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Issues: Revenue Adjustments
Weather Normals
Weather Normalization
Customer Annualization
Revenue Reconciliation
Witness: Larry W. Loos
Exhibit Type: Direct
Sponsoring Party: Missouri Gas Energy
Case No: GR-2009-__
Date: April 2, 2009

MISSOURI PUBLIC SERVICE COMMISSION

MISSOURI GAS ENERGY

CASE NO. GR-2009-__

DIRECT TESTIMONY OF

LARRY W. LOOS

Jefferson City, Missouri

April 2009

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MISSOURI PUBLIC SERVICE COMMISSION

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CASE NO. GR-2009-__

DIRECT TESTIMONY OF

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DIRECT TESTIMONY OF LARRY W. LOOS

CASE NO. GR-2009-__

INDEX TO TESTIMONY

DIRECT TESTIMONY OF LARRY W. LOOS

CASE NO. GR-2009- __

QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Larry W. Loos, 11401 Lamar, Overland Park, KS 66211.

Q. WHAT IS YOUR OCCUPATION?

A. I am an engineer and consultant employed by Black & Veatch Corporation (Black & Veatch). I currently serve as a Director in Black & Veatch's Enterprise Management Solutions Division.

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

A. Black & Veatch has employed me continuously since 1971.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I am a graduate of the University of Missouri at Columbia, with a Bachelor of Science Degree in Mechanical Engineering and a Masters Degree in Business Administration.

Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER?

A. Yes, I am a registered Professional Engineer in the state of Missouri, as well as the states of Iowa, Colorado, Indiana, Kansas, Louisiana, Nebraska, and Utah.

Q. TO WHAT PROFESSIONAL ORGANIZATIONS DO YOU BELONG?

A. I am a member of the American Society of Mechanical Engineers, the National Society of Professional Engineers, the Missouri Society of Professional Engineers, and the Society of Depreciation Professionals.

Q. WHAT IS YOUR PROFESSIONAL EXPERIENCE?

A. I have been responsible for numerous engagements involving electric, gas, and other utility services. Clients served include both investor-owned and publicly owned utilities; customers of such utilities; and regulatory agencies. During the course of these engagements, I have been responsible for the preparation and presentation of studies involving weather normalization, normal degree-days, proforma adjustments, cost classification, cost allocation, cost of service, rate design, pricing, financial feasibility, cost of capital, valuation, depreciation and other engineering, economic and management matters.

Q. PLEASE DESCRIBE BLACK & VEATCH.

A. Black & Veatch has provided comprehensive construction, engineering, consulting, and management services to utility, industrial, and governmental clients since 1915. We specialize in engineering and construction associated with utility services including electric, gas, water, wastewater, telecommunications, and waste disposal. Service engagements consist principally of investigations and reports, design and construction, feasibility analyses, cost studies, rate and financial reports, valuation and depreciation studies, reports on operations, management studies, and general consulting services. Present engagements include work throughout the United States and numerous foreign countries. Including professionals assigned to affiliated companies, Black & Veatch currently employs approximately 10,000 people.

Q. HAVE YOU PREVIOUSLY APPEARED AS AN EXPERT WITNESS?

A. Yes, I have. I have presented expert witness testimony before the Missouri Public Service Commission (Commission) on several of occasions. I have also testified before the Federal Energy Regulatory Commission (FERC); regulatory bodies in the states of Colorado, Illinois, Indiana, Iowa, Kansas, Minnesota, New Mexico, New York, Pennsylvania, North Carolina, South Carolina, Texas, Utah, Vermont, and Wyoming; Circuit Courts in Missouri, Colorado, Kansas, and Nebraska; and Courts of Condemnation in Iowa and Nebraska. I have also served as a special advisor to the Connecticut Department of Public Utility Control.

INTRODUCTION

Q. FOR WHOM ARE YOU TESTIFYING IN THIS MATTER?

A. I am testifying on behalf of Missouri Gas Energy ("MGE" or "Company").

Q. WHAT IS THE PURPOSE OF YOUR PREPARED DIRECT TESTIMONY?

A. MGE asked me to prepare test period adjustments to revenues under existing rates to:

1) Reflect normal weather conditions,
2) Annualize number of customers (bills) to year-end levels, and
3) Synchronize revenues.

Q. HOW DO YOU ORGANIZE THE BALANCE OF YOUR DIRECT TESTIMONY?

A. Following this introduction I have organized my testimony into the following sections:

- Weather Normalization Adjustment
  - *Selection of Weather Stations*
  - Normal Heating Degree Days
  - Customer Use Characteristics
  - Normal Sales and Revenue
- Customer Annualization Adjustment
- Revenue Reconciliation Factor
- Proforma Revenues

Q. DO YOU SPONSOR ANY SCHEDULES?

A. Yes, I do. I sponsor the following Schedules:

- Schedule LWL 1 – Per Books Sales, Revenues, and Cost of Gas
- Schedule LWL 2 – Normal Heating Degree Days
  - Sheet 1 - Graphical Comparison of Annual HDDs: Actual, NOAA Normal, 30-Year Average, OCN, and Hinge-Fit

- Sheet 2 - Comparison of Actual Annual HDDs with NOAA Normal and Current 30-Year Average
- Sheet 3 - Graphical Comparison of Annual HDDs: Actual, 30-Year Average, OCN, and Hinge-Fit – Homogenized HDDs
- Sheet 4 - Calculation of Hinge-Fit HDDs
- Sheet 5 - Summary of Hinge-Fit Results
- Sheet 6 - Difference Between Actual And "Normal" HDDs
- Sheet 7 - Monthly Normal HDDs

- Schedule LWL 3 - Summary of Heating Degree-Day Regression Results
- Schedule LWL 4 - Weather Normalization Adjustment
- Schedule LWL 5 – Customer Annualization Adjustment
- Schedule LWL 6 – Revenue Reconciliation Factor
- Schedule LWL 7 – Calculation of Proforma Revenues[1] Under Existing Rates

Each of these Schedules was prepared by me or under my supervision and direction.

Q. WHAT IS THE SOURCE OF THE DATA THAT YOU RELY ON?

A. I requested of the Company, monthly sales[2] and the numbers of customers (bills) for each rate schedule for the period 2005 through 2008. In developing my weather normalization adjustment, I prefer to rely on a data set that is of sufficient duration so that average heating degree-days over the period are approximately equal to normal. The Company provided me data for the period May 1, 2004 through December 31, 2008.

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1 In my direct testimony, unless otherwise indicated, I use the term revenues to refer to margin where margin represents revenues less cost of gas.

2 In my direct testimony, unless otherwise indicated, I use the term sales volumes (and revenues) to refer to both the volume of gas sold to customers as well as the volume of gas transported for customers.

In Schedule LWL 1, I summarize per books numbers of bills, sales, and revenues, exclusive of cost of gas (margin) for the 12 months ended December 31, 2008.

I obtained heating degree data for the various weather stations that I rely on from the Climatological Data report, published monthly by the National Climatic Data Center (NCDC) for the state of Missouri for the period 1951 through 2008. In addition, MGE witness Dr. Robert Livezey provided me with "homogenized" average monthly temperature data for the 59-year period, 1949 through 2007.

WEATHER NORMALIZATION ADJUSTMENT

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

A. I will describe:

1) The need to adjust for normal weather
2) The weather stations and weather data upon which I rely
3) My development of normal heating degree-days (HHDs)
4) My determination of the relationship between volumes and HHDs
5) My determination of the adjustment required to heat sensitive volumes to reflect normal weather conditions (HHDs)
6) The results of my weather normalization adjustment analyses

I prepare my analysis in a somewhat iterative basis. For example, I initially select various weather stations for analysis based on their location relative to the Company's load centers. However, I refine that selection based on how well sales data correlates to heating degree-days (HDDs) and the reliability and sufficiency of the data reported.

Q. **WHAT IS A HEATING DEGREE-DAY?**

A. A heating degree-day is a relative measure of space heating energy requirements. The number of HDDs for any day is the positive difference between 65 (degrees Fahrenheit) and the average of the high and low temperatures on that day. HDDs are set equal to zero on any day that the average temperature amounts to 65 or more. The number of HDDs over any period represents the sum of the HDDs for the days included in that period.

Q. **WHY ARE HDDS IMPORTANT IN THE CONTEXT OF A GAS RATE CASE?**

A. Natural gas distribution companies' sales are heavily dependent on weather conditions, primarily temperature during the winter period. In order to recognize the impact on gas sales due to variations in weather conditions, for rate case purposes, base year sales, revenues, and gas costs are adjusted to reflect the load during the test period had weather conditions been "normal." By so doing, Commission-approved gas rates are intended to be established so that they take into account reasonably expected weather conditions during the future period of time that the rates will be in effect.

Q. **IN LIGHT OF THE COMMISSION'S APPROVAL OF A STRAIGHT FIXED VARIABLE RATE DESIGN, WHY ARE YOU PROPOSING AN ADJUSTMENT TO REFLECT NORMAL WEATHER CONDITIONS?**

A. The Commission approved the Company's proposal to adopt a straight fixed variable (SFV) rate design for the Company's residential customers in the Company's prior case

(Case No. GR-2006-0422). In its Report and Order in that Case, the Commission indicated that by approval of the SFV rate design, weather no longer affects revenues from 90 percent of the Company's customers. The SFV rate design approved by the Commission eliminated the link between the design of proposed rates and test year volumes. The recovery of fixed cost through rate charges does not depend on weather. This suggests that at least 90 percent of the customers do not need a weather adjustment.

However, while the SFV rates eliminates weather variability from revenues derived from 87.5 percent of customers, weather variability remains for 12.5 percent of the customers and over 50 percent of the volumes delivered to customers. Based on my analysis, I find that of the Company's weather sensitive sales, over 30 percent is delivered to customers other than residential.

Further, I understand that the Commission's decision implementing SFV has been appealed. Because of the uncertainty associated with the appeal and the fact that 50 percent of the volumes delivered to customers are not subject to the SFV rate, the need to adjust sales for normal weather remains.

To the extent that weather affects revenues, test year volumes should be adjusted to reflect sales levels reasonably expected during the period rates approved by the Commission are in effect. The most reasonable basis on which to set rates is on "normal" conditions. For example, if rates are based on volume levels that are inflated due to colder than normal conditions, all other factors equal, rates are set too low. Rates set too low will result in an under recovery of costs. Over the long term, using properly developed normal conditions eliminates a bias that could be introduced by using volume levels that are higher or lower than what would normally be expected. Thus, it is usually necessary to apply an adjustment to actual sales to recognize what volumes would have been if conditions were normal.

Q. WERE WEATHER CONDITIONS DURING THE TEST YEAR NORMAL IN THE COMPANY'S MISSOURI SERVICE TERRITORY?

A. As I will subsequently demonstrate, actual HDDs substantially exceeded normal HDDs during calendar year 2008.

SELECTION OF WEATHER STATIONS

Q. PLEASE DESCRIBE THE WEATHER DATA YOU RELY ON.

A. I analyzed actual HDDs reported by the National Climatic Data Center (NCDC) for the following weather stations:

- Carrollton
- Joplin
- Kansas City International Airport (MCI)
- Kansas City Municipal (Downtown) Airport
- Lee's Summit
- Sedalia
- Springfield
- St. Joseph
- Warrensburg

Based on examination of historical data, I concluded that there are problems with the historical data reported for most of these stations. For example:

- No data is reported for Kansas City International Airport (MCI) prior to 1972
- No data is reported for Downtown Airport over several extended periods
- Data reported for Lee's Summit, Warrensburg, and Sedalia does not match trends evident throughout the Midwest.[3]

Q. WHAT DID YOU DO IN LIGHT OF THESE DATA PROBLEMS?

A. As my studies progressed, I discussed these data problems with Company witness Dr. Robert Livezey. He was able to obtain historical data of average monthly temperatures for each of the stations except Downtown Airport. He referred to this data as "homogenized" which seems an apt description because the NCDC had made certain adjustments to the data Dr. Livezey provided. The NCDC adjusted data to:

1) Correct for quality control
2) Correct the time of the observations
3) Fill in missing data
4) Correct for temporal discontinuities (such as exposure, location, or instrument changes) and spatial inconsistencies
5) Correct historical data to make it consistent with more current observations

[3] Lee's Summit reported HDDs in 1993 of over 7,400. Over the entire 1951 through 2008 period, the next highest (of all the Missouri stations, St. Joseph) was slightly over 6,400. The next highest reported amount for Lee's Summit was less than 5,800 HDDs.

The Warrensburg station was relocated a number of times between 1951 and 2008. There appears to be a substantial dislocation in the HDD data corresponding to the relocation (from an urban to rural area) of the station in 1974.

The Sedalia station shows a dislocation in reported HDDs in the early 1970s.

Q. DO YOU USE THIS HOMOGENIZED DATA IN YOUR ANALYSIS?

A. I do not use it directly. I do however use it to evaluate the reasonableness of the data that I do rely on and the conclusions I reach. While this homogenized data does not have any of the problems I encountered with the HDD data I obtained through normal channels, it does suffer from a couple of fatal deficiencies. These deficiencies are:

1) Homogenized data are not available for 2008

2) Homogenized data are available only for average monthly temperatures, not monthly or annual HDDs

Q. CAN YOU CONVERT THESE AVERAGE MONTHLY TEMPERATURES TO MONTHLY HDDS?

A. No, while with extensive effort, I can develop an algorithm to convert monthly average temperatures to HDDs, use of such an algorithm still results in an estimate.

I can approximate monthly HDDs by subtracting average monthly temperature from 65 and multiplying by the number of days in the month. For winter period months, this procedure provides a reasonably reliable approximation. During warmer months, this method tends to understate HDDs.

Q. WHICH WEATHER STATIONS DO YOU ULTIMATELY RELY ON?

A. As I previously indicated, I prepare my weather normalization study using a somewhat iterative process. I first identified "candidate" stations. I analyze the data to determine which data appear the most reliable. Based on this analysis, I found that there is a number of missing monthly data points. I fill-in this missing data using multiple regression analysis of HDD data for all 9 Missouri stations to predict the missing monthly data points. I ultimately select the stations I rely on by examining which stations appear to have the highest correlation to sales.

Based on these factors, I conclude that for the purpose of this case, MCI offers the best "choice" for MGE's Kansas City and St. Joseph sales districts, and Joplin offers the best for the Joplin sales district.

NORMAL HEATING DEGREE DAYS

Q. WITH REGARD TO NORMAL HDDS, DO YOU HAVE ANY OBSERVATIONS?

A. Yes I do, As I will more fully explain, based on generally accepted ratemaking principles and my studies of recently reported weather conditions in MGE's Missouri service area, as well as in Colorado, Iowa, Michigan, New Mexico, and Wyoming, I will demonstrate:

1) The National Oceanographic and Atmospheric Administration's (NOAA) published 30-year heating degree-day (HDD) normals are not appropriate for use in this case.

2) Use of a 30-year average as the normal in this case will likely cause hypothetical test period sales to exceed what the Company will actually experience during the period the rates approved by the Commission are in effect.

3) The Commission should adjust base year sales using a "normal" more representative of recent climatic conditions and of conditions reasonably anticipated during the period rates established in this case will be in effect.

4) For the purpose of this case, the Commission should not adjust sales based on use of a 30-year average, but should rely on normal HDDs developed using the hinge-fit technique described by Dr. Livezey in his direct testimony.

Q. ARE YOU THE ONLY MGE WITNESS THAT ADDRESSES NORMAL HDDS?

A. Dr. Livezey and I both address the issue of normal HDDs.

Dr. Livezey's testimony addresses normal HDDs from a more philosophical and theoretical perspective. He describes recent patterns in temperatures globally, nationally, and regionally. I apply the results of Dr. Livezey's analysis to determine the normal HDDs which should be used in this case.

Q. WHAT ARE THE "NORMAL" HDDS THE COMMISSION TYPICALLY USES TO ADJUST SALES?

A. In its March 22, 2007 Report and Order in Case No. GR-2006-0422, the Commission noted that it had historically used a 30-year average published by NOAA. In that Case, the Commission found that "in the absence of more convincing evidence that this methodology should be changed, the Commission will continue to adopt the 30-year weather normalization as proposed by Staff." Staff proposed use of the NOAA published 30-year average.

Q. IN YOUR OPINION, SHOULD THE COMMISSION MODIFY ITS TYPICAL WEATHER NORMALIZATION APPROACH?

A. Yes, the Commission should approve a more accurate approach to determine normal HDDs.

Q. PLEASE EXPLAIN.

A. The Commission should rely on HDD normals that more accurately reflect conditions reasonably expected to occur during the period that rates will be in effect. My analysis demonstrates that, over the past 25 or so years, normals based on 30-year averages have consistently understated temperatures (overstated HDDs) actually experienced. Because of this bias, one cannot reasonably expect that normals based on 30-year averages will reasonably reflect actual conditions in the immediate future.

My analysis further demonstrates that based on recent experience, normals calculated by using Dr. Livezey's hinge-fit technique better correlate to conditions actually experienced and reasonably anticipated (on average) during the period Commission-approved rates are in effect. The better the correlation between the normals used in a rate case to set rates and the conditions experienced during the period that rates will be in effect, the better the alignment of test period sales and sales revenues with what the Company actually experiences.

A utility must be afforded a reasonable opportunity to earn a fair and reasonable return on its investment. A utility is denied that opportunity if rates are based on test period sales that are overstated due to use of a normal that is biased toward colder conditions than what can reasonably be expected to occur. The Commission cannot set just and reasonable rates if they are designed on test period sales that are overstated due to use of normal HDDs, which have a bias toward colder conditions than what can be reasonably expected to occur.

Q. **PLEASE DESCRIBE THE APPROACH YOU FOLLOWED TO CONDUCT YOUR STUDY OF WEATHER NORMALS.**

A. I first compare actual HDDs with NOAA Normals and 30-year average HDDs. I show this comparison graphically in Schedule LWL 2 Sheets 1A and 1B for the Kansas City International (MCI) and Joplin weather stations respectively[4]. In Schedule LWL 2 Sheet 2, I compare actual HDDs with normals based on a 30-year average in tabular form.

I tested the reliability of the data I use by preparing similar graphs of "homogenized" HDDs I develop from average temperature data Dr. Livezey was able to obtain for all of the stations I examined except Downtown Airport.

Q. **HOW DO NOAA NORMALS DIFFER FROM A 30-YEAR AVERAGE?**

A. They differ in two respects. First, there is a timing difference. NOAA normals are based on a 30-year average of HDDs. However, NOAA publishes its 30-year normals once every ten years. The NOAA 30-year normals available currently are based on data for the 30-year period ended 2000. The 30-year average, on the other hand, represents the average of the most recent 30-year period. Thus, for the purpose of this rate case, NOAA normals are based on the average HDDs for the 30-year period ended December 31, 2000. The 30-year average is based on the average HDDs for the 30-year period ended December 31, 2008.

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4 I include in my workpapers similar comparisons for seven other weather stations (Carrollton, Kansas City Downtown Airport, Lee's Summit, Sedalia, Springfield, St Joseph, and Warrensburg). Based on my subsequent analysis, I do not consider data from these weather stations as reliable in predicting MGE's heat sensitive sales as MCI and Joplin.

Assuming there has not been a trend (warming or cooling) in weather conditions prior to 1979 and subsequent to 2000, NOAA normals will approximately equal the 30-year average (for the 30-year period ended December 31, 2008), and there would be no problem with using NOAA normals or the 30-year average. Since (under this assumption) conditions are neither warming nor cooling, the NOAA normal should approximately equal the 30-year average and the 30-year average should be representative of recent and reasonably anticipated conditions. However, as I show in Schedule LWL 2 Sheets 1A and 1B for the MCI and Joplin weather stations, in recent years, the annual number of HDDs is less than during earlier periods. In other words, average temperatures have been rising (HDDs declining).

Q. WHAT IS THE SECOND DIFFERENCE?

A. While NOAA suggests that its published normals are based on a 30-year average, NOAA also indicates that it makes adjustments and estimations to certain published climate records to make the data "homogeneous" and "serially complete." As a result, the NOAA normal HDDs do not entirely conform to calculated 30-year averages of actual HDDs reported by NOAA. I show the difference in NOAA normals and 30-year average HDDs in Schedule LWL 2 Sheets 1A and 1B for the MCI and Joplin weather stations. If NOAA Normals are used to adjust sales in this case, this lack of conformity introduces into the weather normalization adjustment confounding elements that are related to the difference in the data sets in addition to those related to variations in weather conditions.

Thus, in addition to other deficiencies, the use of NOAA Normals mixes apples and oranges. NOAA uses different data sets depending upon whether they report actual

HDDs or normal HDDs. In calculating weather normalization adjustments, an implicit part of the calculation is the division of "normal" HDDs by actual HDDs. An inconsistency is introduced if the data set used to calculate "normal" HDDs is not the same as the data set of actual HDDs. The two data sets should match.

I have no problem with NOAA developing normals as they do. I have no problem with the 30-year average underlying the NOAA Normals. I do have a problem with using normals based on a 30-year average in rate cases when temperatures have been trending warmer or colder. Dr. Livezey and I demonstrate that since about 1975 average temperatures have been trending warmer. In this case as a result of the warming trend discussed by Dr. Livezey, normals based on a 30-year average will tend to overstate sales.

Q. DO OTHERS SHARE YOUR CONCERN REGARDING USE OF TEMPERATURE NORMALS?

A. Yes. The concern regarding the reasonableness of NOAA Normals has been the subject of a number of presentations. For example, on September 26, 2007, I monitored a webcast on utility, regulatory, and climate perspectives regarding "Improving Climate Normals." During this webcast, panelists identified a number of options to NOAA's current method.

Three main issues were discussed. They were:

1) Is the 30-year average representative of the current climate?

2) What if there is a predominant trend?

3) Are normals obsolete?

These presentations demonstrated that:

1) Except for Florida, the current (2001-06) minimum January temperature experienced in the continental United States (including the Company's service area) was warmer than in the recent past (1971-00).

2) Except for the east and southeast United States, average temperatures in January through March are warmer today (1975-05) than in the past (1941-75).

3) A number of stakeholder groups are questioning whether NOAA normal HDDs are representative and whether the NOAA normals recognize recently observed climate (temperature) change.

4) Professionals within NOAA are questioning the reasonableness of NOAA's current practice.

5) Some change in NOAA's "official" methodology will likely occur in the near future.

During this webcast, Dr. Livezey described the hinge-fit technique he discusses in his testimony.

Q. DOES NOAA USE THE NOAA-PUBLISHED 30-YEAR NORMALS TO FORECAST WEATHER?

A. No. While NOAA's Climate Prediction Center (CPC) publishes long-term forecasts in terms of <u>departure</u> from the 30-year NOAA Normal, the forecast techniques described by the CPC indicate that in preparing its forecasts, the CPC relies on the most recent 10-year trend (average).

The CPC lists eight main factors that influence its seasonal climate forecasts. The first of these eight factors is El Niño and La Niña. The second of these eight factors is trends "approximated by the difference between the most recent 10-year mean of temperature or 15-year mean of precipitation for a given location and time of year and the 30-year climatology period (currently 1971-2000)." Thus, the National Weather Service (NOAA) bases its long-range forecasts on the 10-year average temperature, not the 30-year NOAA Normal.

Q. WHAT LONG-TERM FORECASTS OF TEMPERATURE DOES THE CPC PROVIDE?

A. The CPC provides forecasts for 102 geographic areas within the Continental United States. Forecasts are updated monthly for 13 three-month periods (Apr, May, and June 2008; May, June, and July 2008, etc). For example, in mid February 2009, CPC published forecasts through the three-month period ending May 2010.

Q. WHAT ARE THE GEOGRAPHIC AREAS IN MISSOURI?

A. Based on the climate similarity, the CPC divides the Continental United States into 102 climate divisions of which four apply to Missouri. The divisions of relevance to MGE are:

1) Area 42 – West Central and Northwest Missouri
2) Area 52 – Southwest Missouri, Northwest Arkansas, and East Central and Southeast Oklahoma

In addition, in close proximity to MGE's service area, and its western Missouri (Kansas City, Joplin and St. Joseph) load centers, Area 43, which includes Eastern Kansas and Northwest Oklahoma.

Q. WHAT IS THE CPC FORECAST FOR MGE'S MISSOURI SERVICE AREA THIS COMING WINTER?

A. The CPC forecasts that average temperatures for the 2009-10 winter period (December, January, and February) will likely be higher (and thus HDDs will be lower) than the 30-year normal in each of these three climatological regions. Specifically the CPC forecasts that for the three-month period ending February 2010, the average temperature will exceed the 30-year NOAA Normal by 1.09, 0.86, and 1.03 degrees F in Areas 42, 52, and 43, respectively.

Q. WHAT IS THE IMPLICATION OF THIS CPC FORECAST ON THE EXPECTED HDDS?

A. One can only reasonably expect that if rates set in this rate case are based on the 30-year NOAA Normals or 30-year averages, test period sales will exceed the level of sales the Company will experience when the rates approved in this case first go into effect.

Q. DO OTHER STATE REGULATORY COMMISSIONS RELY ON NORMALS OTHER THAN NORMALS BASED ON A 30-YEAR AVERAGE?

A. Yes, several do. I understand that the Minnesota Public Service Commission routinely relies on a 20-year average. In a recent decision, the Wyoming Public Service Commission adopted a settlement in which test period sales were based on a five-year weighted normal. The New Mexico Public Service Commission has recently used a 10-year rolling average and is currently in the process of a generic investigation into whether NOAA Normals should continue to be used. Further, I understand that commissions in the states of Arizona, Illinois, New Jersey, New Mexico, Rhode Island, Texas, Utah, and Vermont have relied on something other than the 30-year NOAA normals for normalizing weather in rate cases. These are only the states that I have identified; there may be more.

Q. BASED ON THE FOREGOING, WHAT DO YOU CONCLUDE?

A. I conclude that one cannot assume that NOAA normals are reasonable for normalizing sales in gas rate cases just because they are calculated and published by NOAA. In his direct testimony, Dr. Livezey addresses the reasonableness of the use of normals based on a 30-year average.[5] In simple fact, a 30-year average does not consider the sustained trend of warmer winter period temperatures since 1975.

Q. PLEASE DESCRIBE SCHEDULE LWL 2 SHEETS 1A AND 1B.

A. In Sheets 1A and 1B, for the MCI and Joplin weather stations, I have plotted annual HDDs reported from 1951 through 2008. I have also plotted:

1) The most recently published NOAA Normals available in each year since 1973,
2) The 30-year rolling average ended each year since 1980,
3) The Optimum Climate Normal (OCN), and

[5] Dr. Livezey also documents recent information indicating that later this spring NOAA will supplement the traditional 30-year averages calculated once each decade with normals based on a 30-year rolling average, OCN, and application of the hinge-fit technique.

4) The normal using data for the 58-year period ended December 31, 2008, following the hinge-fit technique described by Dr. Livezey

I have included in my workpapers similar graphs for seven other Missouri weather stations.

Q. WHY DO YOU USE DATA FOR THIS 58-YEAR PERIOD?

A. This period corresponds to the end of the test year in this rate case (December 31, 2008). The first year of data that I include is 1951. HDD data prior to January 1, 1951 are not readily available. Daily temperature data are typically available but not HDD data.

Q. DO YOU REACH ANY CONCLUSIONS BASED ON THE INFORMATION YOU SHOW IN SCHEDULE LWL 2 SHEETS 1A AND 1B?

A. Yes, I do. Based on my examination of these graphs, I conclude that neither the NOAA normals nor the 30-year average reasonably relate to HDDs actually experienced. The degree that NOAA Normals fail to relate to actuals is demonstrated by the fact that, with one exception (2008 MCI), actual reported HDDs for the MCI and Joplin weather stations have been less than NOAA normals for every year since 1996. Further, as might be expected, with limited exception since 1996 the 30-year average exceeds actual HDDs.

Since normals based on a 30-year average have exceeded actual HDDs for 9 out of 10 years (8 for Joplin), one can reasonably conclude that in all likelihood, normals based on a 30-year average will continue to exceed actual HDDs.

Q. HAVE YOU QUANTIFIED THE AMOUNT BY WHICH NORMAL HDDS BASED ON A 30-YEAR AVERAGE EXCEED ACTUAL HDD?

A. Yes, I have. In Schedule LWL 2, Sheet 2, I summarize the average annual difference between actual HDDs and both the NOAA published normals and the 30-year average ended that same year.

On Lines 1 through 4, I show the comparison for the 25-year period ended December 31, 2008. In Column E (Sheet 2A) I show that NOAA Normal HDDs have exceeded actual HDDs on average by over 5 percent during the 25-year period. In Column G, I show that actual HDDs have exceeded NOAA Normals only one year in five.

On Lines 5 through 8, I show the comparison for the 10-year period ended December 31, 2008. I show in Column E (Sheet 2A) that NOAA Normal HDDs for the MCI and Joplin stations exceeded actual HDDs by over 8.5 percent on average. In Column G, I show that actual HDDs exceeded NOAA Normal HDDs only once during this 10-year period.

On Lines 9 through 12, I show the comparison for the 15-year period ended December 31, 1998. As I show in Column E, NOAA Normals for the 2 stations on average exceeded actual HDDs by about 3.7 percent. In Column G, I show that, overall, actual HDDs exceeded the NOAA Normals 30 percent of the time, whereas NOAA normals exceeded actual 70 percent of the time.

The results I show in Sheet 2B (actual HDDs versus the rolling 30-year average) are similar to Sheet 2A but not quite as dramatic.

Q. WHAT IS THE SIGNIFICANCE OF THESE RESULTS?

A. The results confirm the warming trend (fewer HDDs) Dr. Livezey identifies in his testimony. Based solely on the results for the 25-year period, the reasonableness of relying on NOAA normals is highly questionable. Based on the results for the 15-year period ended December 31, 1999, NOAA normals arguably reasonably compare with actual HDDs. However, if one focuses on the most recent 10-year period, it becomes clear that relying on NOAA Normals is wholly unreasonable.

I believe it especially disturbing that prior to 1998, NOAA Normals exhibited some correlation (albeit weak) to actuals, while after 1997 NOAA Normals have exceeded actuals in each year except 2008 (MCI). This demonstrates among other things Dr. Livezey's conclusion that recent weather conditions are warmer than historical.

Q. DO YOU REACH SIMILAR CONCLUSIONS BASED ON THE SUMMARY YOU SET FORTH IN SHEET 2B?

A. Yes, I do. As expected, because the rolling 30-year average does not have the 3 to 12 year lag built-in to NOAA normals, the 30-year average is a bit closer to actual HDDs than the NOAA Normals. This result further confirms the general warming trend identified by Dr. Livezey. The principal difference between NOAA Normals and the 30-year average for most stations is that the 30-year average is updated each year whereas NOAA normals are updated once every ten years.

Q. DOES YOUR COMPARISON IN SCHEDULE LWL 2, SHEET 2 REALISTICALLY MEASURE WHETHER NORMALS BASED ON A 30-YEAR

AVERAGE EXCEED ACTUAL HDDS DURING THE PERIOD RATES WILL BE IN EFFECT?

A. While the comparisons set forth in both Sheets 1 and 2 of Schedule LWL 2 provide a measure, they do not explicitly recognize the timing difference ("regulatory lag") between the 12-month period which represents the test period and the first 12-month period in which rates established in that rate case will be in effect. In periods of relatively stable weather conditions, this does not represent a problem with respect to the normal used. However, during periods when weather conditions exhibit some change over time, as evidenced in this case, it does.

Q. BASED ON THE FOREGOING, HAVE YOU DETERMINED WHETHER USE OF NOAA NORMALS OR 30-YEAR AVERAGE HDDS ARE LIKELY TO CORRESPOND WITH THE HDDS THAT WILL OCCUR DURING THE PERIOD RATES APPROVED BY THE COMMISSION IN THIS DOCKET WILL BE IN EFFECT?

A. Yes, I have. My study demonstrates that, because of the warming trend since about 1975, normals based on a 30-year average no longer reasonably correspond to the actual HDDs experienced during the first year rates are in effect. This failure is especially evident during the most recent 10 years. Over the 10-year period ended December 31, 2008, NOAA normals exceed actuals so consistently and to such a significant extent that it is likely their use will result in weather-normalized sales in excess of the levels the Company will actually experience when rates developed on the basis of such excess sales levels are in effect.

My study also demonstrates that while a 30-year average better corresponds to actual HDDs than NOAA normals, the use of a 30-year average likewise does not provide a reasonable probability that actual HDDs will correspond to the normal.

Q. WHAT IMPACT DOES THIS HAVE ON THE COMPANY?

A. Since NOAA 30-year Normals and 30-year averages have been higher than actual HDDs one can only reasonably expect their use in this rate case will result in an overstatement of test year sales. To the extent that overstated sales are used to design rates, rates will be too low and will not provide a reasonable opportunity for MGE to earn its allowed rate of return.

Q. SINCE NEITHER NOAA NORMALS NOR 30-YEAR AVERAGES ARE REPRESENTATIVE OF ACTUAL HDDS, HAVE YOU DEVELOPED NORMALS THAT MORE REASONABLY REPRESENT ACTUAL?

A. Yes, I have. I do so by relying on the hinge-fit technique outlined in Dr. Livezey's direct testimony. I show the results of my hinge analysis as the curve labeled "Hinge-Fit" in Schedule LWL 2, Sheets 1A and 1B.

Q. HOW DO YOU APPLY DR. LIVEZEY'S HINGE-FIT TECHNIQUE?

A. Dr. Livezey observes that from about 1940 to the mid-1970's there was no predominant trend in average temperatures. He further observes that after the mid-1970's a strong linear trend of warming temperatures (fewer HDDs) is evident. Recognizing these two features, I use a simple least squares linear regression technique where:

1) The dependent variable (Y) is equal to the actual annual HDDs,

2) The independent variable (X) is equal to one, prior to 1976, and

3) The independent variable is increased by one, each year beginning in 1976.

The result of this linear regression is an equation in the form of:

"Y = A + BX"

where "A" is a constant and "B" is the annual change (since 1975) in HDDs over time

By setting "X" equal to one prior to 1976, I anchor the hinge at 1975. By incrementing "X" by one each year after 1975, I reflect the implication of the linear warming trend discussed by Dr. Livezey.

With this equation, I can predict HDDs for the period 1951 through 2008, and estimate HDDs a few years in the future. For example, I can use this equation to estimate HDDs for the first year rates resulting from this Case will be in effect.

The resulting fitted curve (equation) is a straight line (constant) from 1951 to 1975. Beginning in 1976, the curve exhibits a downward trend. I show this curve for MCI and Joplin weather stations in Schedule LWL 2, Sheet 1.

Q. EARLIER IN YOUR TESTIMONY, YOU DISCUSS "HOMOGENIZED" WEATHER DATA. DID YOU APPLY DR. LIVEZEY'S HINGE-FIT TECHNIQUE TO HOMOGENIZED HDDS?

A. Yes, I did. I show results for homogenized HDDs for MCI and Joplin as well as for the average of 8 Missouri stations in Schedule LWL 2, Sheets 3A, 3B, and 3C.

Q. HOW DOES THIS HOMOGENIZED DATA COMPARE WITH REPORTED HDD?

A. Comparison of the graphs set forth in Sheets 1A and 1B of reported HDDs with the graphs I show in Sheets 3A and 3B of homogenized HDDs indicates that for Joplin, the hinge fit of actual and homogenized HDDs produce similar results. For MCI, comparison shows that while actual HDDs are greater than homogenized, the warming trend exhibited by actual HDD is less than that exhibited by homogenized HDDs.

Q. HAVE YOU PREPARED AN EXHIBIT SHOWING YOUR DEVELOPMENT OF THE HINGE-FIT?

A. Yes, I have. In Schedule LWL 2, Sheets 4A and 4B, I show my development for the MCI and Joplin weather stations. I show the hinge-fit for these two stations graphically in Sheets 1A and 1B of Schedule LWL 2.

In Sheets 4C, 4D, and 4E, I show my development of the hinge-fit using homogenized HDDs for MCI, Joplin, and the combined eight Missouri weather stations, respectively. I show the hinge-fit graphically of this information in Schedule LWL 2, Sheets 3A, 3B, and 3C.

In Sheet 4F, I provide a narrative description of the calculations I show in Sheets 4A through 4E.

Q. DO YOU HAVE ANY OBSERVATIONS REGARDING THE HINGE-FIT RESULTS YOU SHOW IN SCHEDULE LWL 2 SHEETS 1 AND 3?

A. Yes, I do. In examining the results that I show in Schedule LWL 2, I note, that as expected, homogenized HDD's are generally lower than actual reported HDDs. For MCI and Joplin, the hinge fit normal HDD for 2010 are less than using actual reported HDD. For Joplin, the hinge slope is about the same. For MCI however, the hinge slope (15 HDD/year decline) using homogenized HDDs substantially exceeds that (9 HDD/year decline) using actual HDDs. For both MCI and Joplin, the homogenized analysis suggests that my analysis using actual HDD produces a normal HDD level that conservatively overstates normal HDDs.

In Sheet 5, I summarize hinge fit results of reported and homogenized HDDs for all stations.

Q. HAVE YOU EVALUATED THE NORMALS YOU DEVELOP FOLLOWING DR. LIVEZEY'S HINGE-FIT TECHNIQUE IN A MANNER SIMILAR TO SCHEDULE LWL 2, SHEETS 2A AND 2B?

A. Yes, I have. In Schedule LWL 2 Sheet 6, I summarize the results of this evaluation. I show the results of my comparison over the 25-year period ended December 31, 2008, of actual HDDs with the "hinge-fit normal" HDDs based on data for the period ended the second preceding year for the MCI and Joplin weather stations. I also show results over the most recent 10-year period.

I show in Sheet 6, comparison of actual HDD with various normal (average) HDDs. Normal HDDs are shown based on the average over various periods, NOAA normals, and hinge-fit normals. In this regard, I compare the actual annual HDD for a period with the normal based on the average over the specified period ended 2 years previously. By introducing this 2-year lag, I recognize that the rates set based on a calendar year 2008 test year likely will not go into effect until early 2010.

In making this comparison with hinge-fit normal HDDs, I compare actual HDDs each year with the HDDs predicted for that year based on a hinge-fit of data ended two-years previously. By comparing actuals in this manner, I assume that a rate case prepared in the first quarter of 2009, using a December 31, 2008, test year, would rely on historical data through December 2008, adjusted to reflect the HDDs predicted by the hinge slope for the 12-months ended December 31, 2010. Further, I assume the rates resulting from that rate case would become effective approximately January 1, 2010. Thus, the actual HDDs for the first year rates would be in effect are for the 12 months ended December 31, 2010.

Q. DO YOU HAVE ANY OBSERVATIONS ABOUT THE COMPARISONS YOU SHOW IN SCHEDULE LWL 2, SHEET 6?

A. Yes, I do. Generally, as the number of years included in the average (normal) declines, the average difference between actual and normal tends to decrease. Further, the balance between the numbers of years that the actual exceeds the average (normal) and the number of years the average (normal) exceeds the actual tends to improve.

With regard to the normals calculated using the hinge-fit technique, my comparison indicates that for Joplin, the average difference is less than for any of the other "normals." This suggests that during the period analyzed, the hinge-fit "predicts" actual HDDs better than the alternatives. With regard to the number of years actual HDDs exceed normal, the normal based on the hinge-fit and the 5-year average show the best balance.

For MCI, my comparison shows that over the 25-year period, averages regardless of period, predict actual HDDs better than the hinge-fit. The hinge-fit is however superior to the NOAA normal. However, when the analysis is limited to the most recent 10-years the hinge-fit predicts actual HDDs better than any average except for the 5-year. With regard to the number of years during which actual exceeds normal, the hinge-fit shows the best balance.

Q. ARE THE RESULTS YOU SHOW IN SCHEDULE LWL 2, SHEET 6 SURPRISING?

A. No, they are not. The results reflect the simple fact that recent winter weather in MGE's western Missouri service area has been generally warmer than in the past. Further, the results are comparable to results of similar studies I recently performed for weather stations in Colorado, Iowa, Michigan, Nebraska, New Mexico, and Wyoming. In each of these studies, I found that for nearly all weather stations evaluated, as the number of years included in measuring the normal decreases, the resulting normal better predicts actual HDD in the second succeeding year.

Q. WHAT IS THE RELEVANCE OF THE AVERAGE DIFFERENCE YOU SHOW AS "ACTUAL EXCEEDS NORMAL" IN SHEET 6?

A. This average difference (Lines 4, 10, 17, and 23) provides a measure of how well normal HDDs correspond to actual over the long term. Assuming a rate case is filed and acted on each year, as this difference approaches zero, sales during the period analyzed (in this case 10 and 25 years) will more closely approximate (on average, all other factors equal) the level used to set rates during that period,

Q. WHAT IS THE SIGNIFICANCE OF THE "NUMBER OF YEARS" ACTUAL EXCEEDS NORMAL?

A. The number of years where the actual exceeds the normal (Lines 6, 12, 19, and 25) versus the number where normal exceeds actual provides a measure of the probability that actual sales during the first year rates are in effect will exceed weather adjusted test period sales. When the normals used in a rate case exceed actuals, test year weather normalized sales will exceed actual sales (all other factors being equal), and hence rates designed based on those sales will be set at a level that does not permit the Company a reasonable opportunity to earn its allowed rate of return.

Because of the extreme variations in the number of HDDs from year to year, I do not expect normal HDDs to exactly equal actual. However, there should be a reasonable balance or symmetry over the longer term.

Q. WHAT RECOMMENDATION DO YOU HAVE FOR THE COMMISSION REGARDING SETTING NORMAL HDDS?

A. Consistent with generally accepted ratemaking principles, the Commission should endeavor to rely on normal HDDs which with reasonable probability:

1) Will exceed actual HDDs (during the period rates are in effect) about 50 percent of the time (Lines 7, 13, 20, and 26), and

2) Result in a minimum cumulative difference (positive or negative) between actual and normal HDDs (Lines 4, 10, 17, and 23).

Q. WHAT IS THE RESULT IF THE COMMISSION USES NORMALS THAT MORE CLOSELY ALIGN WITH ACTUAL HEATING DEGREE-DAYS WHEN MAKING WEATHER NORMALIZATION ADJUSTMENTS?

A. The clear result is that the Commission will establish adjusted test period sales that will better approximate actual sales during the first year rates are in effect. To the extent, rates are designed so that fixed costs are recovered in volumetric charges, the rates approved by the Commission are based on sales levels will offer the Company a more reasonable opportunity to earn the rate of return approved by the Commission.

Q. ARE YOU SUGGESTING THAT THE COMMISSION PREDICT THE WEATHER?

A. No, I am not. I am not suggesting that the Commission predict weather any more than the Commission has in the past. In reality, the Commission implicitly predicts the weather any time it approves or adopts a weather normalization adjustment in a rate case. The Commission assumes that the weather during the period the rates resulting from a rate case are in effect will be comparable to the normal used in the normalization adjustment.

The utilities subject to the jurisdiction of the Commission are entitled to rates that provide them a reasonable opportunity to earn the rate of return allowed by the Commission. In order for the Commission to provide this opportunity, the Commission must rely on billing units upon which rates are developed (test period bills, normalized sales, etc.) that reasonably reflect what will be experienced during the period the rates approved by the Commission will be in effect. To the extent rates are designed based on test period sales, if the Commission uses normal HDDs, which exceed the level reasonably expected during the period the rates will be in effect, the Commission has denied the utility a reasonable opportunity to earn the allowed rate of return that the Commission finds reasonable. Such a result might be considered confiscatory.

Q. TO SUMMARIZE, BASED ON YOUR INVESTIGATION, HOW SHOULD THE COMMISSION DETERMINE NORMAL HDDS IN THIS CASE?

A. Consistent with generally accepted ratemaking principles, normal HDDs for the purpose of weather normalizing sales in this case should be determined for 2010 using the hinge-fit technique. The data set that should underlie this determination should be actual HDDs reported for the 58-year period ended December 31, 2008.

Based on the analysis I have described in this testimony, and consistent with the concept of providing the Company with a reasonable opportunity to earn a return on equity commensurate with that allowed by the Commission; NOAA-published normal HDDs should not be used for the purpose of weather normalizing sales in this case. My analysis clearly demonstrates that over the past 25 years, NOAA-published normals have consistently exceeded actual HDDs experienced during periods when rates based on such normals would have been in effect. Therefore, historically, the use of these NOAA normals to develop pro forma test period sales results in inadequate rate levels.

I have demonstrated historically that use of the hinge-fit technique or shorter-term averages to define normal HDDs for purposes of the weather normalization adjustment better aligns rates with conditions during the period that the Commission's approved rates would have been in effect.

Q. HAVE YOU DETERMINED THE APPROPRIATE LEVEL OF NORMAL HDDS BY MONTH, USING THE HINGE-FIT?

A. Yes, I have. In Schedule LWL 2, Sheet 7, I show normal HDDs by month based on use of the hinge-fit technique. I develop these monthly normals in exactly the same fashion as I do annual normals in Schedule LWL 2, Sheet 4.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY REGARDING NORMAL HEATING DEGREE-DAYS?

Yes, it does.

CUSTOMER USE CHARACTERISTICS

Q. WHAT ARE CUSTOMER USE CHARACTERISTICS?

A. In the context of weather normalization adjustments the relevant customer use characteristic is the degree that sales fluctuate in response to changes in HDDs. Adjusting sales based on actual weather conditions to reflect normal HDD is based on the extent that sales change in response to changes in HDDs.

Q. HOW DO YOU DETERMINE THE RELATIONSHIP OF SALES VOLUMES AND WEATHER?

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

Multiple regression yields an equation in the form:

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

Where

Y	is the dependent variable
$X_1 ... X_k$	are the independent variables
B	is the y-intercept (constant)

$A_1 \ldots A_k$ are the regression coefficients

With respect to my use of multiple regression as a tool in developing adjustments to reflect normal weather conditions, the dependent variable (Y) is monthly use per customer. I calculate this dependent variable by dividing the monthly volumes by monthly number of customers. I use monthly use per customer, not total monthly volumes, because the per customer basis reduces the implications of growth, or decline in volumes due to changes in number of customers (particularly on a seasonal basis). Independent variables ($X_1 \ldots X_K$) are typically weather variables such as HDDs. The intercept (B) is a monthly constant. The constant represents use per customer per month that is predicted by the regression that is not affected by changes in the independent variables. This non-weather sensitive use is generally referred to as "base use." I develop the coefficients ($A_1 \ldots A_K$) using the regression analysis based on the best fit (least squares).

I calculate several statistics in connection with my regression analysis to assist in the evaluation of significance (the degree to which the independent variables in the analysis explain the dependent variable). In my analysis, I focus on the coefficient of determination (Adjusted R-squared), Standard Error of the Estimate, and the F-statistic to evaluate of the significance of alternative regression analysis results.

Q. WHAT DATA DO YOU USE IN PERFORMING THE MULTIPLE LINEAR REGRESSION ANALYSIS DESCRIBED ABOVE?

A. I base my analysis on regressing actual monthly use per customer versus actual monthly HDDs. In simple terms, this regression analysis provides coefficients which represents the change in use per customer for a change of one HDD.

Q. WHAT RATE SCHEDULES ARE YOU PROPOSING TO ADJUST?

I am proposing to adjust sales under those rate schedules that demonstrate use that is sensitive to changes in winter temperature conditions. These rate schedules generally use natural gas for space heating. Variation in monthly HDDs typically explains most of the variation in sales to customers who use gas in space heating applications. However, in this case, I find that HDDs explain variations in sales to all customer classes.

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

The correlation between HDDs and sales is quite high. In my regression analyses, I include as independent variables HDDs (both current and prior month) and a trend term. Monthly sales are based on the reading of a customer's meter. Monthly use is determined as the difference between the current reading and the reading in the prior period. The average time between meter reads approximates a little over 30 days.

For most customers, meters are read on a cycle that does not correspond to the end of the calendar month. Therefore, most customers' bills are for a 27 to 33-day period that spans two calendar months. For this reason, I include HDDs for the previous month as a variable.

In addition, I include a trend variable that "captures" change in use per customer over time. In this case, with very limited exception, I do not find this trend term significant.

Q. WHY DO YOU WANT TO PERFORM YOUR ANALYSES OVER A PERIOD INSTEAD OF ONLY THE 12 MONTHS THAT CORRESPOND TO THE TEST YEAR?

A. In connection with studies that I have performed regarding the relationship between gas sales and winter weather conditions, I have observed several anomalies. One of these anomalies is that for a specific customer class, the relationship between sales and HDDs can appear to change substantially from year to year. While studying this question, I concluded that significant changes in the relationship generally correspond to years where weather conditions are more abnormal. I therefore prefer to examine conditions over a long enough period so that any weather adjustment I make reflects usage characteristics where weather conditions aren't significantly biased towards being abnormally warmer or colder than normal.

Q. PLEASE DESCRIBE YOUR REGRESSION RESULTS.

A. In order to identify anomalies in usage patterns over the 4-year period for which I have sales data, I performed regression analyses in decreasing blocks of time (2005-08, 2006-08, 2007-08, and 2008) for each class (Residential, Small General Service, Large General Service, and Large Volume Service) and each Sales District (Kansas City, Joplin, and St.

Joseph). In Schedule LWL 3, I summarize the results of each of these regressions. I evaluate the results of each for the various periods using six criteria to determine which period should be used to calculate my proposed adjustment. These six criteria are:

1) Consistency of predicted normal use per customer
2) Degree average actual annual HDDs for the period correspond to normal
3) Adjusted R-squared – higher values indicate a higher correlation of predicted to actual values
4) F-statistic – higher values equate to a higher level of significance
5) Standard error of the estimate – lower values indicate a higher level of confidence
6) Obvious changes in the database as reflected in coefficients and statistics

In Schedule LWL 3, I show regression results and identify the analysis I use for each rate schedule and sales district.

NORMAL SALES AND REVENUES

Q. HOW DO YOU DETERMINE THE ADJUSTMENT TO NORMALIZE SALES?

A. I summarize this calculation in Schedule LWL 4. The heating adjustment per customer is the difference between normal and actual HDDs multiplied by the respective coefficients (current and prior month) for each month of the test year. I use the monthly normal HDDs I show in Schedule LWL 2, Sheet 7. The heating adjustment per customer is determined using coefficients from Schedule LWL 3.

I multiply each of the monthly heating adjustments per customer by the respective number of customers for each month to determine the total volumetric adjustment. I show in Column J of Schedule LWL 4, my recommended adjustment amounts to a reduction in test year sales of about 56.1 million Ccf.

Q. HOW DO YOU DETERMINE THE ADJUSTMENT TO REVENUES FOR EACH OF THE RATE CLASSES?

A. The revenues adjustment is equal to the margin rate (sales rate excluding gas cost and transportation rate) times the volumetric adjustment. I show the margin rates in Columns H and I (for the first and second rate blocks respectively) of Schedule LWL 4, Sheet 4. I calculate the revenues adjustment by multiplying the margin rate (Columns H and I) by the volume adjustment to each rate block (Columns F and G). I show in Schedule LWL 4, Sheet 4, the total revenues adjustment amounts to a decrease in revenues (margin) of $2.6 million.

CUSTOMER ANNUALIZATION ADJUSTMENT

Q. WHY ARE YOU PROPOSING AN ADJUSTMENT TO ANNUALIZE CUSTOMERS?

A. The Company is proposing rate base based on year-end plant balances. To synchronize investment, revenues, and costs, numbers of customers must be adjusted to reflect year-end levels.

Q. TO ANNUALIZE NUMBER OF CUSTOMERS, DO YOU SIMPLY ASSUME THAT THE NUMBER OF CUSTOMERS SERVED AT YEAR-END WERE BILLED THROUGHOUT THE YEAR?

A. No. Gas distributors such as MGE experience fluctuations in numbers of bills through out the year. Typically, the number of customers (bills) served increases toward the end of the year and declines through the summer. To annualize properly the number of customers, the normal fluctuation in monthly number of bills throughout the year needs to be preserved. The adjustment should reflect only the change in number of customers and volumes attributable to the overall change from the beginning to the end of the test period.

Q. HOW DO YOU PROPOSE TO ADJUST FOR YEAR END NUMBER OF CUSTOMERS?

A. Because of the extremely small change in number of customers during the test year, I develop my annualization adjustment based on the change in number of bills from December 2007 to December 2008. I prorate this change into equal monthly increments. For example, I calculate the monthly increase (or decrease) the number of bills by dividing the change in customers (from December 2007 to December 2008) by 12. I then adjust the number of bills in January by eleven times this monthly change. I adjust the number of bills in February by ten times this monthly change and so forth.

I adjust monthly sales by multiplying the change in monthly number of customers by weather-normalized use per customer for the corresponding month. Because of the small change in number of customers, I adjust margin revenues by multiplying the change in seasonal number of customers by weather-normalized revenues per customer.

In Schedule LWL 5, I summarize my development of my recommended adjustment to reflect annualized sales. As I show in Schedule LWL 5, Sheet 2 my proposed annualization adjustment amounts to a decrease in sales of 371,197 Ccf.

In Schedule LWL 5, Sheet 2, I summarize my development of my recommended adjustment to revenues to reflect annualized number of customers. My proposed adjustment amounts to a decrease in revenues of $183,983.

REVENUE RECONCILIATION FACTOR

Q. WHAT DOES YOUR PROPOSED REVENUE RECONCILIATION FACTOR REPRESENT?

A. The purpose of my recommended reconciliation factor is to synchronize adjusted test year revenues (margin) with per books billing units and and revenues. By adjusting calculated revenues by my reconciliation factor revenues are restated to perbooks revenues plus normalization and annualization adjustments.

By reconciling revenues, I align sales, number of bills, and revenues. By so doing, the adjusted units can be used (along with this reconciliation factor) to calculate revenues under both existing and proposed rate levels.

My overall reconciliation adjustment amounts to $1,819,044 (0.98%). Of this amount, $2,482,884 relates to revenues associated with final and corrected bills. The balance (negative $663,840 or -0.36%) relates to other differences between revenues reported on the Company's books and my calculation of revenues using existing rates and test period billing units.

Q. HAVE YOU PREPARED A SCHEDULE SHOWING HOW YOU CALCULATED THIS RECONCILIATION FACTOR?

A. Yes, I show my detailed calculations in Schedule LWL 6. As I show, I adjust per books revenues of $186,539,845 by my recommended normalization and annualization adjustments. I compare normalized and annualized revenues with the revenues I calculate using normalized and annualized billing units. I show this calculation in Schedule LWL 7. The difference between normalized and annualized revenues and calculated revenues amounts to $1,819,044 or 0.98% of calculated revenues.

SUMMARY PROFORMA REVENUES

Q. HAVE YOU PREPARED A SUMMARY OF PROFORMA REVENUES UNDER EXISTING RATES ?

A. Yes, I have. My summary is set forth in Schedule LWL 7.

In Schedule LWL 7, I calculate revenues prior to reconciliation by multiplying adjusted test year billing units by existing rates (excluding cost of gas.) I adjust this calculated amount by the reconciliation factor I develop in Schedule LWL 6 to determine total test period adjusted revenues under existing rates of $183,752,058.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Missouri Gas Energy to Increase Rates For Gas Service Provided to Customers In the Company's Missouri Service Area	))))	Case No. GR-2009- __

AFFIDAVIT OF LARRY W. LOOS

STATE OF ARIZONA)
MARICOPA) ss
COUNTY OF ~~PINAL~~)

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

Larry W Loos
Larry W. Loos

Subscribed and sworn before me this 31 day of March 2009.

Robert A. Calta
Notary Public

My commission expires: 11/20/2009

Robert A. Calta
Notary Public - Arizona
Maricopa County
Commission #255023
Expires November 20, 2009

Missouri Gas Energy
Index of LWL Schedules

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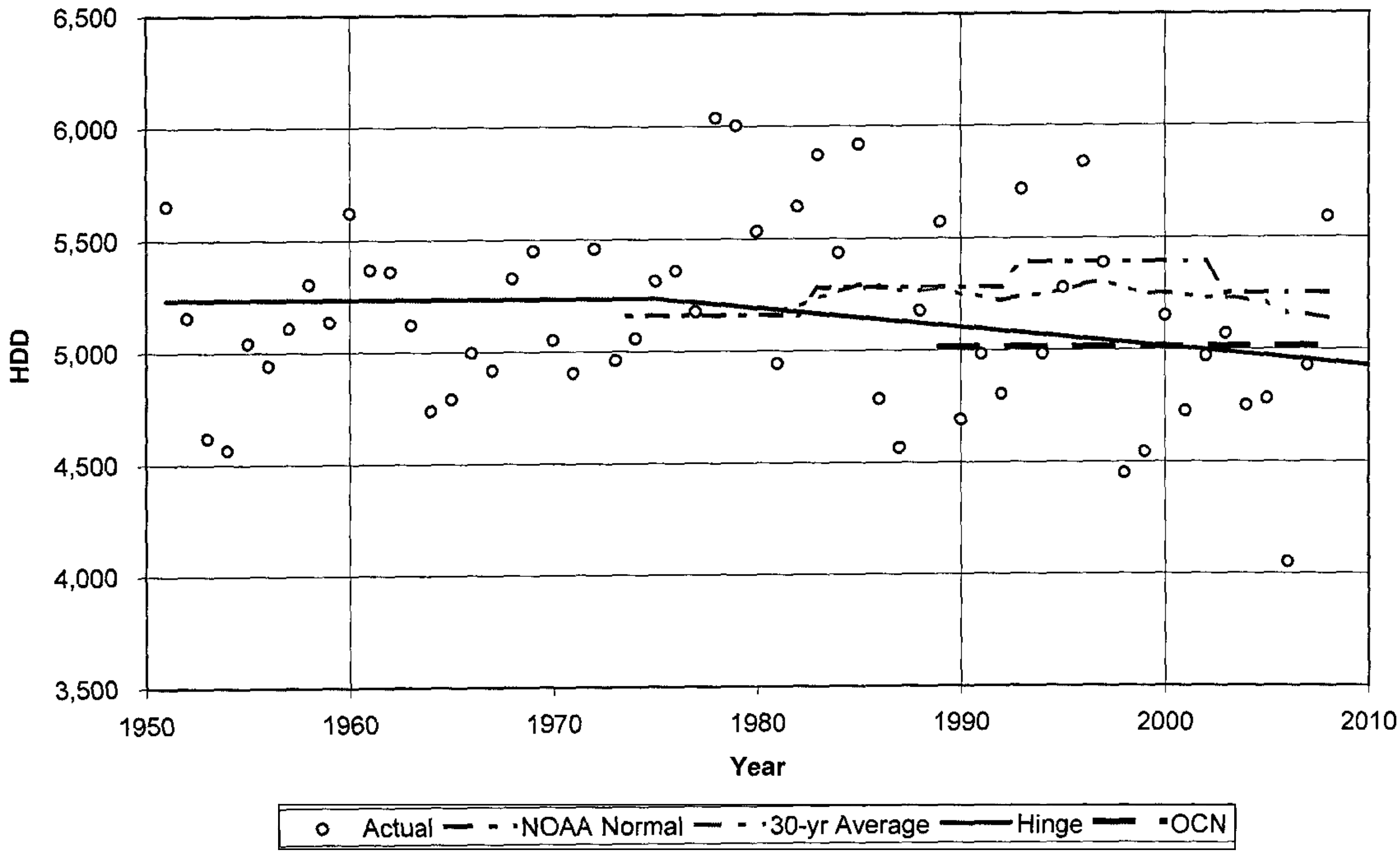
Missouri Gas Energy
Per Books Bills, Deliveries, and Margin Revenues - 12 Months Ended 12/31/08

	[A]	[B]	[C]	[D]
Line No.	Description	Number of Bills	Deliveries	Margin Revenues
			Ccf	$
1	Residential	5,246,661	391,144,938	130,103,150
2	Small General Service			
3	Sales	739,622	153,296,193	38,897,593
4	Transportation	8,303	9,143,182	1,680,545
5	Total SGS	747,925	162,439,375	40,578,138
6	Large General Service			
7	Sales	3,246	13,796,457	2,161,241
8	Transportation	381	1,524,883	257,823
9	Total LGS	3,627	15,321,340	2,419,064
10	Large Volume			
11	Sales	132	2,833,160	246,360
12	Transportation	5,813	261,951,863	13,193,133
13	Total Large Volume	5,945	264,785,023	13,439,493
14	Total 2008 Per Books	6,004,158	833,690,676	186,539,845
15	Recap:			
16	Sales	5,989,661	561,070,748	171,408,344
17	Transportation	14,497	272,619,928	15,131,501
18	Total	6,004,158	833,690,676	186,539,845

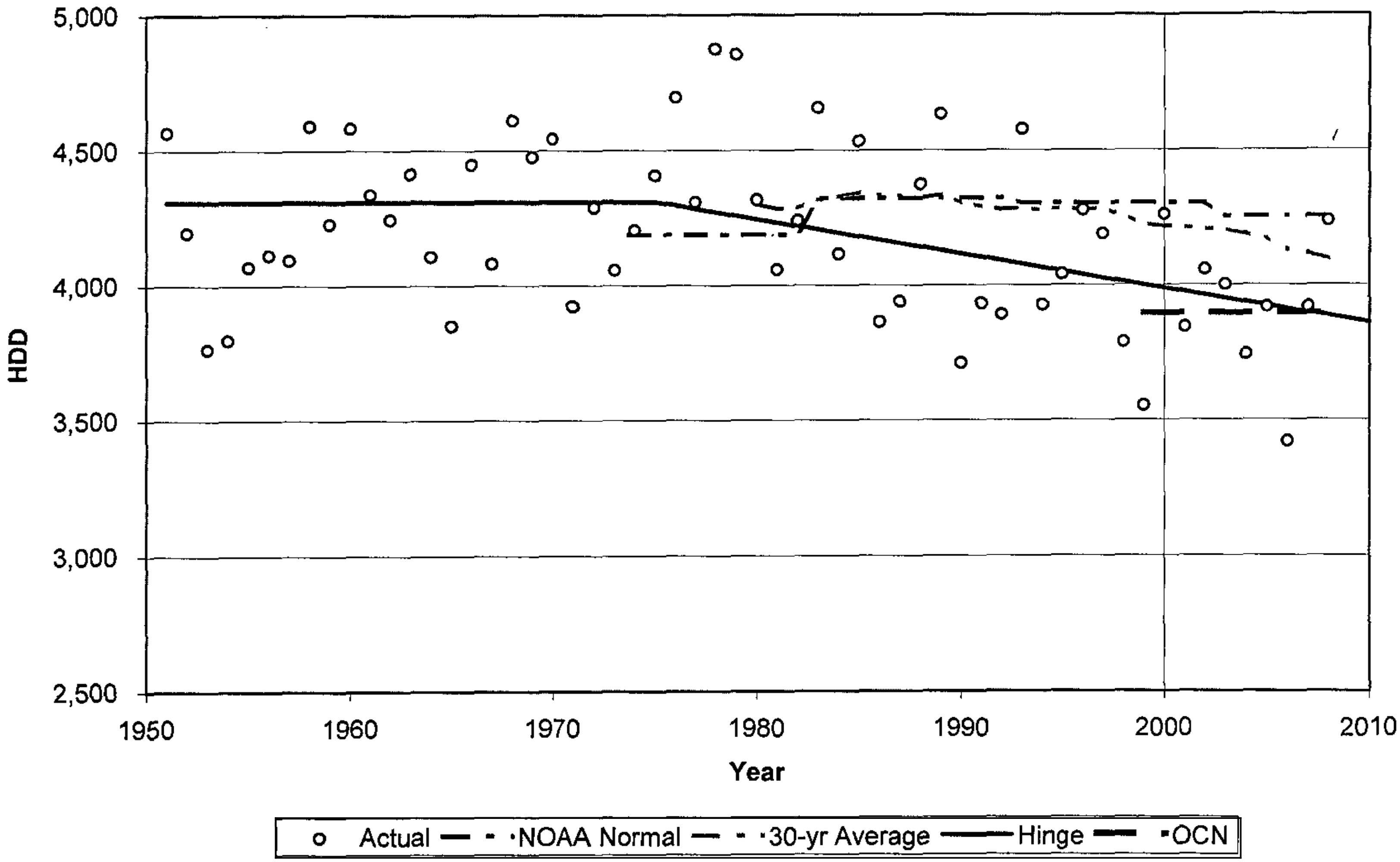
Schedule LWL 2
Sheet 1A

Missouri Gas Energy
Kansas City Int'l AP (MCI) Weather Station
Comparison of Actual, NOAA Normal, 30-yr Average, OCN, and Hinge Fit HDD



Schedule LWL 2
Sheet 1B

Missouri Gas Energy
Joplin Weather Station
Comparison of Actual, NOAA Normal, 30-yr Average,
OCN, and Hinge Fit HDD



Schedule LWL 2
Sheet 2A

Missouri Gas Energy
Comparison of Annual Actual HDDs with NOAA Normal HDDs
Over Various Periods

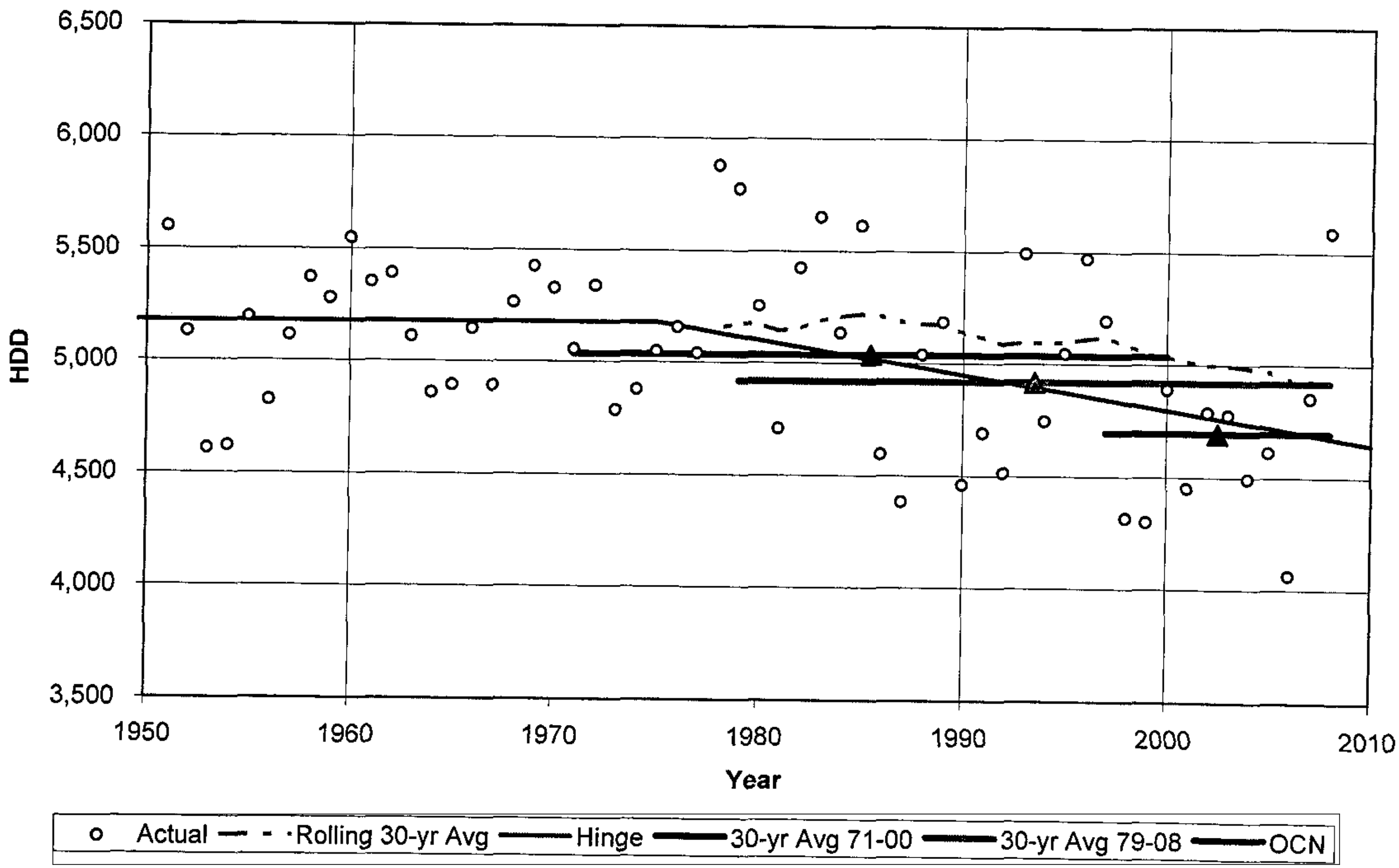
	[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line No.	Weather Station	Average NOAA Normal HDDs	Average Actual	Amount Actual Exceeds NOAA		Number of Years Actual Exceeds NOAA	
				Average Annual	Percent	Number	Percent
1	25-year Period Ended December 31, 2008						
2	MCI	5,319	5,046	(273)	-5.14%	6	24.00%
3	Joplin	4,297	4,029	(269)	-6.26%	4	16.00%
4	Average	4,808	4,537	(271)	-5.70%	5	20.00%
5	10-year Period Ended December 31, 2008						
6	MCI	5,307	4,856	(451)	-8.50%	1	10.00%
7	Joplin	4,273	3,894	(379)	-8.87%	0	0.00%
8	Average	4,790	4,375	(415)	-8.69%	1	5.00%
9	15-year Period Ended December 31, 1998						
10	MCI	5,327	5,172	(155)	-2.91%	5	33.33%
11	Joplin	4,314	4,118	(195)	-4.53%	4	26.67%
12	Average	4,820	4,645	(175)	-3.72%	5	30.00%

Schedule LWL 2
Sheet 2B

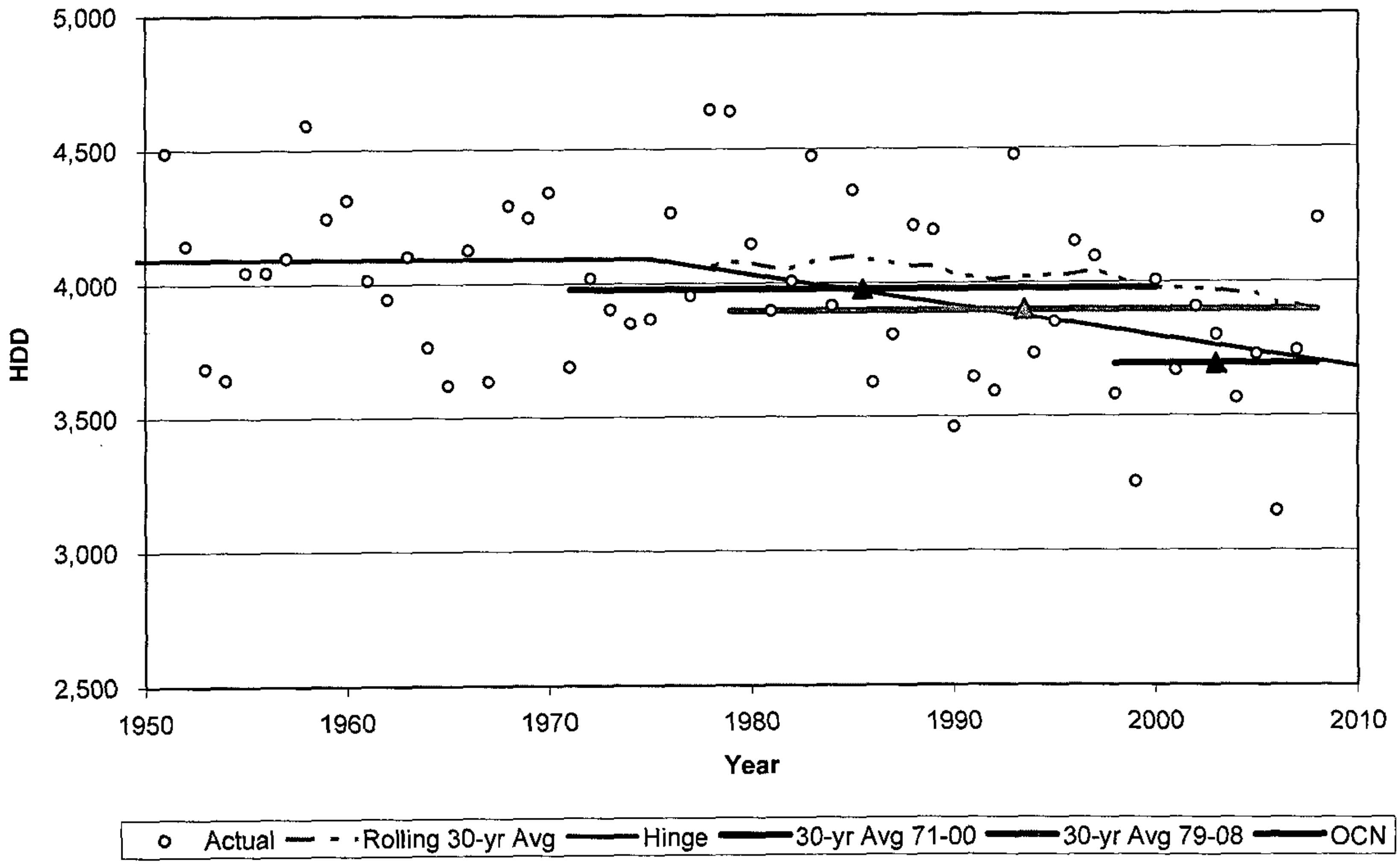
Missouri Gas Energy
Comparison of Annual Actual HDDs with 30-Year Average HDDs
Over Various Periods

	[A]	[B]	[C]	[D]	[E]	[F]	[G]
Line No.	Weather Station	Average of 30-Year Average HDD	Average Actual	Amount Actual Exceeds 30-Year Average		nber of Years Actual Exceeds 30-Year Ave	
				Average Annual	Percent	Number	Percent
1	25-year Period Ended December 31, 2008						
2	MCI	5,244	5,046	(198)	-3.78%	8	32.00%
3	Joplin	4,251	4,029	(223)	-5.24%	6	24.00%
4	Average	4,747	4,537	(210)	-4.51%	7	28.00%
5	10-year Period Ended December 31, 2008						
6	MCI	5,208	4,856	(353)	-6.77%	1	10.00%
7	Joplin	4,176	3,894	(282)	-6.76%	2	20.00%
8	Average	4,692	4,375	(317)	-6.76%	2	15.00%
9	15-year Period Ended December 31, 1998						
10	MCI	5,267	5,172	(95)	-1.80%	7	46.67%
11	Joplin	4,302	4,118	(183)	-4.26%	4	26.67%
12	Average	4,784	4,645	(139)	-3.03%	6	36.67%

Missouri Gas Energy
Kansas City Int'l AP (MCI) Weather Station
Comparison of Actual, 30-yr Average, OCN, and Hinge Fit HDD - Homogenized HDDs

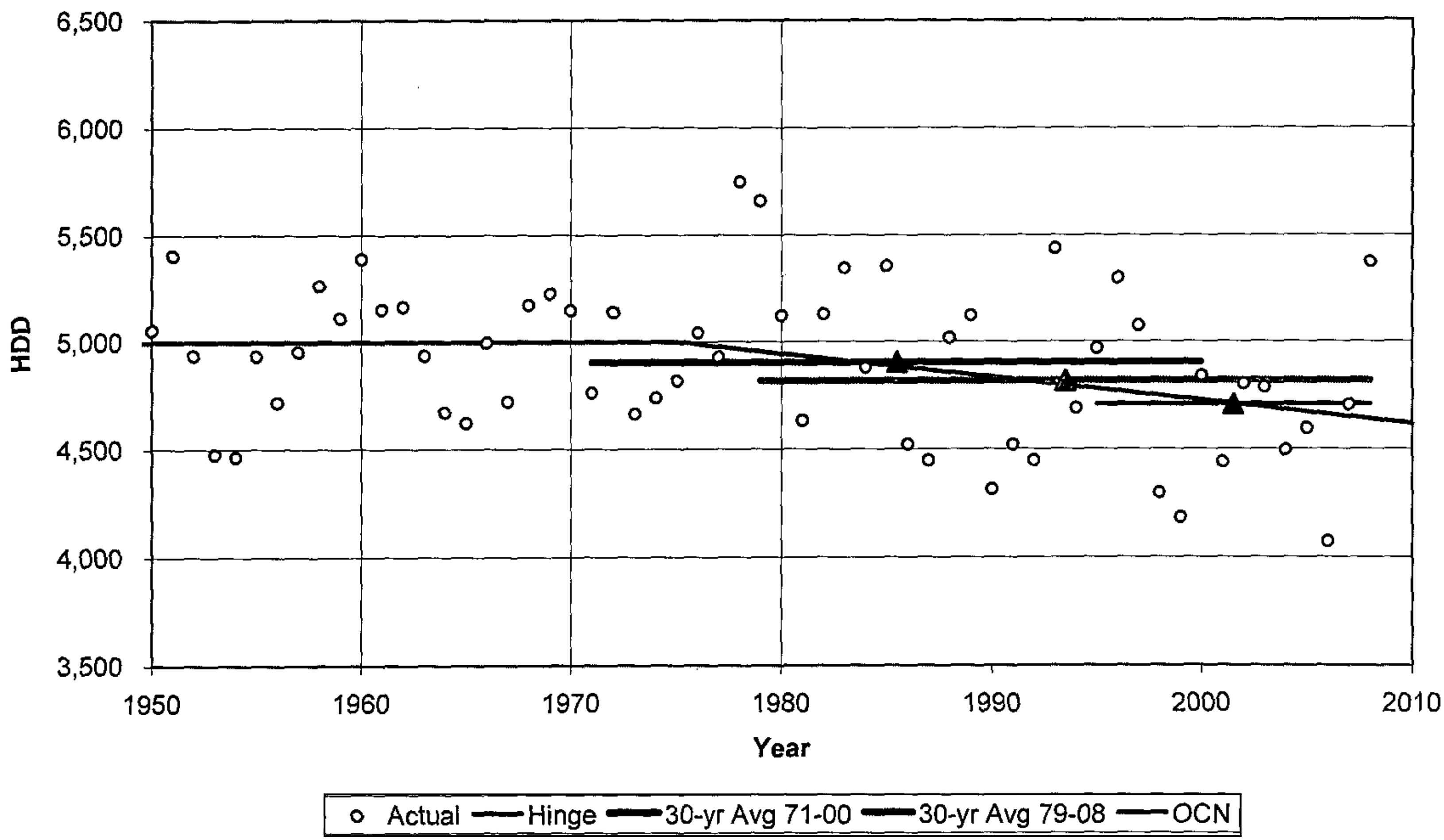


Missouri Gas Energy
Joplin Weather Station
Comparison of Actual, 30-yr Average, OCN, and Hinge Fit HDD - Homogenized HDDs



Schedule LWL 2
Sheet 3C

Missouri Gas Energy
Combined Missouri Weather Stations
Comparison of Actual, 30-yr Average, OCN, and Hinge-Fit HDD - Homogenized HDDs



	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
			Predicted by Hinge			Actual less Predicted - Complete Data Set			Actual less Predicted - Data Set to Date			
			Complete Data Set	Data Set to Date								
Line No.	Desription/Year	Actual HDD		Predicted	Hinge Slope	No Offset	One Year Offset	Two Year Offset	No Offset	One Year Data Lag	Two Year Data Lag	Hinge Factor
						[B] - [C]	[B (Prior Year)] - [C]	[B (2nd Prior Year)] - [C]	[B] - [D]	[B] - [D (Prior Year)]	[B] - [D (2nd Prior Year)]	
1	Data Set	1951 - 2008	1951 - 2008	1951 - To Date	1951 - To Date	1951 - 2008	1951 - To Date	1951 - To Date	1951 - To Date	1951 - To Date(-1)	1951 - To Date(-2)	
2	2007-08 Hinge Slope - HDD/yr		(8.78)	55.73								
3	Correlation of Residuals (g)					29.61%						
4	Correlation Coefficient		23.48%	56.73%								
5	OCN (years)		20									
6	Entire Data Set											
7	Years	58	58	58		58	57	56	58	57	56	
8	Mean	5,149.40	5,149.40	5,253.32		(0.00)	(6.24)	(0.83)	(103.92)	(141.99)	(173.89)	
9	Standard Deviation	417.38	97.99	269.75		405.71	401.05	405.74	345.29	449.06	498.28	
10	Actual Exceeds Predicted											
11	Number of Years %					45%	44%	45%	40%	42%	38%	
12	Average					(0.00)	(6.24)	(0.83)	(103.92)	(141.99)	(173.89)	
13	Standard Deviation					405.71	401.05	405.74	345.29	449.06	498.28	
14	Most Recent 10 Years											
15	Actual Exceeds Predicted											
16	Number of Years %					30%	20%	30%	40%	40%	10%	
17	Average	4,855.70	4,984.12	5,027.04		(128.42)	(242.52)	(196.02)	(171.34)	(193.81)	(236.31)	
18	Standard Deviation	403.44	26.58	93.19		408.60	326.57	373.58	403.14	449.38	460.50	
19	Most Recent 25 Years											
20	Actual Exceeds Predicted											
21	Number of Years %					44%	44%	48%	40%	40%	24%	
20	Average	5,045.60	5,049.96	5,244.21		(4.36)	6.92	35.68	(198.61)	(243.92)	(293.88)	
21	Standard Deviation	462.39	64.61	243.37		447.59	451.53	461.25	414.81	497.75	517.45	
22	50 - Years											
23	Actual Exceeds Predicted											
24	Number of Years %					48%	48%	48%	40%	42%	38%	
25	Average	5,165.48	5,135.81	5,268.51		29.67	23.97	27.63	(103.03)	(132.23)	(162.26)	
26	Standard Deviation	427.58	99.02	272.87		408.72	399.82	401.14	358.22	457.64	497.69	
27	Forecast											
28	2010		4,927	4,927								36.0
29	2009		4,936	4,936								35.0
30	Historical											
31	2008	5,590	4,945	4,945	(8.78)	645	(20)	(893)	645	712	716	34.0
32	2007	4,925	4,953	4,889	(11.12)	(28)	(901)	(173)	36	40	(57)	33.0
33	2006	4,052	4,962	4,896	(11.26)	(910)	(182)	(212)	(844)	(937)	(963)	32.0
34	2005	4,780	4,971	4,997	(7.81)	(191)	(221)	98	(217)	(242)	(276)	31.0
35	2004	4,750	4,980	5,029	(6.87)	(230)	89	(11)	(279)	(312)	(311)	30.0
36	2003	5,069	4,989	5,067	(5.58)	80	(20)	(262)	2	2	(12)	29.0
37	2002	4,969	4,997	5,072	(5.58)	(28)	(270)	153	(103)	(117)	(166)	28.0
38	2001	4,727	5,006	5,091	(5.03)	(279)	144	(461)	(364)	(411)	(410)	27.0
39	2000	5,150	5,015	5,141	(2.96)	135	(470)	(566)	9	10	(79)	26.0
40	1999	4,545	5,024	5,143	(3.01)	(479)	(575)	366	(598)	(683)	(805)	25.0
41	1998	4,449	5,032	5,227	0.98	(583)	358	805	(778)	(894)	(886)	24.0
42	1997	5,390	5,041	5,337	6.62	349	796	237	53	62	150	23.0
43	1996	5,837	5,050	5,322	6.19	787	228	(68)	515	599	606	22.0
44	1995	5,278	5,059	5,236	1.75	219	(77)	658	42	49	2	21.0
45	1994	4,982	5,068	5,228	1.35	(86)	649	(264)	(246)	(290)	(199)	20.0
46	1993	5,717	5,076	5,268	3.94	641	(272)	(96)	449	535	452	19.0
47	1992	4,804	5,085	5,184	(1.31)	(281)	(105)	(394)	(380)	(457)	(521)	18.0
48	1991	4,980	5,094	5,257	3.66	(114)	(403)	478	(277)	(338)	(492)	17.0
49	1990	4,691	5,103	5,310	7.76	(412)	469	73	(619)	(763)	(726)	16.0
50	1989	5,572	5,111	5,436	18.16	461	65	(544)	136	170	109	15.0
51	1988	5,176	5,120	5,386	15.53	56	(553)	(336)	(210)	(267)	(543)	14.0
52	1987	4,567	5,129	5,423	20.24	(562)	(345)	790	(856)	(1,109)	(1,413)	13.0
53	1986	4,784	5,138	5,633	42.84	(354)	781	299	(849)	(1,127)	(1,095)	12.0
54	1985	5,919	5,147	5,841	69.66	772	290	725	78	106	(35)	11.0
55	1984	5,437	5,155	5,746	66.66	282	717	489	(309)	(436)	(392)	10.0
56	1983	5,872	5,164	5,791	81.49	708	480	(222)	81	119	99	9.0
57	1982	5,644	5,173	5,676	76.49	471	(231)	360	(32)	(50)	(579)	8.0
58	1981	4,942	5,182	5,615	79.16	(240)	351	820	(673)	(1,124)	(1,510)	7.0
59	1980	5,533	5,190	5,909	157.11	343	812	848	(376)	(696)	(702)	6.0
60	1979	6,002	5,199	6,006	223.06	803	839	(24)	(4)	(9)	605	5.0
61	1978	6,038	5,208	5,787	224.30	830	(33)	151	251	710	198	4.0
62	1977	5,175	5,217	5,259	68.74	(42)	142	98	(84)	(425)	57	3.0
63	1976	5,359	5,226	5,359	240.60	133	89	(169)	-	241	249	2.0
64	1975	5,315	5,234	5,118		81	(177)	(275)	197	205	202	1.0
65	1974	5,057	5,234	5,110		(177)	(275)	225	(53)	(56)	(63)	1.0
66	1973	4,959	5,234	5,113		(275)	225	(329)	(154)	(161)	(144)	1.0
67	1972	5,459	5,234	5,120		225	(329)	(183)	340	356	346	1.0
68	1971	4,905	5,234	5,103		(329)	(183)	216	(198)	(208)	(212)	1.0
69	1970	5,051	5,234	5,113		(183)	216	94	(62)	(66)	(47)	1.0
70	1969	5,450	5,234	5,117		216	94	(317)	333	352	366	1.0
71	1968	5,328	5,234	5,098		94	(317)	(239)	230	244	233	1.0
72	1967	4,917	5,234	5,084		(317)	(239)	(444)	(167)	(178)	(185)	1.0
73	1966	4,995	5,234	5,095		(239)	(444)	(496)	(100)	(107)	(129)	1.0
74	1965	4,790	5,234	5,102		(444)	(496)	(113)	(312)	(334)	(364)	1.0
75	1964	4,738	5,234	5,124		(496)	(113)	126	(386)	(416)	(418)	1.0
76	1963	5,121	5,234	5,154		(113)	126	134	(33)	(35)	(17)	1.0
77	1962	5,360	5,234	5,156		126	134	388	204	222	245	1.0
78	1961	5,368	5,234	5,138		134	388	(100)	230	253	310	1.0
79	1960	5,622	5,234	5,115		388	(100)	71	507	564	573	1.0
80	1959	5,134	5,234	5,058		(100)	71	(126)	76	85	122	1.0
81	1958	5,305	5,234	5,049		71	(126)	(293)	256	293	309	1.0
82	1957	5,108	5,234	5,012		(126)	(293)	(192)	96	112	101	1.0
83	1956	4,941	5,234	4,996		(293)	(192)	(669)	(55)	(66)	(58)	1.0
84	1955	5,042	5,234	5,007		(192)	(669)	(614)	35	43	(101)	1.0
85	1954	4,565	5,234	4,999		(669)	(614)	(79)	(434)	(578)	(840)	1.0
86	1953	4,620	5,234	5,143		(614)	(79)	421	(523)	(785)	(1,035)	1.0
87	1952	5,155	5,234	5,405		(79)	421		(250)	(500)		1.0
88	1951	5,655	5,234	5,655		421			-			1.0

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
			Predicted by Hinge			Actual less Predicted - Complete Data Set			Actual less Predicted - Data Set to Date			
			Complete Data Set	Data Set to Date								
Line No.	Description/Year	Actual HDD		Predicted	Hinge Slope	No Offset	One Year Offset	Two Year Offset	No Offset	One Year Data Lag	Two Year Data Lag	Hinge Factor
						[B] - [C]	[B (Prior Year)] - [C]	[B (2nd Prior Year)] - [C]	[B] - [D]	[B] - [D (Prior Year)]	[B] - [D (2nd Prior Year)]	
1	Data Set	1951 - 2008	1951 - 2008	1951 - To Date	1951 - To Date	1951 - 2008	1951 - To Date	1951 - To Date	1951 - To Date	1951 - To Date(-1)	1951 - To Date(-2)	
2	2007-08 Hinge Slope - HDD/yr		(12.91)	22.46								
3	Correlation of Residuals (g)					9.76%						
4	Correlation Coefficient		44.70%	63.30%								
5	OCN (years)		10									
6	Entire Data Set											
7	Years (Observations)	58	58	58		58	57	56	58	57	56	
8	Mean	4,184.29	4,184.29	4,228.52		(0.00)	1.27	8.27	(44.23)	(73.80)	(98.73)	
9	Standard Deviation	322.35	144.09	219.21		288.35	288.41	292.48	250.00	343.55	375.59	
10	Actual Exceeds Predicted											
11	Number of Years %					48%	51%	50%	47%	49%	50%	
12	Average					(0.00)	1.27	8.27	(44.23)	(73.80)	(98.73)	
13	Standard Deviation					288.35	288.41	292.48	250.00	343.55	375.59	
14	Most Recent 10 Years											
15	Actual Exceeds Predicted											
16	Number of Years %					50%	50%	50%	50%	50%	50%	
17	Average	3,893.80	3,941.26	3,948.70		(47.46)	(92.56)	(65.46)	(54.90)	(62.41)	(78.65)	
18	Standard Deviation	270.99	39.08	60.33		276.37	241.46	253.64	265.47	297.86	295.20	
19	Most Recent 25 Years											
20	Actual Exceeds Predicted											
21	Number of Years %					44%	52%	52%	44%	44%	40%	
20	Average	4,028.60	4,038.07	4,114.85		(9.47)	7.29	20.13	(86.25)	(107.50)	(129.30)	
21	Standard Deviation	303.64	95.00	170.44		283.27	289.01	289.00	265.36	320.24	314.59	
22	50 - Years											
23	Actual Exceeds Predicted											
24	Number of Years %					52%	56%	54%	48%	50%	50%	
25	Average	4,190.06	4,164.32	4,233.15		25.74	32.80	36.32	(43.09)	(67.56)	(91.79)	
26	Standard Deviation	327.49	145.60	226.11		280.07	279.24	282.31	251.60	343.22	367.74	
27	Forecast											
28	2010		3,857	3,857								36.0
29	2009		3,870	3,870								35.0
30	Historical											
31	2008	4,237	3,883	3,883	(12.91)	354	35	(465)	354	390	397	34.0
32	2007	3,918	3,896	3,861	(14.19)	22	(478)	21	57	63	12	33.0
33	2006	3,418	3,909	3,869	(14.41)	(491)	8	(169)	(451)	(501)	(502)	32.0
34	2005	3,917	3,922	3,931	(12.57)	(5)	(182)	78	(14)	(16)	(41)	31.0
35	2004	3,740	3,935	3,945	(12.51)	(195)	65	121	(205)	(230)	(227)	30.0
36	2003	4,000	3,948	3,981	(11.56)	52	108	(107)	19	21	30	29.0
37	2002	4,056	3,961	3,991	(11.65)	95	(120)	299	65	74	53	28.0
38	2001	3,841	3,974	3,994	(12.00)	(133)	286	(423)	(153)	(173)	(140)	27.0
39	2000	4,260	3,986	4,025	(11.12)	274	(435)	(200)	235	267	199	26.0
40	1999	3,551	3,999	4,006	(12.57)	(448)	(213)	190	(455)	(520)	(566)	25.0
41	1998	3,786	4,012	4,080	(9.53)	(226)	177	265	(294)	(338)	(329)	24.0
42	1997	4,189	4,025	4,132	(7.40)	164	252	15	57	66	92	23.0
43	1996	4,277	4,038	4,130	(7.85)	239	2	(112)	147	170	157	22.0
44	1995	4,040	4,051	4,116	(9.12)	(11)	(125)	526	(76)	(89)	(129)	21.0
45	1994	3,926	4,064	4,137	(8.40)	(138)	513	(175)	(211)	(249)	(169)	20.0
46	1993	4,577	4,077	4,182	(6.18)	500	(188)	(145)	395	471	422	19.0
47	1992	3,889	4,090	4,117	(10.81)	(201)	(158)	(381)	(228)	(274)	(329)	18.0
48	1991	3,932	4,103	4,171	(7.83)	(171)	(394)	530	(239)	(290)	(420)	17.0
49	1990	3,709	4,116	4,227	(4.30)	(407)	517	256	(518)	(638)	(560)	16.0
50	1989	4,633	4,128	4,343	4.40	505	244	(190)	290	363	393	15.0
51	1988	4,372	4,141	4,271	(1.21)	231	(203)	(280)	101	128	28	14.0
52	1987	3,938	4,154	4,247	(3.47)	(216)	(293)	379	(309)	(401)	(570)	13.0
53	1986	3,861	4,167	4,334	4.70	(306)	366	(52)	(473)	(628)	(602)	12.0
54	1985	4,533	4,180	4,469	19.65	353	(65)	476	64	87	(57)	11.0
55	1984	4,115	4,193	4,429	17.19	(78)	463	46	(314)	(442)	(373)	10.0
56	1983	4,656	4,206	4,525	32.25	450	33	(148)	131	193	65	9.0
57	1982	4,239	4,219	4,439	24.18	20	(161)	96	(200)	(311)	(666)	8.0
58	1981	4,058	4,232	4,509	40.67	(174)	83	622	(451)	(754)	(1,168)	7.0
59	1980	4,315	4,245	4,719	92.94	70	609	630	(404)	(748)	(813)	6.0
60	1979	4,854	4,258	4,899	163.75	596	617	49	(45)	(97)	151	5.0
61	1978	4,875	4,270	4,774	177.08	605	37	425	101	286	(732)	4.0
62	1977	4,307	4,283	4,474	114.38	24	412	124	(167)	(844)	68	3.0
63	1976	4,695	4,296	4,695	456.00	399	111	(92)	-	456	463	2.0
64	1975	4,407	4,309	4,239		98	(105)	(253)	168	175	174	1.0
65	1974	4,204	4,309	4,232		(105)	(253)	(21)	(28)	(29)	(37)	1.0
66	1973	4,056	4,309	4,233		(253)	(21)	(387)	(177)	(185)	(183)	1.0
67	1972	4,288	4,309	4,241		(21)	(387)	233	47	49	33	1.0
68	1971	3,922	4,309	4,239		(387)	233	167	(317)	(333)	(318)	1.0
69	1970	4,542	4,309	4,255		233	167	301	287	302	315	1.0
70	1969	4,476	4,309	4,240		167	301	(228)	236	249	272	1.0
71	1968	4,610	4,309	4,227		301	(228)	139	383	406	398	1.0
72	1967	4,081	4,309	4,204		(228)	139	(462)	(123)	(131)	(115)	1.0
73	1966	4,448	4,309	4,212		139	(462)	(202)	236	252	227	1.0
74	1965	3,847	4,309	4,196		(462)	(202)	104	(349)	(374)	(383)	1.0
75	1964	4,107	4,309	4,221		(202)	104	(65)	(114)	(123)	(108)	1.0
76	1963	4,413	4,309	4,230		104	(65)	26	183	199	201	1.0
77	1962	4,244	4,309	4,215		(65)	26	272	30	32	45	1.0
78	1961	4,335	4,309	4,212		26	272	(81)	123	136	178	1.0
79	1960	4,581	4,309	4,200		272	(81)	281	382	424	433	1.0
80	1959	4,228	4,309	4,157		(81)	281	(215)	71	80	143	1.0
81	1958	4,590	4,309	4,148		281	(215)	(196)	442	505	506	1.0
82	1957	4,094	4,309	4,085		(215)	(196)	(240)	9	10	16	1.0
83	1956	4,113	4,309	4,084		(196)	(240)	(514)	29	35	33	1.0
84	1955	4,069	4,309	4,078		(240)	(514)	(546)	(9)	(11)	(106)	1.0
85	1954	3,795	4,309	4,080		(514)	(546)	(113)	(285)	(380)	(586)	1.0
86	1953	3,763	4,309	4,175		(546)	(113)	257	(412)	(618)	(803)	1.0
87	1952	4,196	4,309	4,381		(113)	257		(185)	(370)		1.0
88	1951	4,566	4,309	4,566		257			-			1.0

Missouri Gas Energy
Hinge-Fit Analysis - Homogenized HDDs
Kansas City Int'l AP Weather Station

Schedule LWL 2
Sheet 4C

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
			Predicted by Hinge			Actual less Predicted - Complete Data Set			Actual less Predicted - Data Set to Date			
			Complete Data Set	Data Set to Date								
Line No.	Description/Year	Actual HDD		Predicted	Hinge Slope	No Offset	One Year Offset	Two Year Offset	No Offset	One Year Data Lag	Two Year Data Lag	Hinge Factor
						[B] - [C]	[B (Prior Year)] - [C]	[B (2nd Prior Year)] - [C]	[B] - [D]	[B] - [D (Prior Year)]	[B] - [D (2nd Prior Year)]	
1	Data Set	1949 - 2008	1949 - 2008	1949 - To Date	1949 - To Date	1949 - 2008	1949 - To Date	1949 - To Date	1949 - To Date	1949 - To Date	1949 - To Date	
2	2007-08 Hinge Slope - HDD/yr		(15.21)	75.99								
3	Correlation of Residuals (g)					21.38%						
4	Correlation Coefficient		42.10%	59.48%								
5	OCN (years)		12									
6	Entire Data Set											
7	Years	60	60	60		60	59	58	60	59	58	
8	Mean	5,033.30	5,033.30	5,079.20		(0.00)	(7.02)	(1.54)	(45.90)	(58.67)	(77.23)	
9	Standard Deviation	401.50	169.05	244.49		364.17	347.35	350.09	322.79	414.93	458.61	
10	Actual Exceeds Predicted											
11	Number of Years %					50%	51%	50%	48%	51%	47%	
12	Average					(0.00)	(7.02)	(1.54)	(45.90)	(58.67)	(77.23)	
13	Standard Deviation					364.17	347.35	350.09	322.79	414.93	458.61	
14	Most Recent 10 Years											
15	Actual Exceeds Predicted											
16	Number of Years %					50%	40%	40%	50%	50%	50%	
17	Average	4,681.71	4,741.94	4,703.34		(60.23)	(187.58)	(153.52)	(21.63)	(26.74)	(50.83)	
18	Standard Deviation	413.10	46.07	74.85		432.79	284.80	316.12	417.85	464.86	477.51	
19	Most Recent 25 Years											
20	Actual Exceeds Predicted											
21	Number of Years %					52%	52%	52%	44%	44%	44%	
20	Average	4,827.65	4,856.06	4,909.03		(28.20)	(25.76)	(2.81)	(81.18)	(106.43)	(134.27)	
21	Standard Deviation	429.92	111.98	234.86		421.69	395.93	401.90	404.07	480.83	497.23	
22	50 - Years											
23	Actual Exceeds Predicted											
24	Number of Years %					52%	54%	52%	48%	50%	46%	
25	Average	5,023.40	5,004.85	5,068.72		18.55	14.19	19.43	(45.32)	(59.39)	(75.08)	
26	Standard Deviation	418.26	171.62	263.64		372.86	350.91	350.35	333.31	425.29	467.01	
27	Forecast											
28	2010		4,643	4,643								36.0
29	2009		4,658	4,658								35.0
30	Historical											
31	2008	5,590	4,673	4,673	(15.21)	917	177	(609)	917	1,011	1,039	34.0
32	2007	4,851	4,689	4,597	(18.50)	162	(624)	(75)	253	280	220	33.0
33	2006	4,064	4,704	4,590	(19.46)	(640)	(90)	(209)	(526)	(584)	(590)	32.0
34	2005	4,614	4,719	4,665	(17.34)	(106)	(224)	57	(51)	(57)	(81)	31.0
35	2004	4,495	4,734	4,688	(17.12)	(240)	42	53	(193)	(216)	(210)	30.0
36	2003	4,776	4,750	4,727	(16.23)	26	38	(298)	49	55	62	29.0
37	2002	4,788	4,765	4,737	(16.47)	23	(313)	124	50	56	16	28.0
38	2001	4,452	4,780	4,748	(16.73)	(328)	109	(480)	(296)	(335)	(323)	27.0
39	2000	4,889	4,795	4,802	(15.06)	94	(495)	(479)	87	99	24	26.0
40	1999	4,300	4,810	4,805	(15.59)	(510)	(494)	381	(505)	(577)	(666)	25.0
41	1998	4,317	4,826	4,889	(12.26)	(509)	365	646	(573)	(658)	(624)	24.0
42	1997	5,191	4,841	4,982	(8.15)	350	631	205	209	241	329	23.0
43	1996	5,472	4,856	4,960	(9.78)	616	189	(112)	512	595	623	22.0
44	1995	5,046	4,871	4,891	(14.16)	174	(127)	622	155	181	155	21.0
45	1994	4,744	4,886	4,880	(15.62)	(142)	607	(372)	(136)	(160)	(44)	20.0
46	1993	5,493	4,902	4,919	(14.21)	592	(387)	(211)	575	685	617	19.0
47	1992	4,514	4,917	4,830	(20.87)	(403)	(226)	(455)	(315)	(379)	(430)	18.0
48	1991	4,691	4,932	4,910	(16.77)	(241)	(470)	250	(219)	(267)	(393)	17.0
49	1990	4,462	4,947	4,971	(13.56)	(486)	235	90	(510)	(628)	(604)	16.0
50	1989	5,182	4,963	5,095	(5.07)	219	75	(578)	87	109	97	15.0
51	1988	5,038	4,978	5,079	(6.74)	60	(593)	(380)	(42)	(53)	(282)	14.0
52	1987	4,385	4,993	5,097	(5.81)	(608)	(395)	621	(712)	(922)	(1,170)	13.0
53	1986	4,598	5,008	5,294	12.86	(411)	606	125	(696)	(923)	(872)	12.0
54	1985	5,614	5,023	5,486	34.70	591	110	628	128	175	48	11.0
55	1984	5,134	5,039	5,410	29.80	95	612	385	(276)	(389)	(298)	10.0
56	1983	5,651	5,054	5,480	42.99	597	370	(346)	171	252	288	9.0
57	1982	5,424	5,069	5,367	32.47	355	(361)	183	57	89	(381)	8.0
58	1981	4,708	5,084	5,307	27.77	(376)	169	691	(599)	(1,000)	(1,368)	7.0
59	1980	5,252	5,099	5,611	96.88	153	676	780	(359)	(664)	(637)	6.0
60	1979	5,775	5,115	5,757	159.60	660	764	(75)	18	40	767	5.0
61	1978	5,879	5,130	5,581	154.13	749	(90)	25	298	841	667	4.0
62	1977	5,040	5,145	5,068	(29.76)	(106)	10	(98)	(29)	(144)	(87)	3.0
63	1976	5,155	5,160	5,155	28.32	(5)	(113)	(283)	-	28	25	2.0
64	1975	5,047	5,176	5,127		(128)	(298)	(389)	(79)	(82)	(92)	1.0
65	1974	4,878	5,176	5,130		(298)	(389)	164	(252)	(262)	(277)	1.0
66	1973	4,786	5,176	5,140		(389)	164	(122)	(354)	(368)	(360)	1.0
67	1972	5,340	5,176	5,154		164	(122)	152	185	193	189	1.0
68	1971	5,054	5,176	5,146		(122)	152	250	(93)	(97)	(88)	1.0
69	1970	5,328	5,176	5,151		152	250	89	177	186	200	1.0
70	1969	5,426	5,176	5,142		250	89	(284)	284	298	305	1.0
71	1968	5,264	5,176	5,128		89	(284)	(31)	136	144	131	1.0
72	1967	4,892	5,176	5,121		(284)	(31)	(282)	(229)	(242)	(241)	1.0
73	1966	5,144	5,176	5,134		(31)	(282)	(316)	11	12	(3)	1.0
74	1965	4,893	5,176	5,133		(282)	(316)	(68)	(240)	(255)	(274)	1.0
75	1964	4,859	5,176	5,148		(316)	(68)	216	(289)	(308)	(312)	1.0
76	1963	5,108	5,176	5,167		(68)	216	177	(59)	(64)	(47)	1.0
77	1962	5,391	5,176	5,171		216	177	372	220	237	254	1.0
78	1961	5,353	5,176	5,154		177	372	103	198	215	252	1.0
79	1960	5,548	5,176	5,138		372	103	196	410	447	465	1.0
80	1959	5,279	5,176	5,101		103	196	(63)	178	196	228	1.0
81	1958	5,372	5,176	5,083		196	(63)	(353)	289	321	329	1.0
82	1957	5,113	5,176	5,051		(63)	(353)	18	62	70	38	1.0
83	1956	4,823	5,176	5,043		(353)	18	(555)	(220)	(251)	(231)	1.0
84	1955	5,194	5,176	5,074		18	(555)	(566)	119	139	53	1.0
85	1954	4,620	5,176	5,054		(555)	(566)	(47)	(434)	(521)	(654)	1.0
86	1953	4,609	5,176	5,141		(566)	(47)	421	(532)	(665)	(713)	1.0
87	1952	5,129	5,176	5,274		(47)	421	109	(145)	(194)	(57)	1.0
88	1951	5,597	5,176	5,323		421	109	(89)	274	411	510	1.0
89	1950	5,284	5,176	5,186		109	(89)		99	197		1.0
90	1949	5,087	5,176	5,087		(89)			-			1.0

Missouri Gas Energy
Hinge-Fit Analysis - Homogenized HDDs
Joplin AP Weather Station

Schedule LWL 2
Sheet 4D

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
			Predicted by Hinge			Actual less Predicted - Complete Data Set			Actual less Predicted - Data Set to Date			
			Complete Data Set	Data Set to Date								
Line No.	Desription/Year	Actual HDD		Predicted	Hinge Slope	No Offset	One Year Offset	Two Year Offset	No Offset	One Year Data Lag	Two Year Data Lag	Hinge Factor
						[B] - [C]	[B (Prior Year)] - [C]	[B (2nd Prior Year)] - [C]	[B] - [D]	[B] - [D (Prior Year)]	[B] - [D (2nd Prior Year)]	
1	Data Set	1949 - 2008	1949 - 2008	1949 - To Date	1949 - To Date	1949 - 2008	1949 - To Date	1949 - To Date	1949 - To Date	1949 - To Date	1949 - To Date	
2	2007-08 Hinge Slope - HDD/yr		(11.75)	41.39								
3	Correlation of Residuals (g)					9.70%						
4	Correlation Coefficient		39.89%	60.25%								
5	OCN (years)		11									
6	Entire Data Set											
7	Years (Observations)	60	60	60		60	59	58	60	59	58	
8	Mean	3,980.86	3,980.86	4,051.02		(0.00)	(2.48)	3.48	(70.16)	(88.77)	(109.29)	
9	Standard Deviation	327.29	130.54	193.80		300.13	295.01	298.16	261.24	335.35	351.40	
10	Actual Exceeds Predicted											
11	Number of Years %					48%	53%	52%	40%	42%	38%	
12	Average					(0.00)	(2.48)	3.48	(70.16)	(88.77)	(109.29)	
13	Standard Deviation					300.13	295.01	298.16	261.24	335.35	351.40	
14	Most Recent 10 Years											
15	Actual Exceeds Predicted											
16	Number of Years %					50%	50%	50%	50%	50%	50%	
17	Average	3,704.97	3,755.87	3,748.98		(50.90)	(116.46)	(81.15)	(44.01)	(50.66)	(68.06)	
18	Standard Deviation	327.14	35.57	55.48		336.19	268.90	293.28	323.58	362.10	363.17	
19	Most Recent 25 Years											
20	Actual Exceeds Predicted											
21	Number of Years %					44%	52%	52%	44%	44%	40%	
20	Average	3,829.78	3,843.99	3,905.55		(14.20)	(4.71)	5.84	(75.77)	(95.96)	(116.81)	
21	Standard Deviation	329.55	86.47	166.50		317.55	313.66	313.54	300.54	357.66	355.22	
22	50 - Years											
23	Actual Exceeds Predicted											
24	Number of Years %					46%	52%	52%	40%	42%	38%	
25	Average	3,954.72	3,958.89	4,033.70		(4.17)	2.97	10.09	(78.98)	(98.11)	(117.54)	
26	Standard Deviation	329.46	132.53	204.98		303.48	303.05	303.57	261.43	336.26	347.35	
27	Forecast											
28	2010		3,680	3,680								36.0
29	2009		3,691	3,691								35.0
30	Historical											
31	2008	4,237	3,703	3,703	(11.75)	534	39	(558)	534	589	598	34.0
32	2007	3,742	3,715	3,662	(13.66)	28	(570)	12	81	89	30	33.0
33	2006	3,145	3,726	3,667	(13.97)	(582)	1	(161)	(522)	(579)	(580)	32.0
34	2005	3,727	3,738	3,736	(11.86)	(11)	(172)	62	(9)	(10)	(32)	31.0
35	2004	3,566	3,750	3,749	(11.82)	(184)	50	156	(183)	(205)	(202)	30.0
36	2003	3,800	3,762	3,781	(10.98)	38	144	(93)	19	21	36	29.0
37	2002	3,906	3,773	3,790	(11.07)	132	(105)	232	116	130	114	28.0
38	2001	3,668	3,785	3,787	(11.68)	(117)	220	(532)	(119)	(135)	(107)	27.0
39	2000	4,005	3,797	3,814	(11.01)	208	(544)	(216)	191	217	136	26.0
40	1999	3,253	3,809	3,800	(12.18)	(556)	(227)	287	(547)	(625)	(672)	25.0
41	1998	3,581	3,820	3,886	(8.57)	(239)	275	331	(305)	(350)	(324)	24.0
42	1997	4,095	3,832	3,938	(6.38)	263	319	18	158	182	221	23.0
43	1996	4,152	3,844	3,921	(7.61)	308	6	(110)	231	268	260	22.0
44	1995	3,850	3,856	3,893	(9.58)	(5)	(122)	621	(43)	(50)	(84)	21.0
45	1994	3,734	3,867	3,910	(9.18)	(133)	609	(274)	(175)	(207)	(100)	20.0
46	1993	4,476	3,879	3,949	(7.36)	597	(286)	(233)	528	629	571	19.0
47	1992	3,593	3,891	3,881	(13.47)	(298)	(245)	(430)	(268)	(322)	(387)	18.0
48	1991	3,646	3,903	3,926	(9.99)	(257)	(441)	295	(279)	(340)	(472)	17.0
49	1990	3,461	3,914	3,992	(5.90)	(453)	283	301	(531)	(654)	(631)	16.0
50	1989	4,197	3,926	4,112	2.95	271	290	(121)	85	107	144	15.0
51	1988	4,216	3,938	4,089	1.31	278	(133)	(311)	126	161	80	14.0
52	1987	3,805	3,950	4,057	(1.50)	(145)	(323)	395	(252)	(326)	(504)	13.0
53	1986	3,627	3,961	4,126	5.09	(334)	384	(47)	(499)	(661)	(630)	12.0
54	1985	4,345	3,973	4,268	20.75	372	(59)	501	77	105	(35)	11.0
55	1984	3,914	3,985	4,222	17.79	(71)	489	21	(308)	(433)	(349)	10.0
56	1983	4,474	3,997	4,315	32.47	477	9	(102)	159	234	100	9.0
57	1982	4,006	4,008	4,218	22.71	(2)	(113)	139	(212)	(328)	(642)	8.0
58	1981	3,895	4,020	4,294	40.05	(125)	127	620	(399)	(667)	(1,003)	7.0
59	1980	4,147	4,032	4,476	86.11	115	609	617	(328)	(607)	(564)	6.0
60	1979	4,641	4,044	4,611	143.48	597	605	(91)	30	64	569	5.0
61	1978	4,649	4,055	4,442	134.67	593	(103)	206	207	584	(56)	4.0
62	1977	3,953	4,067	4,058	6.93	(115)	194	(201)	(105)	(530)	(88)	3.0
63	1976	4,262	4,079	4,262	221.46	183	(213)	(229)	-	221	215	2.0
64	1975	3,866	4,091	4,040		(225)	(241)	(188)	(174)	(181)	(189)	1.0
65	1974	3,850	4,091	4,047		(241)	(188)	(72)	(197)	(205)	(211)	1.0
66	1973	3,903	4,091	4,055		(188)	(72)	(403)	(152)	(158)	(160)	1.0
67	1972	4,019	4,091	4,061		(72)	(403)	249	(42)	(44)	(61)	1.0
68	1971	3,688	4,091	4,063		(403)	249	156	(375)	(392)	(380)	1.0
69	1970	4,340	4,091	4,080		249	156	200	260	272	281	1.0
70	1969	4,247	4,091	4,067		156	200	(456)	179	188	201	1.0
71	1968	4,291	4,091	4,058		200	(456)	34	233	245	222	1.0
72	1967	3,635	4,091	4,046		(456)	34	(470)	(411)	(434)	(431)	1.0
73	1966	4,125	4,091	4,069		34	(470)	(329)	56	59	31	1.0
74	1965	3,621	4,091	4,066		(470)	(329)	13	(445)	(473)	(495)	1.0
75	1964	3,762	4,091	4,094		(329)	13	(148)	(331)	(354)	(354)	1.0
76	1963	4,104	4,091	4,116		13	(148)	(77)	(12)	(12)	(26)	1.0
77	1962	3,942	4,091	4,117		(148)	(77)	222	(174)	(188)	(197)	1.0
78	1961	4,014	4,091	4,130		(77)	222	155	(116)	(125)	(110)	1.0
79	1960	4,313	4,091	4,140		222	155	503	174	189	202	1.0
80	1959	4,246	4,091	4,124		155	503	8	122	135	188	1.0
81	1958	4,594	4,091	4,112		503	8	(46)	482	536	541	1.0
82	1957	4,098	4,091	4,058		8	(46)	(46)	40	45	44	1.0
83	1956	4,045	4,091	4,053		(46)	(46)	(447)	(8)	(10)	(11)	1.0
84	1955	4,045	4,091	4,054		(46)	(447)	(405)	(9)	(11)	(93)	1.0
85	1954	3,643	4,091	4,056		(447)	(405)	54	(412)	(495)	(608)	1.0
86	1953	3,686	4,091	4,138		(405)	54	398	(452)	(565)	(600)	1.0
87	1952	4,145	4,091	4,251		54	398	97	(106)	(142)	(40)	1.0
88	1951	4,489	4,091	4,287		398	97	92	203	304	306	1.0
89	1950	4,188	4,091	4,185		97	92		2	5		1.0
90	1949	4,183	4,091	4,183		92			-			1.0

Missouri Gas Energy
Hinge-Fit Analysis - Homogenized HDDs
Combined Missouri Weather Stations

Schedule LWL 2
Sheet 4E

	[A]	[B]	[C]	[D]	[E]	[F]	[G]
			Predicted by Hinge			Actual less Predicted - Complete Data Set	
			Complete Data Set	Data Set to Date			
Line No.	Desription/Year	Actual HDD		Predicted	Hinge Slope	No Offset	One Year Offset
						[B] - [C]	[B (Prior Year)] - [C]
1	Data Set	1949 - 2008	1949 - 2008	1949 - To Date	1949 - To Date	1949 - 2008	1949 - To Date
2	2007-08 Hinge Slope - HDD/yr		(10.93)	62.07			
3	Correlation of Residuals (g)					21.02%	
4	Correlation Coefficient		33.69%	55.69%			
5	OCN (years)		14				
6	Entire Data Set						
7	Years (Observations)	60	60	60		60	59
8	Mean	4,896.47	4,896.47	4,945.04		(0.00)	(6.32)
9	Standard Deviation	360.35	121.40	210.65		339.28	328.69
10	Actual Exceeds Predicted						
11	Number of Years %					48%	47%
12	Average					(0.00)	(6.32)
13	Standard Deviation					339.28	328.69
14	Most Recent 10 Years						
15	Actual Exceeds Predicted						
16	Number of Years %					50%	40%
17	Average	4,628.18	4,687.22	4,663.46		(59.04)	(166.72)
18	Standard Deviation	368.88	33.08	55.86		381.67	278.28
19	Most Recent 25 Years						
20	Actual Exceeds Predicted						
21	Number of Years %					48%	48%
20	Average	4,746.27	4,769.17	4,821.46		(22.91)	(23.94)
21	Standard Deviation	386.21	80.42	179.32		381.24	360.66
22	50 - Years						
23	Actual Exceeds Predicted						
24	Number of Years %					52%	52%
25	Average	4,893.58	4,876.03	4,945.38		17.55	15.38
26	Standard Deviation	373.69	123.25	227.88		346.50	333.01
27	Forecast						
28	2010		4,616	4,616			
29	2009		4,627	4,627			
30	Historical						
31	2008	5,372	4,638	4,638	(10.93)	734	66
32	2007	4,704	4,649	4,576	(13.55)	55	(579)
33	2006	4,070	4,660	4,576	(14.04)	(589)	(65)
34	2005	4,595	4,671	4,644	(12.00)	(76)	(177)
35	2004	4,494	4,682	4,661	(11.78)	(188)	104
36	2003	4,786	4,693	4,692	(11.02)	93	111
37	2002	4,803	4,704	4,692	(11.48)	100	(266)
38	2001	4,437	4,715	4,690	(12.06)	(277)	125
39	2000	4,840	4,725	4,734	(10.63)	114	(544)
40	1999	4,182	4,736	4,731	(11.28)	(555)	(442)
41	1998	4,295	4,747	4,816	(7.65)	(452)	326
42	1997	5,073	4,758	4,898	(3.92)	315	538
43	1996	5,297	4,769	4,876	(5.29)	527	198
44	1995	4,967	4,780	4,816	(8.89)	187	(90)
45	1994	4,690	4,791	4,800	(10.32)	(101)	645
46	1993	5,436	4,802	4,829	(9.17)	634	(356)
47	1992	4,446	4,813	4,730	(16.20)	(367)	(294)
48	1991	4,519	4,824	4,800	(12.52)	(305)	(512)
49	1990	4,312	4,835	4,869	(8.41)	(523)	287
50	1989	5,122	4,846	4,997	0.88	276	171
51	1988	5,017	4,857	4,968	(1.51)	161	(410)
52	1987	4,447	4,868	4,957	(2.61)	(421)	(347)
53	1986	4,521	4,878	5,097	10.77	(358)	477
54	1985	5,356	4,889	5,255	28.85	466	(11)
55	1984	4,878	4,900	5,194	25.02	(22)	446
56	1983	5,346	4,911	5,283	40.11	435	217
57	1982	5,128	4,922	5,218	36.28	206	(290)
58	1981	4,632	4,933	5,224	43.61	(301)	188
59	1980	5,121	4,944	5,507	111.81	177	713
60	1979	5,657	4,955	5,656	179.35	702	793
61	1978	5,748	4,966	5,477	179.18	782	(37)
62	1977	4,929	4,977	4,970	11.53	(48)	64
63	1976	5,041	4,988	5,041	95.50	53	(169)
64	1975	4,819	4,999	4,946		(180)	(260)
65	1974	4,738	4,999	4,950		(260)	(335)
66	1973	4,664	4,999	4,959		(335)	139
67	1972	5,138	4,999	4,971		139	(237)
68	1971	4,762	4,999	4,964		(237)	147
69	1970	5,146	4,999	4,973		147	226
70	1969	5,225	4,999	4,965		226	172
71	1968	5,171	4,999	4,952		172	(277)
72	1967	4,722	4,999	4,940		(277)	(3)
73	1966	4,995	4,999	4,953		(3)	(376)
74	1965	4,622	4,999	4,950		(376)	(327)
75	1964	4,672	4,999	4,971		(327)	(64)
76	1963	4,934	4,999	4,990		(64)	164
77	1962	5,163	4,999	4,994		164	152
78	1961	5,151	4,999	4,982		152	390
79	1960	5,388	4,999	4,967		390	113
80	1959	5,111	4,999	4,929		113	264
81	1958	5,263	4,999	4,911		264	(46)
82	1957	4,953	4,999	4,872		(46)	(279)
83	1956	4,719	4,999	4,862		(279)	(65)
84	1955	4,933	4,999	4,882		(65)	(534)
85	1954	4,465	4,999	4,873		(534)	(522)
86	1953	4,477	4,999	4,955		(522)	(62)
87	1952	4,936	4,999	5,075		(62)	406
88	1951	5,405	4,999	5,121		406	55
89	1950	5,054	4,999	4,979		55	(95)
90	1949	4,904	4,999	4,904		(95)	

Line No.	[H]	[I]	[J]	[K]	[L]
	Actual less Predicted - Complete Data Set	Actual less Predicted - Data Set to Date			
	Two Year Offset	No Offset	One Year Offset	Two Year Offset	Hinge Factor
	[B (2nd Prior Year)] - [C]	[B] - [D]	[B] - [D (Prior Year)]	[B] - [D (2nd Prior Year)]	
1	1949 - To Date	1949 - To Date	1949 - To Date	1949 - To Date	
7	58	60	59	58	
8	(1.34)	(48.58)	(53.91)	(63.08)	
9	331.94	299.45	376.30	401.79	
11	47%	48%	51%	47%	
12	(1.34)	(48.58)	(53.91)	(63.08)	
13	331.94	299.45	376.30	401.79	
16	40%	50%	50%	50%	
17	(129.77)	(35.28)	(53.11)	(85.27)	
18	312.48	369.12	410.67	418.22	
21	48%	48%	48%	44%	
20	(6.95)	(75.19)	(101.00)	(126.68)	
21	363.49	363.46	426.63	429.17	
24	50%	48%	50%	48%	
25	20.37	(51.80)	(57.26)	(63.17)	
26	333.16	307.82	383.12	404.12	
28					36.0
29					35.0
31	(568)	734	796	795	34.0
32	(54)	128	127	60	33.0
33	(166)	(506)	(574)	(591)	32.0
34	115	(49)	(67)	(98)	31.0
35	122	(167)	(198)	(198)	30.0
36	(256)	94	94	96	29.0
37	136	111	113	69	28.0
38	(533)	(253)	(297)	(294)	27.0
39	(431)	106	109	23	26.0
40	337	(549)	(635)	(716)	25.0
41	549	(521)	(503)	(581)	24.0
42	209	176	198	257	23.0
43	(79)	421	481	496	22.0
44	656	152	167	138	21.0
45	(345)	(111)	(140)	(40)	20.0
46	(283)	607	706	636	19.0
47	(501)	(284)	(354)	(423)	18.0
48	298	(281)	(350)	(478)	17.0
49	182	(557)	(685)	(656)	16.0
50	(399)	125	154	165	15.0
51	(336)	50	60	(80)	14.0
52	488	(510)	(650)	(809)	13.0
53	(0)	(576)	(735)	(673)	12.0
54	457	100	161	72	11.0
55	228	(316)	(405)	(340)	10.0
56	(279)	62	128	122	9.0
57	199	(89)	(95)	(379)	8.0
58	724	(591)	(875)	(1,024)	7.0
59	804	(387)	(536)	(356)	6.0
60	(26)	1	180	687	5.0
61	75	271	778	707	4.0
62	(158)	(41)	(112)	(17)	3.0
63	(249)	-	95	91	2.0
64	(335)	(127)	(132)	(140)	1.0
65	139	(212)	(221)	(233)	1.0
66	(237)	(295)	(307)	(300)	1.0
67	147	167	174	165	1.0
68	226	(202)	(211)	(203)	1.0
69	172	173	181	194	1.0
70	(277)	260	273	284	1.0
71	(3)	219	230	218	1.0
72	(376)	(219)	(231)	(228)	1.0
73	(327)	43	45	25	1.0
74	(64)	(328)	(348)	(368)	1.0
75	164	(299)	(319)	(323)	1.0
76	152	(56)	(60)	(47)	1.0
77	390	168	181	195	1.0
78	113	170	184	222	1.0
79	264	421	459	477	1.0
80	(46)	182	200	239	1.0
81	(279)	352	391	401	1.0
82	(65)	81	92	71	1.0
83	(534)	(142)	(163)	(154)	1.0
84	(522)	51	60	(22)	1.0
85	(62)	(409)	(490)	(610)	1.0
86	406	(479)	(598)	(644)	1.0
87	55	(139)	(185)	(43)	1.0
88	(95)	284	426	501	1.0
89		75	150		1.0
90		-			1.0

Explanation of Hinge-Fit Analysis

Sheets 4A through 4E of this Schedule LWL 2 show the derivation of the hinge-fit for each weather station and of the combined weather stations. The following is an explanation of the calculations included in this exhibit.

On Lines 1 thorough 26, various statistics regarding the raw data and hinge-fit are shown. On Lines 31 through 90, the raw data is shown along with the amounts predicted by the hinge-fit for the historical period 1951 through 2008. On Lines 27 through 29, normal HDDs are presented based on the hinge-fit for the 2009 and 2010 calendar years.

In Column B (Lines 31 through 90), actual HDDs are shown for each year; these actual HDDs represent the "Y" variable in the regression analysis. In Column L, the "Hinge Factor" (the "X" variable) is shown. As can be seen, for the period 1951 through 1975, the hinge factor is equal to one. Beginning in 1976, the hinge factor is increased by one each year.

By use of a least-squares linear regression analysis, HDDs are predicted by an equation in the form of $Y = A + B * X$, where X and Y are the independent and dependent variables respectively. A is equal to a constant and B is equal to the "slope" (the change in HDD each year subsequent to 1975.)

Using the Microsoft Excel "Trend Function," HDDs are predicted for each year shown in Column A. The Excel "Trend Function" returns the predicted value for a specified "X" value (Column L), and a set of independent (Column L) and dependent

Explanation of Hinge-Fit Analysis

(Column B) variables using a least squares linear regression. These predicted values are shown in Column C and Column D. The values in Column C are based on a linear regression of the entire data set (1951 through 2008). The values in Column C (Lines 27 through 90) are plotted on Schedule LWL 2, Sheets 1A, 1B, 3A, 3B, and 3C.

The values in Column D are based on a linear regression of the data set to date (1951 through the year shown in Column A). In Column E, the slope of the hinge line is shown. The slope varies each year because an additional "X" – "Y" set is added each year.

The values shown in Columns F through K represent differences between the predicted values shown in Columns C and D and the actual HDDs shown in Column B.

Missouri Gas Energy
Summary of Hinge Results

Line No.	[A] Weather Station	[B] Hinge-Fit Residuals Correlation	[C] Hinge-Fit Standard Error	[D] Hinge-Fit Predicted 1951 - 1975 HDD	[E] Hinge-Fit Predicted Slope HDD/yr.	[F] Hinge-Fit Predicted 2010 HDD	[G] OCN Years Years	[H] OCN HDDs HDD
1	Reported HDDs							
2	MCI	29.6%	405.71	5,234	(8.78)	4,927	20	5,013
3	Joplin	9.8%	288.35	4,309	(12.91)	3,857	10	3,894
4	Carrollton	26.1%	351.81	5,233	(5.92)	5,025	23	5,033
5	Lee's Summit	31.4%	480.65	4,933	5.67	5,131	30	5,078
6	Sedalia	56.3%	495.33	4,977	12.20	5,404	21	5,261
7	Springfield Airport	12.3%	330.16	4,651	(10.18)	4,294	14	4,409
8	St. Joseph	28.6%	432.87	5,440	(4.14)	5,296	33	5,436
9	Warrensburg	58.8%	507.02	4,841	9.84	5,185	24	5,023
10	8-Station Average	27.9%	367.98	4,952	(1.78)	4,890	47	4,956
11	KC - Downtown Airport	17.1%	341.65	4,790	(8.24)	4,502	17	4,616
12	9-Station Average	26.0%	361.80	4,934	(2.50)	4,847	40	4,955
13	Homogenized HDDs							
14	MCI	21.4%	364.17	5,176	(15.21)	4,643	12	4,694
15	Joplin	9.7%	300.13	4,091	(11.75)	3,680	11	3,694
16	Carrollton	26.4%	359.56	5,265	(14.35)	4,763	13	4,853
17	Lee's Summit	21.4%	348.68	5,388	(6.37)	5,165	21	5,228
18	Sedalia	26.5%	371.69	5,143	(9.97)	4,794	17	4,912
19	Springfield Airport	19.5%	336.51	4,450	(9.01)	4,135	16	4,225
20	St. Joseph	17.8%	390.60	5,379	(10.48)	5,012	16	5,169
21	Warrensburg	21.2%	342.84	5,098	(10.27)	4,738	15	4,838
22	8-Station Average	21.0%	339.28	4,999	(10.93)	4,616	14	4,708

Missouri Gas Energy
Average Difference Between Actual and "Normal" HDDs
Period Ended December 2008

Schedule LWL 2
Sheet 6

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
Line No.	Weather Station	Average HDD	NOAA	Number of Years Included in Average						Hinge-Fit
				30	25	20	15	10	5	
1	MCI									
2	25-Year Period Ended December 2008									
3	Average	5,046	5,319	5,249	5,260	5,253	5,246	5,222	5,160	5,260
4	Actual Exceeds "Normal"		(273)	(204)	(214)	(207)	(200)	(177)	(114)	(214)
5	Percent		-5%	-4%	-4%	-4%	-4%	-4%	-2%	-4%
6	Number of Years		6	8	7	7	8	8	9	9
7	Percent		24%	32%	28%	28%	32%	32%	36%	36%
8	10-Year Period Ended December 2008									
9	Average	4,856	5,307	5,238	5,222	5,150	5,085	5,060	4,983	5,013
10	Actual Exceeds "Normal"		(451)	(382)	(367)	(295)	(229)	(204)	(127)	(158)
11	Percent		-9%	-8%	-8%	-6%	-5%	-4%	-3%	-3%
12	Number of Years		1	1	1	1	2	1	3	4
13	Percent		10%	10%	10%	10%	20%	10%	30%	40%
14	Joplin									
15	25-Year Period Ended December 2008									
16	Average	4,029	4,297	4,267	4,258	4,236	4,209	4,173	4,113	4,102
17	Actual Exceeds "Normal"		(269)	(238)	(229)	(208)	(180)	(144)	(84)	(74)
18	Percent		-7%	-6%	-6%	-5%	-4%	-4%	-2%	-2%
19	Number of Years		4	6	7	6	8	8	11	12
20	Percent		16%	24%	28%	24%	32%	32%	44%	48%
21	10-Year Period Ended December 2008									
22	Average	3,894	4,273	4,209	4,173	4,108	4,056	4,017	3,971	3,924
23	Actual Exceeds "Normal"		(379)	(315)	(279)	(214)	(162)	(123)	(77)	(30)
24	Percent		-10%	-8%	-7%	-6%	-4%	-3%	-2%	-1%
25	Number of Years		-	2	2	2	2	3	5	6
26	Percent		0%	20%	20%	20%	20%	30%	50%	60%

Missouri Gas Energy
Monthly Normal Degree Days
Hinge-Fit for CY 2010

Schedule LWL 2
Sheet 7

	[A]	[B]	[C]
Line No.	Month	MCI	Joplin
1	January	1,048	861
2	February	863	686
3	March	605	469
4	April	335	236
5	May	100	59
6	June	7	3
7	July	0	0
8	August	1	1
9	September	56	35
10	October	284	204
11	November	626	475
12	December	1,003	828
13	Total	4,927	3,857

Missouri Gas Energy
Summary of Statistical Results from
Heating Degree Day Regression Analysis

Schedule LWL 3
Sheet 1

Line No.	[A] Description	[B] Normal	[C] 2005-2008	[D] 2006-2008	[E] 2007-2008	[F] 2008
1	**Residential Class**					
2	Sales District - **Kansas City**					
3	Weather Station - **MCI**					
4	Constant		9.026	9.019	7.750	7.172
5	Current Month's HDD		0.064	0.059	0.058	0.063
6	Previous Month's HDD		0.081	0.084	0.086	0.083
7	Trend		-	-	-	-
8	Adjusted R Squared		0.977	0.980	0.976	0.978
9	Standard Error of Estimate		8.503	8.002	9.325	9.560
10	F		996.903	839.850	476.532	249.645
11	Predicted Normal Use/Customer		821.69	813.50	805.99	805.60
12	Average HDD	4,927	4,837	4,856	5,258	5,590
13	Time Period Used			XXXXX		
14	Sales District - **Joplin**					
15	Weather Station - **Joplin**					
16	Constant		8.726	8.896	8.459	7.668
17	Current Month's HDD		0.071	0.069	0.065	0.072
18	Previous Month's HDD		0.080	0.081	0.089	0.089
19	Trend		-	-	-	-
20	Adjusted R Squared		0.981	0.981	0.983	0.987
21	Standard Error of Estimate		6.486	6.529	6.788	6.237
22	F		1,226.832	916.858	656.043	430.980
23	Predicted Normal Use/Customer		686.62	685.24	693.87	712.73
24	Average HDD	3,857	3,873	3,858	4,078	4,237
25	Time Period Used		XXXXX			
26	Sales District - **St Joseph**					
27	Weather Station - **MCI**					
28	Constant		9.515	9.428	7.613	6.757
29	Current Month's HDD		0.062	0.055	0.055	0.064
30	Previous Month's HDD		0.090	0.095	0.098	0.091
31	Trend		-	-	-	-
32	Adjusted R Squared		0.977	0.981	0.978	0.979
33	Standard Error of Estimate		8.880	8.166	9.495	9.986
34	F		1,006.336	892.656	511.732	259.019
35	Predicted Normal Use/Customer		862.31	853.82	843.28	846.38
36	Average HDD	4,927	4,837	4,856	5,258	5,590
37	Time Period Used			XXXXX		
38	**Small General Service Class**					
39	Sales District - **Kansas City**					
40	Weather Station - **MCI**					
41	Constant		40.441	40.989	39.517	39.947
42	Current Month's HDD		0.152	0.141	0.139	0.162
43	Previous Month's HDD		0.220	0.228	0.234	0.214
44	Trend		-	-	-	-
45	Adjusted R Squared		0.976	0.978	0.974	0.976
46	Standard Error of Estimate		22.421	21.643	25.313	26.213
47	F		947.180	762.568	428.078	221.005
48	Predicted Normal Use/Customer		2,317.80	2,307.29	2,308.13	2,335.50
49	Average HDD	4,927	4,837	4,856	5,258	5,590
50	Time Period Used			XXXXX		
51	Sales District - **Joplin**					
52	Weather Station - **Joplin**					
53	Constant		45.014	45.851	44.554	42.580
54	Current Month's HDD		0.166	0.156	0.149	0.166
55	Previous Month's HDD		0.216	0.225	0.244	0.248
56	Trend		-	-	-	-
57	Adjusted R Squared		0.970	0.970	0.970	0.975
58	Standard Error of Estimate		20.978	21.023	22.958	22.819
59	F		753.153	574.146	376.148	213.487
60	Predicted Normal Use/Customer		2,014.79	2,021.60	2,050.29	2,107.63
61	Average HDD	3,857	3,873	3,858	4,078	4,237
62	Time Period Used		XXXXX			
63	Sales District - **St Joseph**					
64	Weather Station - **MCI**					
65	Constant		36.406	36.879	33.603	29.535
66	Current Month's HDD		0.212	0.196	0.193	0.233
67	Previous Month's HDD		0.238	0.257	0.271	0.247
68	Trend		-	-	-	-
69	Adjusted R Squared		0.968	0.970	0.966	0.969
70	Standard Error of Estimate		31.309	31.027	36.072	37.812
71	F		711.355	559.051	326.851	172.701
72	Predicted Normal Use/Customer		2,656.06	2,675.15	2,687.56	2,721.70
73	Average HDD	4,927	4,837	4,856	5,258	5,590
74	Time Period Used			XXXXX		

Line No.	[A] Description	[B] Normal	[C] 2005-2008	[D] 2006-2008	[E] 2007-2008	[F] 2008
75	**Large General Service Class**					
76	Sales District - **Kansas City**					
77	Weather Station - **MCI**					
78	Constant		994.268	1,521.996	919.984	896.410
79	Current Month's HDD		3.192	3.111	3.291	3.360
80	Previous Month's HDD		3.542	3.674	3.238	3.153
81	Trend		-	(27.312)	-	-
82	Adjusted R Squared		0.945	0.950	0.987	0.989
83	Standard Error of Estimate		621.175	605.721	306.106	307.098
84	F		403.930	223.362	903.682	481.347
85	Predicted Normal Use/Customer		45,109.10	41,701.64	43,208.07	42,843.85
86	Average HDD	4,927	4,837	4,856	5,258	5,590
87	Time Period Used				XXXXX	
88	Sales District - **Joplin**					
89	Weather Station - **Joplin**					
90	Constant		5,065.857	5,542.841	6,123.923	2,322.305
91	Current Month's HDD		4.700	4.784	5.236	-
92	Previous Month's HDD		5.639	5.033	4.486	11.709
93	Trend		(36.715)	(69.777)	(164.891)	-
94	Adjusted R Squared		0.880	0.875	0.895	0.861
95	Standard Error of Estimate		1,206.861	1,214.884	1,239.189	1,664.446
96	F		116.361	82.535	66.363	69.420
97	Predicted Normal Use/Customer		81,945.79	78,837.87	74,379.68	73,029.30
98	Average HDD	3,857	3,873	3,858	4,078	4,237
99	Time Period Used		XXXXX			
100	Sales District - **St Joseph**					
101	Weather Station - **MCI**					
102	Constant		1,065.103	1,023.365	925.861	832.451
103	Current Month's HDD		1.799	1.543	1.326	1.947
104	Previous Month's HDD		5.313	5.629	6.030	5.501
105	Trend		-	-	-	-
106	Adjusted R Squared		0.973	0.971	0.969	0.966
107	Standard Error of Estimate		454.763	484.017	548.432	622.321
108	F		858.502	594.508	364.465	155.429
109	Predicted Normal Use/Customer		47,825.29	47,619.74	47,356.05	46,684.59
110	Average HDD	4,927	4,837	4,856	5,258	5,590
111	Time Period Used		XXXXX			
112	**Large Volume Class**					
113	Sales District - **Kansas City**					
114	Weather Station - **MCI**					
115	Constant		58,676.218	58,867.725	59,216.255	58,427.656
116	Current Month's HDD		12.541	10.390	10.227	17.852
117	Previous Month's HDD		4.971	6.440	6.224	-
118	Trend		-	-	-	-
119	Adjusted R Squared		0.830	0.829	0.819	0.842
120	Standard Error of Estimate		2,485.713	2,400.093	2,573.478	2,737.611
121	F		115.659	85.867	53.188	59.650
122	Predicted Normal Use/Customer		790,398.10	789,334.35	791,648.59	789,088.50
123	Average HDD	4,927	4,837	4,856	5,258	5,590
124	Time Period Used			XXXXX		
125	Sales District - **Joplin**					
126	Weather Station - **Joplin**					
127	Constant		27,813.416	24,517.029	23,546.256	23,657.084
128	Current Month's HDD		27.068	27.867	29.121	26.370
129	Previous Month's HDD		-	-	-	-
130	Trend		(101.423)	-	-	-
131	Adjusted R Squared		0.871	0.843	0.834	0.998
132	Standard Error of Estimate		4,247.616	4,910.187	5,780.664	606.973
133	F		160.026	189.101	116.185	4,434.430
134	Predicted Normal Use/Customer		386,436.90	401,689.06	394,873.29	385,595.19
135	Average HDD	3,857	3,873	3,858	4,078	4,237
136	Time Period Used					XXXXX
137	Sales District - **St Joseph**					
138	Weather Station - **MCI**					
139	Constant		31,179.429	40,536.335	51,459.116	48,000.483
140	Current Month's HDD		31.684	35.360	38.806	45.848
141	Previous Month's HDD		-	-	-	-
142	Trend		605.497	450.974	-	-
143	Adjusted R Squared		0.622	0.576	0.625	0.838
144	Standard Error of Estimate		12,008.863	13,024.955	13,246.985	9,145.006
145	F		39.734	24.772	39.288	57.833
146	Predicted Normal Use/Customer		839,061.05	825,713.04	808,704.14	801,897.82
147	Average HDD	4,927	4,837	4,856	5,258	5,590
148	Time Period Used					XXXXX

Missouri Gas Energy
Calculation of Weather Normalization Adjustment

Schedule LWL 4
Sheet 1

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
				HDD Current Month		HDD Previous Month				
Line No.	Rate Class	Sales District - Weather Station	2008 Month	Actual	Normal	Actual	Normal	Adjustment	2008 # of bills	Throughput Adjustment
				HDD	HDD	HDD	HDD	Ccf/cust.		Ccf [H]x[I]
1	RES	Kansas City -			0.059		0.084			
2		MCI	January	1,155	1,048	1,082	1,003	(12.90)	352,908	(4,554,224)
3			February	1,075	863	1,155	1,048	(21.46)	354,154	(7,598,509)
4			March	719	605	1,075	863	(24.56)	354,687	(8,710,891)
5			April	400	335	719	605	(13.47)	351,715	(4,738,496)
6			May	109	100	400	335	(6.05)	346,989	(2,100,741)
7			June	0	7	109	100	(0.39)	343,184	(134,394)
8			July	0	0	0	7	0.59	340,294	200,506
9			August	0	1	0	0	0.06	338,850	18,928
10			September	55	56	0	1	0.11	339,034	36,028
11			October	306	284	55	56	(1.24)	341,593	(423,241)
12			November	651	626	306	284	(3.36)	346,442	(1,165,419)
13			December	1,120	1,003	651	626	(9.00)	351,094	(3,161,297)
14			Total	5,590	4,927	5,552	4,927		4,160,944	(32,331,750)
15	RES	Joplin -			0.071		0.080			
16		Joplin	January	880	861	866	828	(4.36)	67,377	(293,855)
17			February	814	686	880	861	(10.61)	67,632	(717,751)
18			March	509	469	814	686	(13.05)	67,489	(880,897)
19			April	309	236	509	469	(8.36)	66,677	(557,538)
20			May	68	59	309	236	(6.49)	65,574	(425,564)
21			June	0	3	68	59	(0.52)	64,709	(33,787)
22			July	0	0	0	3	0.25	64,306	16,054
23			August	0	1	0	0	0.06	64,159	3,628
24			September	21	35	0	1	1.08	64,301	69,392
25			October	211	204	21	35	0.63	64,814	40,708
26			November	547	475	211	204	(5.69)	66,195	(376,440)
27			December	878	828	547	475	(9.26)	67,248	(622,948)
28			Total	4,237	3,857	4,225	3,857		790,481	(3,778,998)
29	RES	St Joseph -			0.055		0.095			
30		MCI	January	1,155	1,048	1,082	1,003	(13.37)	25,217	(337,252)
31			February	1,075	863	1,155	1,048	(21.87)	25,303	(553,349)
32			March	719	605	1,075	863	(26.41)	25,240	(666,560)
33			April	400	335	719	605	(14.46)	24,869	(359,601)
34			May	109	100	400	335	(6.71)	24,560	(164,836)
35			June	0	7	109	100	(0.51)	24,246	(12,480)
36			July	0	0	0	7	0.66	24,090	15,932
37			August	0	1	0	0	0.06	23,963	1,321
38			September	55	56	0	1	0.11	24,055	2,676
39			October	306	284	55	56	(1.16)	24,204	(27,980)
40			November	651	626	306	284	(3.51)	24,544	(86,202)
41			December	1,120	1,003	651	626	(8.88)	24,945	(221,492)
42			Total	5,590	4,927	5,552	4,927		295,236	(2,409,821)
43	SGS	Kansas City -			0.141		0.228			
44		MCI	January	1,155	1,048	1,082	1,003	(32.91)	49,628	(1,633,150)
45			February	1,075	863	1,155	1,048	(54.08)	49,643	(2,684,476)
46			March	719	605	1,075	863	(64.29)	49,268	(3,167,373)
47			April	400	335	719	605	(35.22)	48,317	(1,701,695)
48			May	109	100	400	335	(16.20)	47,004	(761,360)
49			June	0	7	109	100	(1.19)	45,994	(54,628)
50			July	0	0	0	7	1.59	45,276	72,017
51			August	0	1	0	0	0.14	44,703	6,152
52			September	55	56	0	1	0.27	44,613	12,177
53			October	306	284	55	56	(2.94)	44,829	(131,672)
54			November	651	626	306	284	(8.62)	45,909	(395,881)
55			December	1,120	1,003	651	626	(22.18)	47,494	(1,053,202)
56			Total	5,590	4,927	5,552	4,927		562,678	(11,493,089)
57	SGS	Joplin -			0.166		0.216			
58		Joplin	January	880	861	866	828	(11.30)	12,660	(143,056)
59			February	814	686	880	861	(25.40)	12,606	(320,204)
60			March	509	469	814	686	(34.27)	12,478	(427,583)
61			April	309	236	509	469	(20.73)	12,165	(252,188)
62			May	68	59	309	236	(17.31)	11,858	(205,247)
63			June	0	3	68	59	(1.49)	11,665	(17,396)
64			July	0	0	0	3	0.67	11,502	7,752
65			August	0	1	0	0	0.13	11,403	1,523
66			September	21	35	0	1	2.55	11,374	28,985
67			October	211	204	21	35	1.89	11,442	21,585
68			November	547	475	211	204	(13.53)	11,827	(159,973)
69			December	878	828	547	475	(23.77)	12,223	(290,550)
70			Total	4,237	3,857	4,225	3,857		143,203	(1,756,351)

[A]	[B]		[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
				HDD Current Month		HDD Previous Month				
Line No.	Rate Class	Sales District - Weather Station	2008 Month	Actual	Normal	Actual	Normal	Adjustment	2008 # of bills	Throughput Adjustment
				HDD	HDD	HDD	HDD	Ccf/cust.		Ccf [H]x[I]
71	SGS	St Joseph -			0.196		0.257			
72		MCI	January	1,155	1,048	1,082	1,003	(41.12)	3,551	(146,004)
73			February	1,075	863	1,155	1,048	(68.90)	3,550	(244,598)
74			March	719	605	1,075	863	(76.83)	3,547	(272,533)
75			April	400	335	719	605	(42.19)	3,454	(145,723)
76			May	109	100	400	335	(18.64)	3,389	(63,181)
77			June	0	7	109	100	(1.09)	3,390	(3,684)
78			July	0	0	0	7	1.80	3,356	6,049
79			August	0	1	0	0	0.18	3,327	606
80			September	55	56	0	1	0.34	3,302	1,112
81			October	306	284	55	56	(4.14)	3,310	(13,693)
82			November	651	626	306	284	(10.68)	3,372	(36,012)
83			December	1,120	1,003	651	626	(29.36)	3,449	(101,251)
84			Total	5,590	4,927	5,552	4,927		40,997	(1,018,914)
85	LGS	Kansas City -			3.291		3.238			
86		MCI	January	1,155	1,048	1,082	1,003	(605.70)	248	(150,213)
87			February	1,075	863	1,155	1,048	(1,042.04)	246	(256,341)
88			March	719	605	1,075	863	(1,061.32)	247	(262,145)
89			April	400	335	719	605	(584.82)	243	(142,111)
90			May	109	100	400	335	(242.38)	242	(58,657)
91			June	0	7	109	100	(7.98)	244	(1,946)
92			July	0	0	0	7	22.81	244	5,565
93			August	0	1	0	0	2.89	245	707
94			September	55	56	0	1	4.88	245	1,195
95			October	306	284	55	56	(70.39)	243	(17,104)
96			November	651	626	306	284	(155.42)	244	(37,922)
97			December	1,120	1,003	651	626	(465.82)	245	(114,127)
98			Total	5,590	4,927	5,552	4,927		2,936	(1,033,099)
99	LGS	Joplin -			4.700		5.639			
100		Joplin	January	880	861	866	828	(301.82)	31	(9,356)
101			February	814	686	880	861	(709.27)	32	(22,697)
102			March	509	469	814	686	(908.65)	30	(27,260)
103			April	309	236	509	469	(567.45)	32	(18,158)
104			May	68	59	309	236	(455.04)	32	(14,561)
105			June	0	3	68	59	(37.80)	32	(1,209)
106			July	0	0	0	3	17.60	31	546
107			August	0	1	0	0	3.76	31	116
108			September	21	35	0	1	71.71	31	2,223
109			October	211	204	21	35	46.58	31	1,444
110			November	547	475	211	204	(379.04)	30	(11,371)
111			December	878	828	547	475	(638.29)	31	(19,787)
112			Total	4,237	3,857	4,225	3,857		374	(120,071)
113	LGS	St Joseph -			1.799		5.313			
114		MCI	January	1,155	1,048	1,082	1,003	(609.43)	27	(16,455)
115			February	1,075	863	1,155	1,048	(948.09)	26	(24,650)
116			March	719	605	1,075	863	(1,329.88)	27	(35,907)
117			April	400	335	719	605	(724.68)	27	(19,566)
118			May	109	100	400	335	(363.64)	27	(9,818)
119			June	0	7	109	100	(37.85)	27	(1,022)
120			July	0	0	0	7	36.85	26	958
121			August	0	1	0	0	2.14	26	56
122			September	55	56	0	1	5.22	26	136
123			October	306	284	55	56	(35.75)	26	(930)
124			November	651	626	306	284	(163.46)	26	(4,250)
125			December	1,120	1,003	651	626	(344.82)	26	(8,965)
126			Total	5,590	4,927	5,552	4,927		317	(120,414)
127	LV	Kansas City -			10.390		6.440			
128		MCI	January	1,155	1,048	1,082	1,003	(605.70)	355	(215,023)
129			February	1,075	863	1,155	1,048	(1,042.04)	354	(368,880)
130			March	719	605	1,075	863	(1,061.32)	354	(375,706)
131			April	400	335	719	605	(584.82)	354	(207,025)
132			May	109	100	400	335	(242.38)	354	(85,804)
133			June	0	7	109	100	(7.98)	355	(2,832)
134			July	0	0	0	7	22.81	352	8,028
135			August	0	1	0	0	2.89	356	1,028
136			September	55	56	0	1	4.88	356	1,737
137			October	306	284	55	56	(70.39)	356	(25,058)
138			November	651	626	306	284	(155.42)	355	(55,174)
139			December	1,120	1,003	651	626	(465.82)	354	(164,901)
140			Total	5,590	4,927	5,552	4,927		4,255	(1,489,611)

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
				HDD Current Month		HDD Previous Month				
Line No.	Rate Class	Sales District - Weather Station	2008 Month	Actual	Normal	Actual	Normal	Adjustment	2008 # of bills	Throughput Adjustment
				HDD	HDD	HDD	HDD	Ccf/cust.		Ccf [H]x[I]
141	LV	Joplin -			26.370		0.000			
142		Joplin	January	880	861	866	828	(301.82)	99	(29,880)
143			February	814	686	880	861	(709.27)	98	(69,509)
144			March	509	469	814	686	(908.65)	99	(89,957)
145			April	309	236	509	469	(567.45)	99	(56,177)
146			May	68	59	309	236	(455.04)	100	(45,504)
147			June	0	3	68	59	(37.80)	100	(3,780)
148			July	0	0	0	3	17.60	100	1,760
149			August	0	1	0	0	3.76	100	376
150			September	21	35	0	1	71.71	101	7,243
151			October	211	204	21	35	46.58	101	4,704
152			November	547	475	211	204	(379.04)	101	(38,284)
153			December	878	828	547	475	(638.29)	101	(64,468)
154			Total	4,237	3,857	4,225	3,857		1,199	(383,475)
155	LV	St Joseph -			45.848		0.000			
156		MCI	January	1,155	1,048	1,082	1,003	(609.43)	40	(24,377)
157			February	1,075	863	1,155	1,048	(948.09)	41	(38,872)
158			March	719	605	1,075	863	(1,329.88)	41	(54,525)
159			April	400	335	719	605	(724.68)	41	(29,712)
160			May	109	100	400	335	(363.64)	41	(14,909)
161			June	0	7	109	100	(37.85)	41	(1,552)
162			July	0	0	0	7	36.85	41	1,511
163			August	0	1	0	0	2.14	41	88
164			September	55	56	0	1	5.22	41	214
165			October	306	284	55	56	(35.75)	41	(1,466)
166			November	651	626	306	284	(163.46)	41	(6,702)
167			December	1,120	1,003	651	626	(344.82)	41	(14,138)
168			Total	5,590	4,927	5,552	4,927		491	(184,440)
169							RES	Summer	432,312	(8,573,484)
170								Winter	444,095	(29,947,084)
171							SGS	Summer	60,810	(3,192,509)
172								Winter	64,241	(11,075,844)
173							LGS	Summer	302	(272,137)
174								Winter	303	(1,001,447)
175							LVS	Summer	496	(447,130)
176								Winter	495	(1,610,395)
177							Total Adjustment			(56,120,031)

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
Line No.	Description	Per Books Deliveries			Adjustment to Deliveries			Margin Existing Rates		Adjustment to Margin Revenues
		Total	First Step	Balance	Total	First Step	Balance	First Step	Balance	
		Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	$/Ccf	$/Ccf	$
1	Residential									
2	Summer	90,531,165	90,531,165		(8,573,484)	(8,573,484)		-		-
3	Winter	300,613,773	300,613,773		(29,947,084)	(29,947,084)		-		-
4	Total Residential	391,144,938	391,144,938	-	(38,520,568)	(38,520,568)	-			-
5	Small General Service									
6	Sales									
7	Summer	40,320,616	27,236,873	13,083,743	(3,067,662)	(2,072,228)	(995,434)	0.12297	0.11103	(365,345)
8	Winter	112,975,577	63,613,876	49,361,701	(10,783,535)	(6,071,954)	(4,711,582)	0.17950	0.16752	(1,879,200)
9	Total Sales	153,296,193	90,850,749	62,445,444	(13,851,197)	(8,144,182)	(5,707,015)			(2,244,545)
10	Transportation									
11	Summer	1,891,907	1,108,483	783,424	(124,847)	(73,149)	(51,698)	0.12697	0.11503	(15,235)
12	Winter	7,251,275	1,724,378	5,526,897	(292,309)	(69,512)	(222,797)	0.18350	0.17152	(50,970)
13	Total Transportation	9,143,182	2,832,861	6,310,321	(417,156)	(142,661)	(274,495)			(66,204)
14	Total Small General Service	162,439,375	93,683,610	68,755,765	(14,268,353)	(8,286,843)	(5,981,510)			(2,310,749)
15	Large General Service									
16	Sales									
17	Summer	4,088,916	4,088,916		(252,466)	(252,466)		0.08892		(22,449)
18	Winter	9,707,541	9,707,541		(890,758)	(890,758)		0.14498		(129,142)
19	Total Sales	13,796,457	13,796,457	-	(1,143,224)	(1,143,224)	-			(151,591)
20	Transportation									
21	Summer	318,595	318,595		(19,671)	(19,671)		0.09292		(1,828)
22	Winter	1,206,288	1,206,288		(110,688)	(110,688)		0.14898		(16,490)
23	Total Transportation	1,524,883	1,524,883	-	(130,360)	(130,360)	-			(18,318)
24	Total Large General Service	15,321,340	15,321,340	-	(1,273,584)	(1,273,584)	-			(169,910)
25	Large Volume									
26	Sales									
27	Summer	951,890	764,050	187,840	(3,364)	(2,700)	(664)	0.03294	0.02174	(103)
28	Winter	1,881,270	1,061,180	820,090	(21,911)	(12,359)	(9,551)	0.05209	0.04088	(1,034)
29	Total Sales	2,833,160	1,825,230	1,007,930	(25,275)	(15,060)	(10,215)			(1,138)
30	Transportation									
31	Summer	125,562,200	39,248,330	86,313,870	(443,766)	(138,713)	(305,053)	0.03231	0.02093	(10,867)
32	Winter	136,389,663	40,896,988	95,492,675	(1,588,485)	(476,314)	(1,112,171)	0.05118	0.03801	(66,651)
33	Total Transportation	261,951,863	80,145,318	181,806,545	(2,032,251)	(615,026)	(1,417,225)			(77,518)
34	Total Large Volume	264,785,023	81,970,548	182,814,475	(2,057,526)	(630,086)	(1,427,440)			(78,656)
35	Grand Total	833,690,676	582,120,436	251,570,240	(56,120,031)	(48,711,081)	(7,408,950)			(2,559,314)

Missouri Gas Energy
Customer Annualization Adjustment

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]	[N]	[O]	[P]	[Q]
Line No.	Description	Number of Meters Billed				Per Books Sales				Weather Normalization Adjustment				Normalized Sales			
		RES	SGS	LGS	LV	RES	SGS	LGS	LV	RES	SGS	LGS	LV	RES	SGS	LGS	LV
						Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	Ccf	Ccf
1	NORMALIZED																
2	Dec-07	441,504	64,560	309	493												
3	Jan-08	445,502	65,839	306	494	74,909,488	30,283,472	2,710,852	31,942,810	(5,185,331)	(1,922,210)	(176,024)	(269,280)	69,724,157	28,361,262	2,534,828	31,673,530
4	Feb-08	447,089	65,799	304	493	78,479,630	31,631,828	2,778,427	29,817,220	(8,869,609)	(3,249,278)	(303,688)	(477,261)	69,610,021	28,382,550	2,474,739	29,339,959
5	Mar-08	447,416	65,293	304	494	60,929,459	24,569,018	2,139,570	25,572,043	(10,258,347)	(3,867,488)	(325,312)	(520,188)	50,671,112	20,701,530	1,814,258	25,051,855
6	Apr-08	443,281	63,936	302	494	35,710,049	14,194,725	1,356,300	21,793,670	(5,655,634)	(2,099,607)	(179,835)	(292,914)	30,054,415	12,095,118	1,176,465	21,500,756
7	May-08	437,123	62,251	301	495	18,250,951	7,839,739	817,917	18,247,090	(2,691,140)	(1,029,788)	(83,037)	(146,218)	15,559,811	6,809,951	734,880	18,100,872
8	Jun-08	432,139	61,049	303	496	8,228,527	4,355,283	461,358	16,497,830	(180,661)	(75,708)	(4,178)	(8,163)	8,047,866	4,279,575	457,180	16,489,667
9	Jul-08	428,690	60,134	301	493	6,785,804	3,738,841	408,717	16,987,920	232,493	85,818	7,069	11,299	7,018,297	3,824,659	415,786	16,999,219
10	Aug-08	426,972	59,433	302	497	6,040,099	3,524,998	375,279	16,542,530	23,876	8,281	880	1,491	6,063,975	3,533,279	376,159	16,544,021
11	Sep-08	427,390	59,289	302	498	6,968,230	4,034,692	447,283	16,641,230	108,096	42,275	3,554	9,194	7,076,326	4,076,967	450,837	16,650,424
12	Oct-08	430,611	59,581	300	498	8,547,505	4,524,245	540,657	19,803,820	(410,514)	(123,779)	(16,590)	(21,820)	8,136,991	4,400,466	524,067	19,782,000
13	Nov-08	437,181	61,108	300	497	25,132,268	10,022,449	1,073,931	22,507,280	(1,628,060)	(591,865)	(53,544)	(100,159)	23,504,208	9,430,584	1,020,387	22,407,121
14	Dec-08	443,287	63,166	302	496	61,162,928	23,720,085	2,211,049	28,431,580	(4,005,736)	(1,445,003)	(142,879)	(243,507)	57,157,192	22,275,082	2,068,170	28,188,073
	Total 2008	5,246,661	746,878	3,627	5,945	391,144,938	162,439,375	15,321,340	264,785,023	(38,520,568)	(14,268,353)	(1,273,584)	(2,057,526)	352,624,370	148,171,022	14,047,756	262,727,498
15	Change Dec-07 to Dec	1,783	(1,394)	(7)	3												
16	USE PER CUSTOMER - CCF/CUSTOMER																
17	Jan-08													157	431	8,284	64,116
18	Feb-08													156	431	8,141	59,513
19	Mar-08													113	317	5,968	50,712
20	Apr-08													68	189	3,896	43,524
21	May-08													36	109	2,441	36,567
22	Jun-08													19	70	1,509	33,245
23	Jul-08													16	64	1,381	34,481
24	Aug-08													14	59	1,246	33,288
25	Sep-08													17	69	1,493	33,435
26	Oct-08													19	74	1,747	39,723
27	Nov-08													54	154	3,401	45,085
28	Dec-08													129	353	6,848	56,831
29	ANNUALIZATION ADJUSTMENT																
30	Jan-08	1,659	(1,297)	(7)	3									259,645	(558,705)	(57,986)	192,349
31	Feb-08	1,516	(1,185)	(6)	3									236,035	(511,152)	(48,844)	178,539
32	Mar-08	1,362	(1,065)	(5)	2									154,250	(337,665)	(29,840)	101,425
33	Apr-08	1,213	(949)	(5)	2									82,245	(179,527)	(19,478)	87,048
34	May-08	1,060	(829)	(4)	2									37,732	(90,688)	(9,766)	73,135
35	Jun-08	911	(712)	(4)	2									16,966	(49,912)	(6,035)	66,491
36	Jul-08	758	(592)	(3)	1									12,410	(37,653)	(4,144)	34,481
37	Aug-08	604	(472)	(2)	1									8,578	(28,060)	(2,491)	33,288
38	Sep-08	456	(356)	(2)	1									7,550	(24,480)	(2,986)	33,435
39	Oct-08	302	(236)	(1)	1									5,707	(17,430)	(1,747)	39,723
40	Nov-08	154	(120)	(1)	-									8,280	(18,519)	(3,401)	-
41	Dec-08	-	-	-	-									-	-	-	-
42	Total	9,995	(7,813)	(40)	18									829,398	(1,853,791)	(186,718)	839,914
43	ANNUALIZED/NORMALIZED																
44	Jan-08	447,161	64,542	299	497									69,983,802	27,802,557	2,476,842	31,865,879
45	Feb-08	448,605	64,614	298	496									69,846,056	27,871,398	2,425,895	29,518,498
46	Mar-08	448,778	64,228	299	496									50,825,362	20,363,865	1,784,418	25,153,280
47	Apr-08	444,474	62,987	297	496									30,136,660	11,915,591	1,156,987	21,587,804
48	May-08	438,183	61,422	297	497									15,597,543	6,719,263	725,114	18,174,007
49	Jun-08	433,050	60,337	299	498									8,064,832	4,229,663	451,145	16,556,158
50	Jul-08	429,448	59,542	298	494									7,030,707	3,787,006	411,642	17,033,700
51	Aug-08	427,576	58,961	300	498									6,072,553	3,505,219	373,668	16,577,309
52	Sep-08	427,846	58,933	300	499									7,083,876	4,052,487	447,851	16,683,859
53	Oct-08	430,913	59,345	299	499									8,142,698	4,383,036	522,320	19,821,723
54	Nov-08	437,335	60,988	299	497									23,512,488	9,412,065	1,016,986	22,407,121
55	Dec-08	443,287	63,166	302	496									57,157,192	22,275,082	2,068,170	28,188,073
56	Total	5,258,656	739,065	3,587	5,963									353,453,768	146,317,231	13,861,038	263,567,412

Missouri Gas Energy
Calculation of Customer Annualization Adjustment

Schedule LWL 5
Sheet 2

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]
		Number of Meters		Weather Normalized Deliveries			Annualization Adjustment to Deliveries			Margin Existing Rates			Adjustment to Margin Revenues
Line No.	Description	Per Books	Annualization Adjustment	Total Ccf	First Step Ccf	Balance Ccf	Total Ccf	First Step Ccf	Balance Ccf	Cust Charge $/Meter	First Step $/Ccf	Balance $/Ccf	$
1	Residential												
2	Summer	3,026,186	5,304	81,957,681	81,957,681	-	171,188	171,188		24.62	-		130,584
3	Winter	2,220,475	4,691	270,666,689	270,666,689	-	658,210	658,210		24.62	-		115,492
4	Total Residential	5,246,661	9,995	352,624,370	352,624,370	-	829,398	829,398	-				246,077
5	Small General Service												
6	Sales												
7	Summer	420,813	(4,099)	37,252,954	25,164,645	12,088,309	(114,274)	(77,193)	(37,081)	18.39	0.12297	0.11103	(88,984)
8	Winter	317,762	(3,628)	102,192,042	57,541,922	44,650,119	(313,476)	(176,511)	(136,965)	18.39	0.17950	0.16752	(121,341)
9	Total Sales	738,575	(7,726)	139,444,996	82,706,567	56,738,429	(427,750)	(253,704)	(174,046)				(210,325)
10	Transportation												
11	Summer	4,860	(47)	1,767,060	1,035,334	731,726	(288,780)	(169,198)	(119,581)	18.39	0.12697	0.11503	(36,109)
12	Winter	3,443	(39)	6,958,966	1,654,866	5,304,100	(1,137,261)	(270,445)	(866,817)	18.39	0.18350	0.17152	(199,026)
13	Total Transportation	8,303	(87)	8,726,026	2,690,200	6,035,826	(1,426,041)	(439,643)	(986,398)				(235,135)
14	Total Small General Service	746,878	(7,813)	148,171,022	85,396,767	62,774,255	(1,853,791)	(693,347)	(1,160,444)				(445,460)
15	Large General Service												
16	Sales												
17	Summer	1,887	(19)	3,836,450	3,836,450	-	(14,143)	(14,143)	-	108.91	0.08892		(3,302)
18	Winter	1,359	(17)	8,816,783	8,816,783	-	(32,504)	(32,504)	-	108.91	0.14498		(6,567)
19	Total Sales	3,246	(36)	12,653,233	12,653,233	-	(46,647)	(46,647)	-				(9,869)
20	Transportation												
21	Summer	224	(2)	298,924	298,924	-	(30,025)	(30,025)	-	108.91	0.09292		(3,033)
22	Winter	157	(2)	1,095,600	1,095,600	-	(110,046)	(110,046)	-	108.91	0.14898		(16,609)
23	Total Transportation	381	(4)	1,394,523	1,394,523	-	(140,071)	(140,071)	-				(19,642)
24	Total Large General Service	3,627	(40)	14,047,756	14,047,756	-	(186,718)	(186,718)	-				(29,511)
25	Large Volume												
26	Sales												
27	Summer	77	0	948,526	761,350	187,176	124,179	99,674	24,505	860.95	0.03294	0.02174	4,007
28	Winter	55	0	1,859,359	1,048,821	810,539	243,422	137,309	106,114	860.95	0.05209	0.04088	11,643
29	Total Sales	132	0	2,807,885	1,810,170	997,715	367,601	236,983	130,618				15,650
30	Transportation												
31	Summer	3,394	10	125,118,434	39,109,617	86,008,817	227,359	71,068	156,291	761.24	0.03231	0.02093	13,011
32	Winter	2,419	8	134,801,179	40,420,675	94,380,504	244,954	73,450	171,504	763.48	0.05118	0.03801	16,250
33	Total Transportation	5,813	18	259,919,612	79,530,292	180,389,320	472,313	144,518	327,795				29,261
34	Total Large Volume	5,945	18	262,727,498	81,340,462	181,387,035	839,914	381,501	458,413				44,911
35	Grand Total	6,003,111	2,160	777,570,645	533,409,356	244,161,290	(371,197)	330,835	(702,032)				(183,983)

Schedule LWL 6

Missouri Gas Energy
Calculation of Reconcialiation Adjustment

Line No.	[A] Description	[B] Per Books Margin Revenue	[C] Margin Adjustment: Weather Adjustment	[D] Margin Adjustment: Customer Annualization	[E] Normalized & Annualized Margin	[F] Calculated Margin
		$	$	$	$	$
1	Residential	130,103,150	-	246,077	130,349,227	129,419,250
2	Small General Service					
3	Sales	38,897,593	(2,244,545)	(210,325)	36,442,723	35,474,848
4	Transportation	1,680,545	(66,204)	(235,135)	1,379,206	1,495,078
5	Total SGS	40,578,138	(2,310,749)	(445,460)	37,821,929	36,969,926
6	Large General Service					
7	Sales	2,161,241	(151,591)	(9,869)	1,999,780	2,000,874
8	Transportation	257,823	(18,318)	(19,642)	219,863	174,154
9	Total LGS	2,419,064	(169,910)	(29,511)	2,219,643	2,175,027
10	Large Volume					
11	Sales	246,360	(1,138)	15,650	260,873	231,699
12	Transportation	13,193,133	(77,518)	29,261	13,144,876	13,181,602
13	Total Large Volume	13,439,493	(78,656)	44,911	13,405,749	13,413,301
14	Total 2008 Per Books	186,539,845	(2,559,314)	(183,983)	183,796,548	181,977,504
15	Final Bill Margin					2,482,884
16	Calculated Margin Adjusted for Final Bills					184,460,388
	Variance with Per Books Margin					(663,840)
	Reconciliation Adjustment					
	Variance with Per Books Margin					(663,840)
	Final Bill Margin					2,482,884
	Net Reconciliation Adjustment					1,819,044
	Percentage Adjustment					0.98%

Missouri Gas Energy
Calculation of Proforma Margin Revenues Under Existing Rates

Schedule LWL 7

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]	[M]	[N]
				Annualized/Normalized Billing Units			Present Rates			Pro Forma Margin Revenue Under Present Rates				
					Throughput			Volumetric Delivery Charge						
Line No.	Rate Class	Rate Code	Season	Number of Meters Billed	First Step	Balance Step	Customer Charge	First Step	Balance Step	Customer Charge	Volumetric Delivery Charge	Total Margin	Reconciliation Adjustment	Adjusted Total
					Ccf	Ccf	$/Meter Billed	$/Ccf	$/Ccf	$	$	$	$	$
													0.98%	
1	**Residential**													
2		608,618	All	5,256,656	353,453,768		24.62	-		129,418,871	-	129,418,871		
3		623 - UGL	All	103			3.68			379	-	379		
		Total RES		5,256,759	353,453,768	-				129,419,250	-	129,419,250	1,262,032	130,681,282
4	**Small General Service**													
5		601,602,611	Summer	416,714	24,900,966	11,961,646	18.39	0.12297	0.11103	7,663,377	4,390,173	12,053,550		
6		612,653,654	Winter	314,134	56,998,936	44,228,785	18.39	0.17950	0.16752	5,776,930	17,640,515	23,417,445		
7		623 - UGL		1,047			3.68			3,853	-	3,853		
8		673,674	Summer	4,813	1,013,417	716,235	18.39	0.12697	0.11503	88,505	211,062	299,567		
9			Winter	3,404	1,545,067	4,952,178	18.39	0.18350	0.17152	62,594	1,132,917	1,195,511		
10		Total SGS		740,112	84,458,386	61,858,845				13,595,258	23,374,668	36,969,926	360,512	37,330,439
11	**Large General Service**													
12		603,613,622	Summer	1,868	3,793,175		108.91	0.08892		203,469	337,289	540,758		
13		645,652	Winter	1,338	9,065,924		108.91	0.14498		145,738	1,314,378	1,460,116		
14		693,694	Summer	222	295,552		108.91	0.09292		24,153	27,463	51,616		
15			Winter	159	706,387		108.91	0.14898		17,300	105,238	122,538		
16		Total LGS		3,587	13,861,038					390,660	1,784,367	2,175,027	21,210	2,196,237
17	**Large Volume**													
18		680	Summer	77	764,050	187,840	860.95	0.03294	0.02174	66,293	29,251	95,545		
19			Winter	55	1,061,180	820,090	860.95	0.05209	0.04088	47,352	88,802	136,154		
20		Trans	Summer	3,404	37,919,157	87,563,514	761.24	0.03231	0.02093	2,591,261	3,057,872	5,649,133		
21			Winter	2,427	40,895,216	94,356,365	763.48	0.05118	0.03801	1,852,966	5,679,503	7,532,469		
22		Total LV		5,963	80,639,602	182,927,809				4,557,872	8,855,428	13,413,301	130,800	13,544,101
23	**Grand Total**			6,006,318	532,412,794	244,786,654				147,963,041	34,014,464	181,977,504	1,774,554	183,752,058