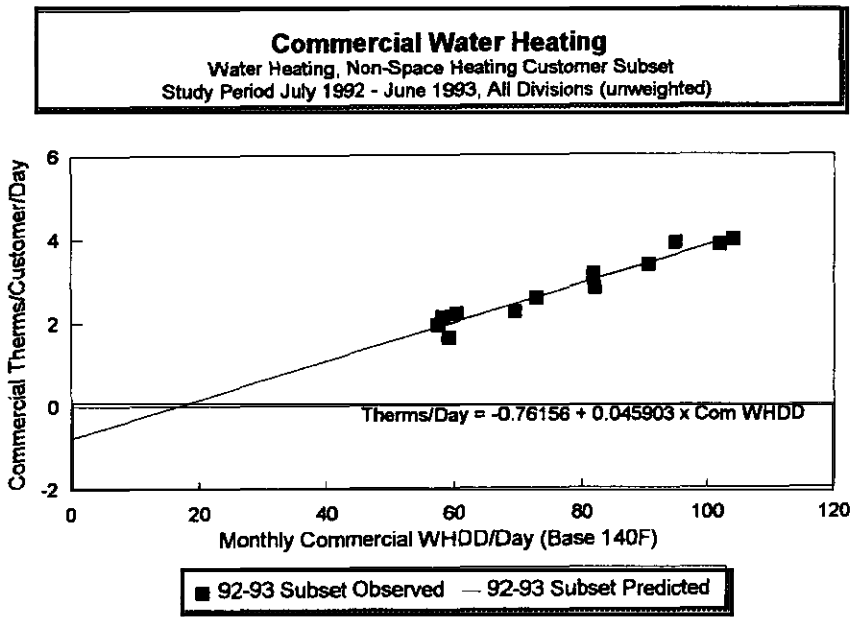
CASE NO. GR-99-315

PREVIOUS CASES IN WHICH PREPARED TESTIMONY WAS PRESENTED BY:

HENRY E. WARREN

COMPANY NAME	CASE NUMBER(S)
St. Joseph Light and Power Company	GR-93-042
Laclede Gas Co.	GR-93-149
Missouri Public Service	GR-93-172
Western Resources	GR-93-240
Laclede Gas Co.	GR-94-220
United Cities Gas Co.	GR-95-160
The Empire District Electric Co.	ER-95-279
Laclede Gas Co.	GR-96-193
Missouri Gas Energy	GR-96-285
The Empire District Electric Co.	ER-97-081
Union Electric Co.	GR-97-393
Missouri Gas Energy	GR-98-140
Laclede Gas Co.	GR-98-374
St. Joseph Light & Power Company	GR-99-246

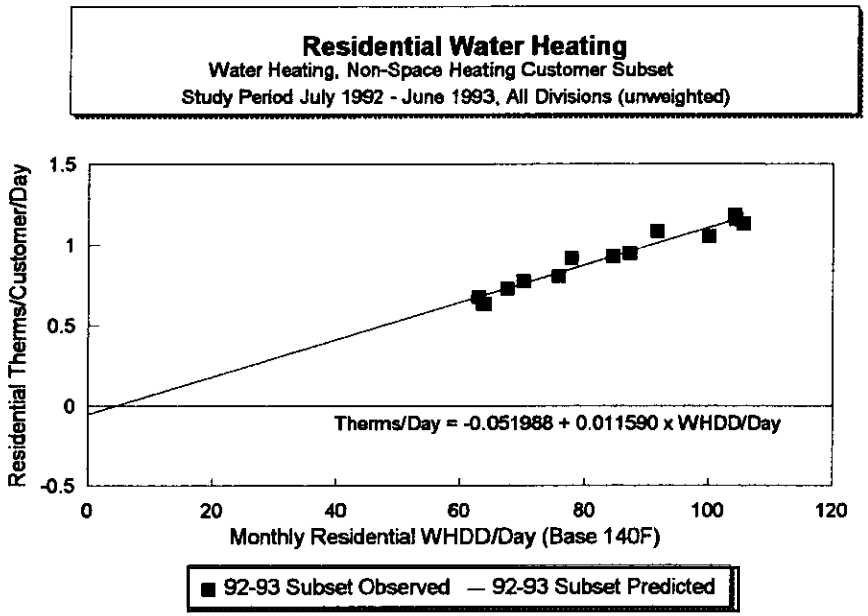
Schedule 1



Laclede Commercial Water Heating

Regression Output:	
Constant	(0.76156)
Standard Error of Y Estimate	0.193935
R Squared	0.948799
No. of Observations	12
Degrees of Freedom	10
X Coefficient	0.045903
Standard Error of X Coefficient	0.003372
T Statistic (X Coefficient)	13.612824
T Statistic (Constant)	(3.926870)

Study Year 1992-93 Month	Number of Customers	Read Cycle Days	USACE Read Cycle Weighted WHDD/Mo	Subset Use/Cust Water Heat Therms	USACE Read Cycle Weighted WHDD/D	Subset Use/Cust Water Heat Therms/Day	Predicted Use/Cust Water Heat Therms/Day
Jul	265	30.6	1,758	15,663	57.5	1.9334	1.8787
Aug	265	28.5	1,686	13,244	59.2	1.6347	1.9565
Sep	265	30.1	1,751	17,152	58.2	2.1172	1.9087
Oct	265	29.7	2,060	18,174	69.5	2.2433	2.4266
Nov	265	30.7	2,521	22,693	82.1	2.8011	3.0056
Dec	265	32.1	2,908	27,265	90.6	3.3654	3.3978
Jan	265	32.3	3,362	32,135	104.0	3.9666	4.0111
Feb	265	30.4	3,099	31,077	102.0	3.8360	3.9215
Mar	265	29.9	2,834	31,441	94.9	3.8809	3.5956
Apr	265	30.7	2,514	25,513	82.0	3.1492	3.0020
May	265	29.8	2,170	20,765	72.8	2.5632	2.5795
Jun	265	30.6	1,846	17,816	60.3	2.1991	2.0066



Laclede Residential Water Heating

Regression Output:	
Constant	(0.051988)
Standard Error of Y Estimate	0.043732
R Squared	0.955088
No. of Observations	12
Degrees of Freedom	10
X Coefficient	0.011590
Standard Error of X Coefficient	0.000795
T Statistic (X Coefficient)	14.582746
T Statistic (Constant)	(1.188784)

Study Year 1992-93 Month	Number of Customers	Read Cycle Days	USACE Read Cycle Weighted WHDD/Mo	Subset Use/Cust Water Heat Therms	USACE Read Cycle Weighted WHDD/D	Subset Use/Cust Water Heat Therms/Day	Predicted Use/Cust Water Heat Therms/Day
Jul	1103	30.6	1,925	22,906	63.0	0.6793	0.6777
Aug	1103	28.5	1,817	19,874	63.8	0.6327	0.6876
Sep	1103	30.1	2,029	24,214	67.4	0.7295	0.7293
Oct	1103	29.7	2,246	26,373	75.7	0.8060	0.8256
Nov	1103	30.7	2,677	32,119	87.2	0.9481	0.9583
Dec	1103	32.1	3,207	37,139	99.9	1.0491	1.1062
Jan	1103	32.3	3,413	40,313	105.5	1.1304	1.1713
Feb	1103	30.4	3,168	38,786	104.3	1.1574	1.1567
Mar	1103	29.9	3,107	39,000	104.1	1.1843	1.1542
Apr	1103	30.7	2,809	36,599	91.6	1.0820	1.0097
May	1103	29.8	2,317	30,097	77.7	0.9154	0.8490
Jun	1103	30.6	2,145	26,056	70.0	0.7715	0.7599

Laclede Gas Company, Case No. GR-99-315
Missouri Natural and Franklin County Divisions
GENERAL SERVICE CLASS

ADJUSTMENTS TO 1998 TEST YEAR VOLUMES

	GENERAL SERVICE CLASS (RESIDENTIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	26,645	18,891	601,937	620,828
Feb	26,696	46,110	664,540	710,649
Mar	26,656	(3,974)	(22,768)	(26,742)
Apr	26,564	81,567	105,272	186,839
May	26,312	123,477	51,807	175,284
Jun	25,990	15,478	2,341	17,820
Jul	25,773	29,114	1,550	30,665
Aug	25,618	9,753	462	10,216
Sep	25,510	88,595	10,155	98,750
Oct	25,680	152,102	42,741	194,843
Nov	26,298	99,784	144,540	244,324
Dec 98	26,627	86,170	538,667	624,837
ANNUAL	314,369	747,069	2,141,244	2,888,313
NOV-APR	159,486	328,548	2,032,187	2,360,735
MAY-OCT	154,883	418,521	109,057	527,578

	GENERAL SERVICE CLASS (COMMERCIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	3,603	7,941	292,410	300,351
Feb	3,607	10,855	328,293	339,148
Mar	3,608	(403)	(8,812)	(9,216)
Apr	3,589	8,143	82,246	90,389
May	3,535	12,947	69,042	81,989
Jun	3,503	1,927	9,886	11,813
Jul	3,476	2,542	13,273	15,815
Aug	3,463	822	4,642	5,463
Sep	3,458	8,358	41,378	49,736
Oct	3,490	12,440	82,378	94,818
Nov	3,578	11,151	107,807	118,958
Dec 98	3,626	11,825	294,393	306,219
ANNUAL	42,536	88,548	1,316,935	1,405,484
NOV-APR	21,611	49,512	1,096,337	1,145,849
MAY-OCT	20,925	39,036	220,599	259,635

	GENERAL SERVICE CLASS (INDUSTRIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	108	87	38,424	38,511
Feb	109	27	44,668	44,695
Mar	113	0	(4,589)	(4,589)
Apr	115	72	12,572	12,644
May	117	230	9,440	9,670
Jun	117	(10)	(259)	(268)
Jul	117	15	483	499
Aug	117	6	154	160
Sep	117	108	3,874	3,982
Oct	117	158	10,837	10,995
Nov	121	4	13,681	13,685
Dec 98	122	0	45,310	45,310
ANNUAL	1,390	698	174,597	175,295
NOV-APR	688	190	150,067	150,257
MAY-OCT	702	508	24,530	25,038

Laclede Gas Company, Case No. GR-99-315
Missouri Natural and Franklin County Divisions
GENERAL SERVICE CLASS

ADJUSTMENTS TO 1998 TEST YEAR VOLUMES

	GENERAL SERVICE CLASS (RESIDENTIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	26,645	18,891	601,937	620,828
Feb	26,696	46,110	664,540	710,649
Mar	26,656	(3,974)	(22,768)	(26,742)
Apr	26,564	81,567	105,272	186,839
May	26,312	123,477	51,807	175,284
Jun	25,990	15,478	2,341	17,820
Jul	25,773	29,114	1,550	30,665
Aug	25,618	9,753	462	10,216
Sep	25,510	88,595	10,155	98,750
Oct	25,680	152,102	42,741	194,843
Nov	26,298	99,784	144,540	244,324
Dec 98	26,627	86,170	538,667	624,837
ANNUAL	314,369	747,069	2,141,244	2,888,313
NOV-APR	159,486	328,548	2,032,187	2,360,735
MAY-OCT	154,883	418,521	109,057	527,578

	GENERAL SERVICE CLASS (COMMERCIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	3,603	7,941	292,410	300,351
Feb	3,607	10,855	328,293	339,148
Mar	3,608	(403)	(8,812)	(9,216)
Apr	3,589	8,143	82,246	90,389
May	3,535	12,947	69,042	81,989
Jun	3,503	1,927	9,886	11,813
Jul	3,476	2,542	13,273	15,815
Aug	3,463	822	4,642	5,463
Sep	3,458	8,358	41,378	49,736
Oct	3,490	12,440	82,378	94,818
Nov	3,578	11,151	107,807	118,958
Dec 98	3,626	11,825	294,393	306,219
ANNUAL	42,536	88,548	1,316,935	1,405,484
NOV-APR	21,611	49,512	1,096,337	1,145,849
MAY-OCT	20,925	39,036	220,599	259,635

	GENERAL SERVICE CLASS (INDUSTRIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	108	87	38,424	38,511
Feb	109	27	44,668	44,695
Mar	113	0	(4,589)	(4,589)
Apr	115	72	12,572	12,644
May	117	230	9,440	9,670
Jun	117	(10)	(259)	(268)
Jul	117	15	483	499
Aug	117	6	154	160
Sep	117	108	3,874	3,982
Oct	117	158	10,837	10,995
Nov	121	4	13,681	13,685
Dec 98	122	0	45,310	45,310
ANNUAL	1,390	698	174,597	175,295
NOV-APR	688	190	150,067	150,257
MAY-OCT	702	508	24,530	25,038

Laclede Gas Company, Case No. GR-99-315
Midwest Division
GENERAL SERVICE CLASS

ADJUSTMENTS TO 1998 TEST YEAR VOLUMES

	GENERAL SERVICE CLASS (RESIDENTIAL) TY			Adjustment Therms
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	14,212	8,796	302,553	311,349
Feb	14,264	30,915	330,415	361,330
Mar	14,294	(2,549)	(12,438)	(14,987)
Apr	14,279	43,334	60,610	103,944
May	14,275	65,263	23,879	89,142
Jun	14,257	10,527	2,115	12,643
Jul	14,284	14,998	1,997	16,994
Aug	14,292	4,298	483	4,781
Sep	14,336	44,068	6,999	51,067
Oct	14,414	83,157	19,845	103,002
Nov	14,554	51,362	67,934	119,296
Dec 98	14,670	67,330	285,078	352,407
ANNUAL	172,131	421,499	1,089,470	1,510,968
NOV-APR	86,273	199,188	1,034,151	1,233,339
MAY-OCT	85,858	222,311	55,318	277,629

	GENERAL SERVICE CLASS (COMMERCIAL) TY			Adjustment Therms
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	734	1,298	74,359	75,657
Feb	736	2,069	86,789	88,858
Mar	738	(247)	(7,365)	(7,611)
Apr	744	2,172	24,016	26,188
May	737	3,094	18,745	21,839
Jun	731	93	502	595
Jul	728	550	3,040	3,590
Aug	724	176	886	1,061
Sep	720	1,815	10,347	12,162
Oct	726	3,016	20,739	23,755
Nov	734	2,155	26,377	28,533
Dec 98	743	2,825	77,175	80,000
ANNUAL	8,795	19,015	335,611	354,626
NOV-APR	4,429	10,272	281,352	291,624
MAY-OCT	4,366	8,742	54,259	63,002

	GENERAL SERVICE CLASS (INDUSTRIAL) TY			Adjustment Therms
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	2	18	2,651	2,670
Feb	2	10	1,896	1,907
Mar	2	1	388	389
Apr	2	0	915	915
May	2	3	192	195
Jun	2	4	153	158
Jul	2	1	32	33
Aug	2	0	4	4
Sep	2	1	52	53
Oct	2	9	503	512
Nov	3	9	758	767
Dec 98	3	0	3,920	3,920
ANNUAL	26	56	11,465	11,522
NOV-APR	14	39	10,529	10,568
MAY-OCT	12	18	936	954

Laclede Gas Company, Case No. GR-99-315
St. Charles Division
GENERAL SERVICE CLASS

ADJUSTMENTS TO 1998 TEST YEAR VOLUMES

	GENERAL SERVICE CLASS (RESIDENTIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	66,253	20,765	1,626,724	1,647,489
Feb	66,451	101,048	1,812,155	1,913,203
Mar	66,687	(11,207)	(80,216)	(91,423)
Apr	66,813	190,898	317,399	508,297
May	66,823	319,680	160,459	480,139
Jun	66,867	34,851	7,325	42,176
Jul	66,980	68,555	14,084	82,639
Aug	67,231	21,767	3,034	24,801
Sep	67,377	229,743	40,584	270,327
Oct	67,721	417,221	127,467	544,688
Nov	68,362	265,817	395,282	661,099
Dec 98	68,874	239,225	1,548,490	1,787,715
ANNUAL	806,439	1,898,364	5,972,787	7,871,151
NOV-APR	403,440	806,547	5,619,833	6,426,380
MAY-OCT	402,999	1,091,817	352,954	1,444,771

	GENERAL SERVICE CLASS (COMMERCIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	3,309	5,274	381,225	386,499
Feb	3,320	8,404	454,029	462,433
Mar	3,318	(844)	(34,494)	(35,338)
Apr	3,320	9,554	127,275	136,829
May	3,310	13,038	97,280	110,318
Jun	3,309	1,346	7,793	9,139
Jul	3,299	2,429	14,547	16,976
Aug	3,281	589	3,516	4,105
Sep	3,264	8,208	47,451	55,659
Oct	3,278	15,486	107,010	122,496
Nov	3,389	10,543	135,213	145,757
Dec 98	3,445	13,212	443,655	456,866
ANNUAL	39,842	87,239	1,784,499	1,871,738
NOV-APR	20,101	46,143	1,506,903	1,553,045
MAY-OCT	19,741	41,096	277,596	318,692

	GENERAL SERVICE CLASS (INDUSTRIAL) TY	Adjustment Therms		
		Units by Monthly Category of Bills (Therms)		
Month	Customers	Bills under 65	Bills over 65	Total Therms
Jan 98	36	420	49,410	49,830
Feb	36	521	64,523	65,045
Mar	36	(67)	(11,326)	(11,392)
Apr	35	0	18,906	18,906
May	34	71	12,561	12,632
Jun	34	(47)	(1,188)	(1,235)
Jul	34	10	466	476
Aug	34	3	185	189
Sep	34	58	5,411	5,470
Oct	34	119	12,953	13,072
Nov	34	0	18,573	18,573
Dec 98	35	127	55,280	55,407
ANNUAL	416	1,215	225,756	226,971
NOV-APR	212	1,001	195,367	196,368
MAY-OCT	204	214	30,389	30,603