Exhibit No.:	
Issue:	Weather Normalized Sales
Witness:	James A. Gray
Sponsoring Party:	MO PSC Staff
Type of Exhibit:	Rebuttal Testimony
Case No.:	GR-99-315

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

REBUTTAL TESTIMONY

OF

JAMES A. GRAY

LACLEDE GAS COMPANY

CASE NO. GR-99-315

Jefferson City, Missouri
August 1999

REBUTTAL TESTIMONY

OF

JAMES A. GRAY

LACLEDE GAS COMPANY

CASE NO. GR-99-315

Q. Please state your name and business address.

A. My name is James A. Gray. My business address is P. O. Box 360, Jefferson City, Missouri 65102.

Q. Are you the same James A. Gray who filed direct testimony in this case?

A. Yes, I am.

Q. What issue are you addressing in your rebuttal testimony?

A. The methodology to weather normalize test year natural gas sales filed by Laclede Gas Company's (Laclede or Company) witness Patricia A. Krieger. Ms. Krieger discusses her methodology on pages 22 through 25 of her Direct Testimony in this case.

Q. Do you agree with the Company's methodology to adjust natural gas sales to normal weather?

A. No, I have concerns in the following areas:

(1) Estimating summer (base) natural gas usage from the July and August natural gas usage in the test year;

(2) Estimating non-space heating natural gas usage for the test year as 135% of the natural gas usage in July and August of 1998;

(3) Estimating the relationship between natural gas space heating usage and heating degree days (HDD) during the ten months of January 1998 through June and September through December 1998 (non-summer months) in the test year;

(4) Adjusting test year volumes for normal weather, and;

(5) Simple averages.

Q. What divisions and districts were studied?

A. We both studied the four Laclede divisions, which consist of the Laclede Division, Missouri Natural Division, Midwest Division, and the St. Charles Division. Additionally, I studied Missouri Natural's Franklin County District separately.

Q. Did Laclede and you study the same General Service (GS) rate classes?

A. Yes, we both studied the GS – residential (RES), GS – commercial (COM), and the GS – small industrial (IND) rate classes separately. I did not weather adjust Franklin County District's IND customers since they did not exhibit any weather sensitivity.

(1) ESTIMATING SUMMER (BASE) USAGE FOR THE TEST YEAR

Q. Why does Laclede use the natural gas usage in July and August of the test year to calculate its summer base natural gas usage?

A. Ms. Krieger states:

> Q. How do you determine the portion of customer use which does not vary with temperature?
> A. This use per customer is based upon the July and August use per customer. The months of July and August do not reflect any space heating load. (Krieger, Direct Testimony, page 24, lines 5-9)

There is some natural gas usage during July and August for natural gas appliances such as gas water heaters, stoves, clothes dryers, and gas air conditioning. Since natural gas air conditioning usage is weather sensitive to warm weather in the summer, Laclede does not include any natural gas air conditioning usage in its computation of summer base usage.

Q. How does Laclede calculate its annualized base usage?

A. Laclede calculates an average usage per customer for July 1998 and August 1998. Laclede adds the two averages together to calculate its summer average base usage, for each division's non-air conditioning natural gas RES, COM, and IND customers. Then Laclede multiplies the summer base usage by six to annualize (2 x 6 = 12) those volumes.

Ms. Krieger states:

> This two-month use is multiplied by six, to produce an annual figure, and the product of this multiplication is finally multiplied by a factor of 1.35 (135%) to calculate the annual usage which does not vary with temperature. (Krieger, Direct Testimony, page 24, lines 8-14)

Q. Do you think that Laclede's annualized summer base volumes accurately represent the natural gas usage patterns for the non-summer months of the test year?

A. No, the characteristics of Laclede's summer customers versus the winter customers are probably quite different. There may be seasonal customers, which only use natural gas in the winter as well as growth in the number of the customers throughout the test year. In my opinion, the newer customers may have quite different natural gas consumption patterns than the older customers.

Q. Is Laclede's methodology especially susceptible to data problems in July and August?

A. Yes, Laclede's base natural gas use estimates are only calculated using two months of billing data, and its annualized estimates are used throughout the entire test year. In my experience, there have been problems with the natural gas usage billing data provided by Laclede.

Laclede is constantly making billing adjustments throughout the test year. Sometimes the adjustments are quite large. Sales are usually much lower in the summer. Therefore negative billing adjustments are consequently more noticeable during this period.

For example in Case No. GR-98-374, Laclede's billing data for Missouri Natural's Franklin County COM customers recorded negative natural gas usage of 84,000 therms in March 1997 and a negative 348,000 therms in July 1997. The Company stated:

> It is possible that the error could be large enough to offset the correct billings, thus resulting in negative usage for entire classification (this usually happens only in the smaller division where there are a limited number of customers). Although these amounts appear in the revenue reports, they do not represent bills mailed out by the Company. Adjustments were made to the mechanical billings of general rate customers which were corrected in subsequent months to better reflect the appropriate revenue month's usage for the classification and thereby produce a more accurate weather normalization adjustment. (Laclede response to Data Request No. 4105 in Case No. GR-98-374)

Laclede's movement of –348,000 therms from July 1997 to August 1997 still understated the average natural gas usage in July and August of 1997 for its weather normalization procedure in Case No. GR-98-374. I have attached Laclede's response to Staff Data Request No. 4105 to this testimony as Schedules 1-1 and 1-2.

Q. Did the data Laclede provided to you in this case contain any negative natural gas usage?

A. Yes, some billing cycles in July 1998 and August 1998 had negative sales. However, I did not send any additional data requests to question or follow-up on those negative sales.

Q. Are you aware of discrepancies in July 1998 and August 1998 between billed therms provided to you and volumes by GS rate block provided to Staff witness Henry E. Warren, PhD.?

A. Yes, Dr. Warren was provided with 282,966 therms in the first block (zero to 65 therms) for Midwest Division's RES customers, while I was provided with only 254,774 total therms for the billing month of July 1998 for the same group of customers. Another example is that Dr. Warren was provided with 9,102,333 therms in the first block for Laclede Division's RES customers, while I was provided with only 7,859,139 total therms for the Laclede's Division's RES customers billing month of August 1998.

The data provided to me was billed total therms (including first and second rate block volumes). Therefore, the natural gas volumes provided to me should exceed the first rate block volumes provided to Dr. Warren, however they did not. Discrepancies in Company supplied data do exist between Dr. Warren's data and mine.

Q. Does an inaccurate estimate of summer base natural gas usage lead to inaccurate estimates of natural gas space heating and non-space heating?

A. Yes, it does. In Laclede's methodology, the July and August natural gas usage must be reasonably precise. This is because two other seasonal values are directly

based on summer base natural gas usage. This demonstrates that Laclede's methodology is highly dependent on accurate summer volumes.

(2) ESTIMATING NON-SPACE HEATING USAGE FOR THE TEST YEAR

Q. Why does Laclede assume that non-space heating natural gas volumes for the test year are 135% times the annualized base natural gas volumes in July and August of 1998?

A. Laclede conducted a study of non-space heating natural gas usage for the heating season of 1990 - 1991. In that study, Laclede estimated that natural gas non-space heating load for the non-summer months is 135% times July and August's annualized base natural gas usage.

Ms. Krieger states:

> It is necessary to increase the 12 months of summer usage by 35% to reflect the fact that customers' "base" usage in winter months exceeds their usage during the summer. This increase is separate from any space heating requirement and is not a function of the number of degree days experienced. (Krieger, Direct Testimony, page 24, lines 14-20)

Staff witness Henry E. Warren, PhD addresses Laclede's non-space heating study in pages 1 through 5 of Dr. Warren's Rebuttal Testimony in this case.

Q. Do you think that a fixed 135% annual adjustment is reasonable?

A. No, in my opinion, the percentage should vary with the weather in the test year. Ms. Krieger states:

> Rather, it arises in large part from the necessity of heating water from lower starting temperatures during the winter. (Krieger, Direct Testimony, page 24, lines 20-22)

Therefore, Laclede's constant 135% adjustment is a very crude method to estimate normal non-space heating natural gas usage in the non-summer months. Since the water inlet temperatures do vary, in my opinion, it is necessary to adjust the test year natural gas water heating usage to monthly normal weather (water temperature).

Q. Does Laclede use any varying monthly adjustments for non-space heating usage in its estimated billing procedures?

A. Yes, Laclede estimates monthly non-space heating as twelve monthly percentages or adjustment factors for RES customers. These twelve monthly percentages are shown in Laclede's response to Staff Data Request No. 3507 in Case No. GR-98-374, which I have attached to this testimony in Schedules 2-1 and 2-2. The data request refers to this percentage as a NAF(Normalization Adjustment Factor). The monthly percentage adjustments range from 100% to 180% for natural gas space heating RES customers and from 100% to 230% for non-space heating RES customers.

Q. Why does Laclede's bill estimation procedure use varying monthly percentage adjustments for non-space heating natural gas usage?

A. In my opinion, the percentages reflect water heating usage that varies with changing average monthly colder inlet water temperatures experienced in the ten non-summer months.

Q. Would using Laclede's monthly percentage adjustment for non-space heating natural gas usage be appropriate in this case for adjusting test year non-space heating natural gas usages to normal weather?

A. No, those values are also fixed or constant for each month. Also, they do not vary correctly with the yearly fluctuations in calendar month weather.

All the monthly values should be adjusted to normal weather conditions experienced during each billing cycle of any given billing month. Staff's weather measures for adjusting natural gas water heating usage to normal weather conditions are addressed in pages 3 through 5 and Schedule 1-1 of Dennis Patterson's Direct Testimony in this case.

Q. Did Laclede use its bill estimation procedures to adjust the monthly percent non-space heating natural gas water usage in this case?

A. No, Laclede used only the constant 135% adjustment times the July and August's annualized natural gas base usage. The 135% is shown in Laclede's Direct Testimony in Section C, TEST YEAR UTILITY OPERATING INCOME STATEMENTS AND ADJUSTMENTS Schedule 3, pages 3 through 14, on the third line under the heading: Calculation of Use per Customer per Degree Day Deficiency.

Q. Is Laclede consistent in its weather adjustment in this case and its bill estimating procedures?

A. No, Laclede's estimated billing procedures do allow for different percentage adjustments by calendar month, presumably to reflect colder or warmer weather throughout a calendar year.

In this case, the 135% adjustment is used for all the ten non-summer months of the test year. Laclede has two seasonal rates for May through October and another for November through April. The 135% adjustment fails to properly match the seasonal rates since the 135% adjustment is applied for ten months. Therefore, Laclede does not properly allocate its seasonal non-space heating natural gas usage adjustments to monthly normal weather.

Q. Please explain why Laclede must carefully estimate the non-space heating natural gas usage for the test year.

A. Laclede's estimated annualized base natural gas usage is multiplied by 135% to adjust for non-space heating natural gas usage. The product is then subtracted from the annual use per customers' natural gas volumes to calculate a remainder for the ten non-summer months. If the estimated 135% adjustment times the annualized base natural gas usage for non-space heating is inaccurate, then the estimated remaining weather sensitive volumes for the non-summer months will also be inaccurate. Since Laclede calculates a weather adjustment for space heating only on the remaining weather sensitive space heating volumes, Laclede's adjustments to test year sales for weather will also be inaccurate if the 135% adjustment is not precisely quantified.

(3) ESTIMATING SPACE HEATING USAGE FOR THE TEST YEAR

Q. What does the remaining weather sensitive natural gas volumes for the test year represent?

A. Ms. Krieger states:

> In each case, the average annual use per customer is the starting point, and the customer use that does not vary with degree days is subtracted to yield the use per customer that varies with degree days. (Krieger, Direct Testimony, page 23, lines 26-28, and page 24, lines 1-2)

In other words, the remainder represents non-summer volumes that are subject to a weather adjustment for space heating. Laclede does not weather adjust all the volumes for the ten non-summer months of the test year. Laclede assumes that the 135% of the annualized estimated summer natural gas usage represent a natural gas usage that is not

related to space heating, and therefore, it is not subject to a weather adjustment in any non-summer month.

Q. How did Laclede estimate the relationship between natural gas space heating usage and weather?

A. Ms. Krieger states:

> This weather sensitive use per customer is divided by the total degree days experienced during the period to yield use per customer per degree day. (Krieger, Direct Testimony, page 24, lines 2-4)

That is, Laclede divided its estimate of non-summer weather sensitive usage by the total actual HDD experienced in the test year. The simple ratio represents an average change in estimated natural gas space heating usage per actual HDD.

A ratio states the relative size of two quantities expressed as a quotient of one quantity divided by the other. Since the use per customer degree day is divided by a weather measure, the larger the ratio, the bigger the adjustment to test year volumes.

Q. Is it customary to calculate a simple ratio of total natural gas space heating usage to total actual HDD experienced in the non-summer months of the test year?

A. No, a simple average of one year's (ten non-summer months) data is not a good estimator of relationships.

In my opinion, Staff's statistical regression produces better estimates than a simple average. Staff's methodology is a monthly model that matches monthly natural gas usage and weather.

Usually a natural gas meter is read only once every billing month. The most elementary level to match natural gas usage and weather is the monthly billing cycle level. Therefore, Staff matches natural gas usage and daily actual and normal weather, in

HDD, with the scheduled meter reading dates by monthly billing cycles. In contrast, Laclede uses a ten-month (non-summer), seasonal ratio times monthly deviations in weather for each non-summer month of the test year.

Q. How would inaccurate estimates of annualized summer base usage and/or non-space heating natural gas usage (135%) influence Laclede's non-summer weather sensitive ratios?

A. If Laclede's annualized July 1998 and/or August 1998 natural gas usage is too high because of an incorrect estimate, Laclede's weather sensitive ratio would be too low. Also, if Laclede's estimated test year non-space heating usage of 135% of annualized summer base usage is too high, Laclede's weather sensitive ratio would also be too low. This is because Laclede's weather sensitive ratio is the remainder of total natural gas usage minus the other two volume estimates.

Q. Does Laclede present any evidence to support how well its simple ratio of estimated natural gas space heating usage to non-summer actual HDD fits the billing months' natural gas space heating usage during the test year?

A. No, Laclede does not present any evidence to evaluate its simple ratio. There is no goodness of fit either by showing plots or statistical measures to support its use of a simple ratio. However, the Staff uses *r squared* (r^2) values as a measure of the goodness of fit along with plots to further demonstrate the good fit of the Staff's regression methodology.

(4) ADJUSTING TEST YEAR VOLUMES FOR NORMAL WEATHER

Q. Does Laclede mix annual, seasonal, and monthly estimates in its methodology?

A. Yes, the estimates of annualized summer natural gas base usage, non-space heating estimates, and non-summer space heating usage are seasonal estimates calculated from annualized July and August natural gas usage in the test year. The natural gas use per customer is an annual estimate while the test year simple average actual HDD deviations from normal HDD are simple monthly averages.

In Laclede's methodology, it is very important to estimate each ratio carefully and independently. Otherwise, the portion of Laclede's volumes subject to a weather adjustment will be incorrect.

Q. Does Laclede properly account for varying days in the billing cycles throughout the test year?

A. No, Laclede has approximately twenty-one billing cycles for each billing month in the test year. The number of days within a billing cycle varies from billing month to billing month.

Staff's methodology expresses natural gas usage on a per day basis. Failure to do so results in distortions (bias) in the data. That is, the non-summer billing cycles with the most number of days influence Laclede's monthly averages the most. This creates a bias in the estimation of natural gas space heating usage per actual HDD ratio.

Q. Does the Company's failure to adjust the days in the test year also cause problems with the calculations of the normal billing cycles' HDD?

A. Yes, the test year in this case has 365 days. Staff makes an adjustment for the number of days in the test year. All billing cycles that do not sum to 365 days are adjusted to normally occurring 365 days a year. Five of Laclede's billing cycles have too many normal HDD because the annual total number of days for those cycles exceed 365 days in the test year. Staff removes the extra days' normal HDD from the test year normal HDD for each billing cycle. Failure to do so, creates billing cycle annual totals that do not sum to the correct annual normal HDD.

Q. How does Laclede calculate billing monthly HDD deviations?

A. Laclede subtracts twelve billing months average actual HDD from the corresponding twelve billing months average normal HDD (normal HDD – actual HDD).

Ms. Krieger states:

> The degree day departure from the average level for each month has been multiplied by the use per customer per degree day to determine the monthly adjustment to use per customer necessary to reflect normal weather. This monthly factor is then multiplied by the number of customers each month in that rate class to determine the total adjustment to therm sales for the month. (Krieger, Direct Testimony, page 24, lines 27-28, and page 25, lines 1-6)

In contrast, Staff's methodology correctly calculates different billing month customer-weighted average actual HDD for each of Laclede's GS classes by division.

(5) SIMPLE AVERAGES

Q. Did Laclede correctly calculate its simple average of annual natural gas use per customer?

A. No, to calculate a very simple annual average natural gas use per customer, the natural gas usages should be totaled and the numbers of customers should be totaled

for all twelve months in the test year. Then the total natural gas usage should be divided by the total number of customers to calculate an annual average natural gas usage per customer.

Q. How did Laclede calculate its annual average natural gas usage per customer?

A. Laclede calculated monthly average natural gas usage per customer by dividing each of twelve monthly total billed natural gas usages by their numbers of customers. Then Laclede summed up the twelve monthly averages of natural gas usage per customer. Therefore, Laclede's annual average was the sum of the twelve monthly averages.

This procedure is shown using Laclede's work papers for Laclede's RES customers in Schedule 3-1, attached to this testimony. In Schedule 3-1, the annual average therm use per customer of 915.7 is shown as the total under the column heading Actual U/C. The annual average therm use per customer of 915.7 is carried over as the average annual use per customer on the first line under the heading of Calculation of Use per Customer per Degree Day Deficiency in Section C, TEST YEAR UTILITY OPERATING INCOME STATEMENTS AND ADJUSTMENTS Schedule 3, page 3 of 14. I have included Laclede's calculated annual average usage per customer in Schedules 3-1 and 3-2, attached to my testimony.

Q. Did Laclede correctly calculate an annual average natural gas usage per customer?

A. No, the customer numbers in each month should not be weighted the same. Equal weighting gives equal contribution across the monthly averages in calculating an annual average. In reality, the customer levels are changing throughout the test year.

Usually there are more customers in the winter months. The monthly averages should not be given equal weight by summing all the monthly averages as Laclede's methodology does.

Therefore, Laclede's estimated averages of natural gas usage per actual HDD are inaccurate. Inaccuracies multiplied times large number of customers and actual HDD for the test year result in a bias or estimation error.

Q. Is the average non-space heating natural gas use per customer during the summer base months calculated the same as the annual use per customer?

A. Yes, the monthly average use per customer for July and August are calculated separately, then the two averages are added together to calculate Laclede's average base natural gas usage.

Q. Can you give an example of why Laclede's calculations of the annual and summer base usage per customer is incorrect?

A. Yes, as an illustration, let's assume we want to calculate the number of desks per student in a school which has two classrooms with different numbers of students and different numbers of desks. Suppose one class has one student, and that classroom has one desk. The desks per student is one for that classroom. Suppose the other classroom has fifteen students and 45 desks. The desks per student are three (45 divided by 15) for the second classroom.

The number of desks per students for the combined classrooms is not four (i.e. not 3 plus 1). The correct desks per student is the student-weighted average for the combined classrooms, which is 2.641 desks per student. These averages differ because the classrooms do not have equal numbers of students. Staff's method utilizes a weighted

average, not adding the classroom averages together. Laclede's method incorrectly adds therms per customer across billing months with different numbers of customers to calculate the summer base and the annual natural gas usage per customer.

Q. Are there additional problems associated with relying on simple averages?

A. Yes, Laclede is not using any statistical methods, such as statistical regression, to estimate relationships between natural gas space heating usage and weather. The use of averages does not formulate an accurate picture of how natural gas space heating usage depends upon weather.

Q. Does Laclede calculate HDD by billing cycle?

A. Yes, Ms. Krieger states:

> Heating degree days recorded on a calendar basis have been converted by the Company to a billing cycle basis, which reflects the Company's cycle method of billing its customers. (Krieger, Direct Testimony, page 23, lines 1-4)

Q. Does Laclede sum the HDD by billing cycle as the Staff does?

A. Yes, Laclede does. However, Laclede uses a different daily normal HDD weather series. For example, Laclede has roughly spread out 4,047 normal HDD over the billing cycles in the test year, while the Staff has precisely spread out 5,094.6 normal HDD over each billing cycle in the test year.

Q. Does Laclede also calculate a simple average of actual HDD by billing month?

A. Yes, Laclede does. Laclede calculates a simple average of all billing cycles in each month of the test year, whereas Staff calculates a customer-weighted average of daily actual HDD for all the billing months of the test year. Laclede simply averages the weather across all billing months' twenty-one billing cycles. Laclede's procedure gives

equal weight to billing cycles without accounting for variations in the number of customers across the billing cycles. For example, a billing cycle might have only one customer while another cycle might have thousands of customers. These unequal numbers of customers in billing cycles are particularly noticeable in the IND and COM classes.

Laclede's methodology calculates a simple average of all billing cycles in a billing month, even if there are no customers in some billing cycles for certain rate codes. HDD from Billing cycles without customers should not count in the average actual HDD for each billing month. Staff's weighting gives the billing cycles with the most customers the most weight to the calculation of daily average weather.

Q. Please give another example of improper averaging.

A. If a school wished to know how much the average donation to a relief organization for all the classrooms in a school, the school would divide the donations by the number of classrooms in the school. If there were empty classrooms, the school would not divide the donations by the number of regular classrooms plus the number of empty classrooms. That would produce a meaningless average donation per classroom.

Laclede's methodology includes all the weather from monthly billing cycles without any customers to calculate its monthly simple average actual and normal HDD. Accordingly, Laclede's monthly average actual and normal HDD are inaccurate.

Q. Please compare Staff and Laclede's average HDD for the billing month of February 1998 for Laclede Division's COM customers.

A. Schedule 3, attached to my Direct Testimony, shows how the different billing cycles for Laclede's COM customers for the February 1998 billing month have different

HDD and customer numbers. Staff's customer weighted daily HDD average of the February 1998 billing month for Laclede's COM customers is 26.1941. For comparison purposes only, I have calculated a similar simple daily average of Staff's actual HDD for that month is 25.76. This demonstrates the difference between a daily weighted average actual HDD and a simple daily average actual HDD for the billing month of February 1998, using the Staff's HDD.

Laclede's methodology for calculating the monthly average of billing cycle HDD for the billing month of February 1998 is attached to this testimony as Schedule 4. It is a simple average calculation.

Q. Does Laclede use the same simple average monthly deviations from normal HDD (normal HDD – actual HDD) for every division and GS class?

A. Yes, Laclede uses the same simple average billing cycle weather and does not use customer weighted average weather. Moreover, Laclede does not even consider if there are any customers in each billing cycle. Therefore, all GS classes for each division have exactly the same "degree day departure from normal average" for each of the twelve billing months of the test year.

SUMMARY

Q. Can you briefly summarize the differences between Staff and Laclede's methodology?

A. The Company uses a simple arithmetic method based on an average annual use per customer by GS class and division. However, the Staff uses a customer weighted

averaging process to account for varying customer numbers among the cycles within a billing month.

In Laclede's calculations, the summer seasonal averages are an average natural gas usage over two, summer months, and the non-summer seasonal average are calculated over the other ten months of the test year. Additionally, these seasonal values are used with non-varying monthly "degree day departure from normal average" HDD.

The goal of adjusting test year natural gas sales to normal weather is to accurately quantify the relationship between weather and natural gas usage. Seasonal average values, one value based on only two summer months and the other non-summer seasonal value based on a ten-month average, do not accomplish that goal.

In statistics, if the natural gas usage (in therms) and actual HDD for a customer class were not related (not correlated) to each other at all, the best estimator of therms per HDD in the test year would be dividing by natural gas usage per customer. However, natural gas usage and actual HDD are related to each other. Then statistical regression gives the best estimate of therms per HDD. The higher the correlation, the smaller the deviation of the estimates from the actual and thus the more accurate the estimates. The Staff's method uses statistical regression of monthly, test year data, to estimate therms per HDD rather than simple arithmetic averages.

RECOMMENDATIONS

Q. What are your recommendations?

A. I recommend that the Commission approve the Staff's regression methodology versus Laclede's ratio method of adjusting test year natural gas sales to normal weather.

Q. Do you have any other items to address at this time?

A. Yes, in my Direct Testimony I stated that I will update Schedule 5 and Schedule 6 attached to my Direct Testimony to reflect revisions to daily normal HDD by Mr. Patterson and Dr. Steve Qi Hu, a consultant appearing on behalf of the Staff. I have updated these schedules and attached them to this Rebuttal Testimony. They are denominated as Revised Schedule 5 and Revised Schedule 6.

Q. Does this conclude your Rebuttal Testimony?

A. Yes, it does.

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 JAMES A. GRAY

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

James A. Gray, is, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Rebuttal Testimony in question and answer form, consisting of 20 pages to be presented in the above case; that the answers in the foregoing Rebuttal 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.

James A. Gray
JAMES A. GRAY

Subscribed and sworn to before me this 4th day of August 1999.

Joyce C. Neuner
Notary Public

Joyce C. Neuner
Notary Public, State of Missouri
County of Osage
My Commission Exp. 06/18/2001

My Commission Expires: _____

DATA INFORMATION REQUEST
LACLEDE GAS COMPANY
CASE NO. GR-98-374

MAY 21 1998

No. 4105

Requested From: Barb Kelly / Patricia A. Krieger

Date Requested: 05/21/98

Information Requested: Regarding the Determination of the Winter & Summer Base Usage :

(a.) In your analsyses, how was a base usage developed when negative therm sales were recorded? Be sure to explain how the negative therms were treated (adjusted, etc. ?).

(General Service - Industrial - Midwest Division had negative usage in June & August of the test year)

(General Service - Commercial - Franklin County had negative usage in August of the test year.)

(b.) Please provide an explanation of what caused the usage to be negative. If the data is an adjustment, please also provide the original data which is being adjusted. (The requested data should include all information to track the data to the proper division, rate code, billing year, billing month, billing cycle, etc.)

Requested By: James A. Gray, Gas Department -- Rate / Tariff Section (573) 751-7350

Information Provided:

See Attached

Section 386.560 provides "Any person . . . who shall falsely make any statement required to be made to the public service commission, in which a penalty has not heretofore been provided for, shall be deemed guilty of a felony, and upon conviction shall be punished by a fine of not less than one thousand dollars nor more than five thousand dollars, or by imprisonment for not less than two years nor more than five years, or both such fine and imprisonment ; . . ."

If these data are voluminous, please (1) identify the relevant documents and their location (2) make arrangements with requestor to have documents available for inspection in the Laclde Gas Company, St. Louis, Missouri office, or other location mutually agreeable. Where identification of a document is requested, briefly describe the document (e.g. book, letter, memorandum, report) and state the following information as applicable for the particular document: name, title, number, author, date of publication and publisher, addresses, date written, and the name and address of the person(s) having possession of the document. As used in this data request the term "document(s)" includes publication of any format, workpapers, letters, memoranda, notes, reports, analyses, computer analyses, test results, studies or data, recordings, transcriptions and printed, typed or written materials of every kind in your possession, custody or control or within your knowledge. The pronoun "you" or "your" refers to Laclede Gas Company and its employees, contractors, agents or others employed by or acting in its behalf.

Signed by:

Date Response Received:

Prepared by: PATRICIA KRIEGER

1/92

Schedule 1-1

a.) Billing anomalies which resulted in negative usage did not impact base usage calculations in the weather effect during this particular test year. Base usage is determined by total usage in July and August. In the one instance where July or August experienced a negative therm total (August in the MoNat/ Franklin Co. Division) August was adjusting the month of July. (We are not aware of any negative usage reported in Midwest Division.

b.) Mechanical bill errors can occur in the Company's billing system due to various reasons (i.e. incorrect meter readings, human error, etc.). Such errors are included in daily revenue until such time that the error is detected and corrected. At that time, the erroneous bill is reversed and the correct bill entered. Occasionally, late cycle billings may not be corrected mechanically in time to be reported in the correct revenue month. When this happens, and we can identify the error, the correction is adjusted manually on the Company's books and such entry is reversed in the subsequent month when the bill correction is entered mechanically. It is possible that the error could be large enough to offset the correct billings, thus resulting in negative usage for an entire classification (this usually happens only in the smaller divisions where there are a limited number of customers). Although these amounts appear in the revenue reports, they do not represent bills mailed out by the Company. Adjustments were made to the mechanical billings of general rate customers which were corrected in subsequent months to better reflect the appropriate revenue month's usage for the classification and thereby produce a more accurate weather normalization adjustment. The following adjustments were made:

Company	Rate/ Revenue Class	Revenue Month	Therms	Comments
MoNat/FC	Commercial	3/97	(84,000.0)	Adjustment estimated; could not
	General	4/97	84,000.0	identify specific account- corrected mechanically in subsequent month.
MoNat/FC	Commercial	7/97	(348,000.0)	Adjustment estimated; could not
	General	8/97	348,000.0	identify specific account- corrected mechanically in subsequent month.

No. 3507

DATA INFORMATION REQUEST
Laclede Gas Company
CASE NO. GR-98-374

Requested From: Barb Kelley
Date Requested: 07/01/1998
Information Requested:

1. Pursuant to the Company's response to DR No. 3503, please provide the criteria to determine a non-heating customer vs. a heating customer.
2. Please provide the current monthly NAF the Company uses in its estimating procedures.
3. Please provide the methodology the Company uses when calculating its ADD. (i.e., Staffs or company)
4. Please provide copies of all support for the use of an annual NAF vs. a monthly NAF.

Requested By: Tom Imhoff

Information Provided: See Attached

Section 386.560 provides "Any person ... who shall falsely make any statement required to be made to the public service commission, in which a penalty has not heretofore been provided for, shall be deemed guilty of a felony, and upon conviction shall be punished by a fine of not less than one thousand dollars nor more than five thousand dollars, or by imprisonment for not less than two years nor more than five years, or by both such fine and imprisonment; ..."

If these data are voluminous, please (1) identify the relevant documents and their location (2) make arrangements with requestor to have documents available for inspection in the Laclede Gas Company office, or other location mutually agreeable. Where identification of a document is requested, briefly describe the document (e.g. book, letter, memorandum, report) and state the following information as applicable for the particular document: name, title, number, author, date of publication and publisher, addressees, date written, and the name and address of the person(s) having possession of the document. As used in this data request the term "document(s)" includes publication of any format, workpapers, letters, memoranda, notes, reports, analyses, computer analyses, test results, studies of data, recordings, transcriptions and printed, typed or written materials of every kind in your possession, custody or control within your knowledge. The pronoun "you" or "your" refers to Laclede Gas Company and its employees, contractors, agents or others employed by or acting in its behalf.

Signed By: _____

Date Response Received: _____

Prepared By: _____

TOTAL P.02

Schedule 2-1

LACLEDE GAS COMPANY
Case No. GR-98-374

Response to Staff Data Request No. 3507

(1) Residential customers are coded at turn on if their natural gas usage will be used for heating.

(2)

	Heating Customers	Non-Heating Customers
January	1.8	2.3
February	1.7	2.1
March	1.6	1.8
April	1.3	1.6
May	1.2	1.3
June	1.1	1.2
July	1.0	1.0
August	1.0	1.0
September	1.1	1.1
October	1.2	1.2
November	1.3	1.4
December	1.6	1.9

(3) The A.D.D. factor is calculated by dividing estimated heating usage by the degree days of the same time period. Heating usage is determined by subtracting estimated base usage from total usage for the period.

(4) The Company uses a monthly NAF for billing purposes.

LACLEDE GAS COMPANY
CASE NO. GR-99-315
(Laclede Workpapers)

Division: Laclede
Revenue Class: Residential
Rate: General

	Therms	Number of Customers	Actual U/C	Norm U/C
January 1998	88,572,498.1	481,265	184.0	196.4
February	73,864,543.4	482,231	153.2	167.7
March	67,685,292.4	482,508	140.3	128.2
April	35,594,410.1	481,198	74.0	76.0
May	17,092,729.3	477,767	35.8	43.0
June	12,354,080.7	475,083	26.0	25.1
July	11,095,174.2	473,235	23.4	23.4
August	7,770,998.2	472,401	16.5	16.5
September	11,499,896.7	471,191	24.4	25.9
October	14,470,208.2	470,980	30.7	30.3
November	36,282,001.4	474,745	76.4	82.2
December	62,620,371.2	477,889	131.0	155.5
Total	438,902,203.9		915.7	970.2

Division: Laclede
Revenue Class: Residential
Rate: General

	Therms	U/C	Number of Customers
January 1998	88,106,178.8	186.7	471,999
February	73,446,314.7	155.3	472,984
March	67,335,694.1	142.3	473,328
April	35,350,548.2	74.9	472,028
May	16,967,751.6	36.2	468,651
June	12,264,969.7	26.3	466,079
July	10,958,821.3	23.6	464,311
August	7,747,563.6	16.7	463,448
September	11,354,496.4	24.6	462,186
October	14,328,528.9	31.0	462,000
November	36,083,393.8	77.5	465,760
December	62,216,224.7	132.7	468,891
Total	436,160,485.8	927.8	

LACLEDE GAS COMPANY
Adjustment of Sales and Revenues For
12 Months Ended December 31, 1998 for Departure of
Actual Degree Day Deficiency (4,047) from Normal (4,420)

Division: Laclede
Revenue Class: Residential
Rate: General

Calculation of Use per Customer per Degree Day Deficiency

Average annual use per customer	915.7	Therms
Use not varying with degree days (July 1998 & August 1998 x 6 x 135%)	323.2	
Use varying with degree days	592.5	Therms
Actual degree day deficiency	4,047	
Use per customer per degree day (U/C/DD)	0.146	Therms

Calculation of Effect of Weather Departure from Average on Sales and Revenues

Billing Month	(1) Degree Day Departure From Normal Average	(2) Adjustment to Use per Cust. Due to Weather Variation (Col. 1 x U/C/DD)	(3) Number of Customers	(4) Adjustment to Therm Sales (Col 2 x Col 3) (000)	(5) Base Rate per Therm	(6) Adjustment to Revenue (Col 4 x Col 5) $(000)
January 1998	85	12.410	481,265	5,972	0.40206	$2,401
February	99	14.454	482,231	6,970	0.40206	2,802
March	(83)	(12.118)	482,508	(5,847)	0.40206	(2,351)
April	14	2.044	481,198	984	0.40206	396
May	49	7.154	477,767	3,418	0.39690	1,357
June	(6)	(0.876)	475,083	(416)	0.39690	(165)
July	0	0.000	473,235	0	0.39690	0
August	0	0.000	472,401	0	0.39690	0
September	10	1.460	471,191	688	0.39690	273
October	(3)	(0.438)	470,980	(206)	0.39690	(82)
November	40	5.840	474,745	2,773	0.40206	1,115
December	168	24.528	477,889	11,722	0.40206	4,713
Total	373	54.458		26,058		$10,459

LACLEDE GAS COMPANY
CASE NO. GR-99-315
(Laclede Workpapers)

CYCLE BILLING DEGREE DAYS
AIRPORT CALCULATIONS - CENTER OF THE FIELD
NORMAL - 4420
MONTH: FEBRUARY, 1998

CYCLE	READING DATE JAN	READING DATE FEB	ACTUAL CUMULATIVE DEGREE DAYS JAN	ACTUAL CUMULATIVE DEGREE DAYS FEB	ACTUAL CUMULATIVE DEGREE DAYS VAR
1	8	6	2,013.5	2,930.5	917.0
2	9	9	2,042.5	3,014.5	972.0
3	12	10	2,151.0	3,039.0	888.0
4	13	11	2,186.0	3,060.0	874.0
5	14	12	2,231.5	3,080.5	849.0
6	15	13	2,269.5	3,109.0	839.5
7	16	17	2,311.0	3,207.5	896.5
8	19	18	2,428.0	3,226.5	798.5
9	20	19	2,470.5	3,249.0	778.5
10	21	20	2,505.5	3,271.5	766.0
11	22	23	2,532.0	3,336.5	804.5
12	23	24	2,564.5	3,355.0	790.5
13	26	25	2,668.5	3,366.0	697.5
14	27	26	2,692.5	3,377.0	684.5
15	28	27	2,710.5	3,388.0	677.5
16	29	2	2,725.5	3,458.0	732.5
17	30	3	2,749.0	3,488.0	739.0
18	2	4	2,815.5	3,519.5	704.0
19	3	5	2,841.0	3,549.0	708.0
20	4	6	2,868.5	3,577.0	708.5
21	5	9	2,899.5	3,643.5	744.0
TOTAL			52,676.0	69,245.5	16,569.5
					16,569.5
					789.0
					789

Schedule 4

Laclede Gas Company
Case No. GR-99-315

Weather Normalized Billing Month Usage in Therms per Customer
For the Test Year of January 1, 1998 - December 31, 1998

General Service - Residential

	Franklin County District	Laclede Division	Midwest Division	Missouri Natural Division	St. Charles Division
Jan 98	166.1776	218.2957	167.4726	167.2618	178.2729
Feb	147.0831	191.9737	144.9215	153.9469	159.6345
Mar	110.1341	140.3269	107.0793	112.7457	119.5626
Apr	65.7285	85.6910	68.2964	65.7139	74.2708
May	29.7832	45.7707	34.2243	37.5488	40.7025
Jun	16.9588	26.8999	22.7521	20.2045	23.1447
Jul	15.9323	24.6575	18.8979	13.9266	22.9296
Aug	12.6241	16.8013	17.2649	13.4070	18.8519
Sep	18.3192	29.5096	21.7774	19.5432	23.0468
Oct	30.3078	42.2193	28.5678	31.0797	32.5171
Nov	68.9841	90.9835	67.1001	70.8188	71.8023
Dec 98	121.8119	165.9291	114.8477	128.3097	130.2964

General Service - Commercial

	Franklin County District	Laclede Division	Midwest Division	Missouri Natural Division	St. Charles Division
Jan 98	729.2246	1,173.8714	740.9323	580.0378	868.8870
Feb	646.9228	1,022.6271	654.2504	541.8819	741.7566
Mar	494.2990	763.7877	498.4316	418.8193	578.8483
Apr	309.4591	441.1781	293.9261	261.5532	339.7562
May	218.6288	243.0644	156.0617	111.0871	204.2589
Jun	154.6924	147.8834	113.5629	96.5801	130.1114
Jul	181.6765	140.3282	119.8324	96.7831	137.3343
Aug	151.7997	99.3613	98.2995	118.6767	134.5760
Sep	189.3405	146.5532	133.7225	89.2784	136.8421
Oct	230.2005	226.2437	185.8966	165.6404	189.9322
Nov	393.4870	438.0939	319.1024	243.1576	332.7886
Dec 98	617.8273	844.0877	538.6753	484.1825	602.8470

General Service - Industrial

	Franklin County District	Laclede Division	Midwest Division	Missouri Natural Division	St. Charles Division
Jan 98		3,751.6315	7,546.8829	5,183.3340	8,978.8511
Feb	N / A	3,309.5495	6,614.0578	4,634.4149	8,740.3273
Mar		2,457.3909	5,025.4946	3,386.2037	6,192.2005
Apr		1,632.0674	3,430.1137	1,915.5658	3,178.1553
May	N / A	939.1327	1,429.9846	1,144.6241	1,979.4153
Jun		471.4342	980.8681	739.9065	704.4282
Jul		510.7145	1,270.0820	855.1904	1,125.0930
Aug	N / A	421.3100	1,109.6825	756.4470	1,218.1452
Sep		517.6558	1,138.7471	978.1722	1,557.3414
Oct		762.8090	1,359.2324	1,456.2612	1,787.5921
Nov	N / A	1,283.9274	1,608.5949	2,475.4817	3,786.3007
Dec 98		2,493.6207	3,647.7665	4,244.7167	5,573.5051

Revised Schedule 5

Laclede Gas Company
Case No. GR-99-315

Estimated Daily Peak Demand in Therms per Customer
For the Test Year of January 1, 1998 - December 31, 1998

General Service - Residential

	Franklin County District	Laclede Division	Midwest Division	Missouri Natural Division	St. Charles Division
Jan 98	7.8210	10.7111	7.6660	8.0783	8.5521
Feb	7.1785	9.7865	7.0387	7.4107	7.8383
Mar	5.3304	7.1528	5.2327	5.4927	5.7914
Apr	3.8629	5.0942	3.7969	3.9725	4.1743
May	2.3261	2.9384	2.2933	2.3807	2.4810
Jun	1.1015	1.2261	1.0948	1.1126	1.1330
Jul	0.7281	0.7281	0.7281	0.7281	0.7281
Aug	0.7423	0.7522	0.7418	0.7432	0.7448
Sep	1.8499	2.3131	1.8250	1.8911	1.9671
Oct	3.3298	4.3810	3.2735	3.4234	3.5957
Nov	5.0514	6.8006	4.9576	5.2071	5.4939
Dec 98	6.9935	9.5365	6.8572	7.2199	7.6368
Annual	7.8210	10.7111	7.6660	8.0783	8.5521

General Service - Commercial

	Franklin County District	Laclede Division	Midwest Division	Missouri Natural Division	St. Charles Division
Jan 98	34.4897	57.8824	35.4336	28.6086	40.7751
Feb	31.8128	52.7514	32.4784	26.2953	37.3402
Mar	24.1244	38.2308	24.0153	19.6192	27.5419
Apr	18.0345	27.0010	17.3425	14.2908	19.8647
May	11.6576	15.2407	10.3552	8.7115	11.8253
Jun	6.5782	5.9206	4.7949	4.2604	5.4363
Jul	5.0409	3.2996	3.1347	2.8836	3.5643
Aug	5.1019	3.4470	3.2055	2.9318	3.6519
Sep	9.7013	11.9887	8.2519	6.9471	9.4688
Oct	15.8388	23.2386	14.9692	12.3272	17.1852
Nov	22.9849	36.4551	22.8036	18.5739	26.2059
Dec 98	31.0494	51.4227	31.6509	25.6157	36.4023
Annual	34.4897	57.8824	35.4336	28.6086	40.7751

General Service - Industrial

	Franklin County District	Laclede Division	Midwest Division	Missouri Natural Division	St. Charles Division
Jan 98	58.1558	184.4498	345.4577	259.7998	457.2961
Feb	111.8873	167.9248	314.3126	236.9966	415.7133
Mar	94.2667	121.6834	227.3687	173.2768	299.7111
Apr	46.7307	86.5900	161.6549	125.0344	212.1368
May	23.5434	49.8360	92.8301	74.5085	120.4160
Jun	15.7146	20.8271	38.5576	34.6510	48.1072
Jul	13.6934	13.1745	24.4488	24.2259	29.3891
Aug	14.3906	13.7229	25.5118	24.9953	30.8196
Sep	15.8361	40.5679	75.8426	61.9256	97.9174
Oct	23.8683	75.5537	141.2851	109.9901	185.1036
Nov	46.1300	116.9544	218.8502	166.9205	288.4871
Dec 98	83.2651	163.9709	306.9902	231.5962	405.9861
Annual	111.8873	184.4498	345.4577	259.7998	457.2961

Revised Schedule 6