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Witness:	John J. Reed
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MISSOURI PUBLIC SERVICE COMMISSION

MISSOURI GAS ENERGY

CASE NOS. GR-2002-348/GR-2003-0330

DIRECT TESTIMONY

OF

JOHN J. REED

ON BEHALF OF MISSOURI GAS ENERGY

Jefferson City, Missouri

November 2005

<u>Denotes Highly Confidential Material</u>

DIRECT TESTIMONY OF

JOHN J. REED

Table of Contents

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CASE NOS. GR-2002-348 and GR-2003-0330 (Consolidated)

November 2005

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John J. Reed. My business address is 313 Boston Post Road West, Suite 210, Marlborough, Massachusetts 01752.

Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?

A. I am the Chairman and Chief Executive Officer of Concentric Energy Advisors, Inc. and CE Capital Advisors (collectively "Concentric"). Concentric Energy Advisors, Inc. ("CEA") is a management consulting and financial advisory firm focused on the North American electricity, natural gas, and water industries. CEA specializes in transaction-related financial advisory services, energy market assessments, regulatory and litigation support, energy commodity procurement, economic feasibility studies, and capital market analyses and negotiations.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL BACKGROUND AND EXPERIENCE.

A. I have more than thirty years of experience in the North American energy industry. Prior to my current position with Concentric, I have served in executive positions with various consulting firms and as Chief Economist with Southern California Gas Company. I have advised more than 100 utility clients over the course of my career on a wide range of financial and economic issues. I have provided expert testimony on financial and economic matters on more than 125 occasions, including numerous proceedings regarding natural gas local distribution company ("LDC") and pipeline prudence-related matters, before the Federal Energy Regulatory Commission ("FERC"), various Canadian regulatory agencies, state utility regulatory agencies, various state and federal courts, and before arbitration panels in the United States and Canada. A copy of my résumé is included as Attachment A and a listing of the testimony I have sponsored previously is included as Attachment B.

Q. HAVE YOU SPONSORED TESTIMONY BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION ("COMMISSION")?

A. Yes. I testified on behalf of Missouri Gas Energy ("MGE" or the "Company") on gas purchasing practices and prudence issues in MGE's previous ACA case, Case No. GR-2001-382. I also testified on behalf of Aquila Networks on cost of capital and capital structure issues in Case Nos. ER-2004-0034 and HR-2004-0024 (consolidated) and in Case No. GR-2004-0072.

Q. ON WHOSE BEHALF ARE YOU SPONSORING TESTIMONY IN THIS PROCEEDING?

A. I am sponsoring testimony on behalf of MGE.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address Commission Staff ("Staff") recommendations of proposed disallowances for MGE allegedly having surplus capacity in the 2001/2002 and 2002/2003 Actual Cost Adjustment ("ACA") periods. The cases that correspond to the two ACA periods in question have been consolidated for the purposes of this proceeding.[1] The Staff recommendations to which I will be responding are contained in memos dated December 19, 2003 for the 2001/2002 ACA period filed in Case No. GR-2002-348 (the "December 2003 Memo") and December 28, 2004 for the 2002/2003 ACA period in Case No. GR-2003-0330 (the "December 2004 Memo").

Q. HOW IS THE BALANCE OF YOUR DIRECT TESTIMONY ORGANIZED?

A. The balance of my testimony is organized into six sections, as listed below:

I. Executive Summary – provides a summary of the specific findings of my Direct Testimony;

II. Overview of Staff's Position – provides a summary of Staff's recommendation for the 2001/2002 and 2002/2003 ACA periods, including the proposed level of disallowance;

III. Overview of Design Day Demand Planning – provides a summary of the purpose of design day planning, components of a design day demand analysis and a brief review of the history in Missouri regarding design day planning;

IV. Prudence Standards – provides a description of the generally accepted prudence standards utilized in the energy industry and specifically those relied upon in Missouri; and

V. Design Day Demand Forecasting – provides a description of generally-accepted design day demand forecasting practices, an explanation of CEA's design day demand forecast, and an explanation of the flaws inherent in Staff's proposed design day forecast upon which its proposed disallowance is based.

VI. Conclusions – provides a summary of my Direct Testimony.

[1] Missouri Public Service Commission, Order Consolidating Cases and Establishing Procedural Schedule, Case Nos. GR-2002-348 and GR-2003-0330, April 12, 2005.

In addition to these sections of my Direct Testimony, there are several schedules that support my testimony and they are attached to this testimony.

I. EXECUTIVE SUMMARY

Q. WHAT ARE THE PRIMARY FINDINGS OF YOUR TESTIMONY?

A. The primary findings of my testimony are as follows:

- There are no defined or specific design day demand planning standards in Missouri;
- There is a wide range of reasonable approaches that can be utilized for design day planning;
- Staff's design day demand forecast is fundamentally flawed and, as a result, is not representative of a projection of MGE's design day demand;
- Due to the errors with Staff's design day demand forecast, its proposed disallowance is equally flawed and thus without merit;
- Conducting a more robust design day demand forecast than proposed by Staff produces a design day demand projection that is not materially different than the design day demand projected by MGE during the 2001/2002 and 2002/2003 ACA periods; and
- Therefore, MGE had an appropriate level of pipeline capacity, not a surplus of pipeline capacity in the 2001/2002 and 2002/2003 ACA periods, and no disallowance regarding MGE's capacity planning is warranted.

II. OVERVIEW OF STAFF'S POSITION

Q. WHAT IS STAFF'S POSITION REGARDING RELIABILITY IN MGE'S 2001/2002 ACA FILING?

A. The December 2003 Memo outlines Staff's concerns with MGE's reliability analysis for the 2001/2002 ACA period, and is attached hereto as Schedule JJR-1. In the December 2003 Memo, Staff asserted that MGE had pipeline capacity under contract in excess of its design day requirements and, as such, recommended certain cost disallowances related to MGE's level of pipeline capacity. Specifically, Staff's allegation of surplus capacity was based upon an analysis it conducted that included a calculation of baseload demand, a calculation of heatload demand, and a determination of an appropriate reserve margin. Based on the results of its analysis, Staff asserted that MGE's capacity in the 2001/2002 ACA period was in excess of the demand projected by Staff for the 2005/2006 period. Staff alleged that MGE had surplus capacity in the 2001/2002 ACA period based on decisions resulting from allegedly inadequate data and analysis. As a result of its position, Staff recommended a disallowance of $1,373,016. However, based on receiving updated daily demand data by service territory, Staff increased its proposed disallowance to $2,041,931 based on a revised analysis.[2]

Q. WHAT IS STAFF'S POSITION REGARDING RELIABILITY IN MGE'S 2002/2003 ACA FILING?

A. The December 2004 Memo outlines Staff's concerns with MGE's reliability analysis for the 2002/2003 ACA Period, and is attached hereto as Schedule JJR-2. In the December 2004 Memo, Staff's position regarding MGE's level of capacity was similar to its position in the December 2003 Memo, i.e., MGE's capacity planning process was allegedly insufficient, MGE's capacity in the 2002/2003 ACA period was in excess of the demand projected by Staff for the 2005/2006 period, and as such, MGE had surplus capacity. Specifically, Staff claimed in the December 2004 Memo that MGE had **_____** Dth/day of surplus capacity to serve Kansas City and **_____** Dth/day of surplus capacity to serve St. Joseph because MGE had not adequately calculated its

[2] Third Status Report, December 21, 2004, GR-2002-348.

design day requirements[3] and had not provided justification for its excess reserve margin.[4] As a result of its position, Staff recommended a disallowance of $2,015,661.

Therefore, regarding the issue of alleged surplus capacity, Staff has recommended a total disallowance for both ACA periods of $4,057,592, i.e., the $2,041,931 disallowance for the 2001/2002 ACA period and $2,015,661 for the 2002/2003 ACA period. The details of Staff's design day demand analysis and its proposed disallowance are attached as Schedule JJR-3. Specifically, JJR-3 is a copy of Data Response No. 139 from Case No. GR-2003-0330.

Q. WHAT INFORMATION HAS STAFF RELIED UPON IN FORMULATING ITS PROPOSED DISALLOWANCE?

A. The information Staff relied upon in preparing its design day demand forecast, and upon which its proposed disallowance is calculated, included the reliability reports that MGE filed in July 2001 and July 2002 (respectively, the "2001 Reliability Report" and the "2002 Reliability Report"), as well as detailed daily demand and weather data provided by MGE.

<u>III. OVERVIEW OF DESIGN DAY DEMAND PLANNING</u>

Q. PLEASE DEFINE "DESIGN DAY" AND "PEAK DAY" DEMAND.

A. "Design day" demand is the maximum demand that the utility is expected to experience

[3] In both its December 2003 Memo and December 2004 Memo, Staff consistently utilized the term "peak day demand" as opposed to "design day demand". For purposes of this direct testimony, it has been assumed that when Staff referred to "peak day demand" it actually intended "design day demand".

[4] December 2004 Memo, p. 5.

under extreme conditions, which may or may not occur during a particular year.[5] In contrast, "peak day" demand is the day in each year in which the maximum amount of natural gas was delivered to customers. Since peak day demand by definition occurs each year, the peak day demand will be different every year.[6] Therefore, the difference between design day demand and peak day demand is that peak day demand occurs annually while design day demand is an extreme circumstance that is not likely to occur annually.

Q. WHAT IS THE PURPOSE OF CONDUCTING A DESIGN DAY DEMAND FORECAST?

A. LDCs are required to maintain sufficient pipeline capacity to reliably serve their customers every day of every year, including during extreme conditions. Therefore, in order to ensure that LDCs have enough capacity to serve their customers, they conduct a capacity planning process. A design day demand forecast is one tool and one part of the on-going capacity planning process that provides an indication of the amount of pipeline capacity customers could use on an extremely cold day.

Q, WHY DO UTILITIES CONDUCT DESIGN DAY DEMAND FORECASTS?

A. LDCs have always been responsible for providing safe and reliable service to their customers. Prior to the early 1990s, this responsibility involved ensuring that the LDCs: (1) purchased enough gas from the interstate pipelines at local citygates; and (2) had

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5 According to the American Gas Association ("AGA"), design day is defined as "the 24-hour period of demand which is used as a basis for planning gas capacity requirements." (www.aga.org; see Natural Gas Glossary).

6 While some use the terms "peak day" and "design day" interchangeably, it is more precise to discuss "design day demand forecasts" in the context of capacity planning.

sufficient capacity on their local distribution systems to transport the gas to their customers. During this time, the purpose of planning for design day demand was to guide gas purchase contracts with the pipelines and for long term planning for potential distribution system upgrades.

However, in the early 1990s, the natural gas industry experienced significant change as the FERC required the unbundling of the pipeline merchant function. Specifically, in April 1992, the FERC issued Order No. 636 that required all interstate pipelines to separate their sales and transportation services and provide non-discriminatory open-access transportation to all customers. Therefore, instead of purchasing gas from pipelines at citygates, LDCs had the responsibility for purchasing natural gas supplies from producers, plus contracting for pipeline capacity to transport those supplies to their local distribution system, in addition to maintaining sufficient distribution capacity. As a result, LDCs had increased roles and responsibilities with respect to natural gas purchases and managing pipeline capacity and storage portfolios for their customers.

Q. WHAT ARE THE PRIMARY COMPONENTS GENERALLY INCLUDED IN A LDC DESIGN DAY DEMAND FORECAST?

A. Based on my experience, while some details regarding design day demand forecasts differ among utilities, most design day demand forecasts include, at a minimum, a design day weather specification, a forecast of baseload demand, a forecast of heatload demand, and a comparison of the forecast design day demand over a period of time to the existing supply-side resources that are capable of delivering natural gas to the LDC citygate. The supply-side resources would include, pipeline capacity capable of delivering supplies from a supply basin, trading hub or from storage, as well as capacity from on-system peakshaving resources, such as liquefied natural gas and/or propane-air facilities.

Q. ARE THERE ANY FEDERAL RULES OR GUIDELINES REGARDING HOW DESIGN DAY DEMAND FORECASTS FOR LDCs SHOULD BE PREPARED?

A. No, not to my knowledge. Design day demand forecasts, in the context of pipeline capacity planning for gas utilities, are generally reviewed by state regulatory commissions, sometimes in the context of detailed integrated resource plans ("IRPs"). An IRP is a detailed planning process and framework within which the costs and benefits of both demand and supply side resources are evaluated to develop a total resource mix for providing long-term reliable services to customers, including the consideration of price and non-price issues, supply diversity, and reliability. A design day demand forecast is one component of an IRP.

Q. DOES THE COMMISSION HAVE AN ESTABLISHED POLICY REGARDING DESIGN DAY DEMAND FORECASTING FOR LDCs IN THE CONTEXT OF IRPs?

A. No. While the Commission has established specific IRP rules for electric utilities,[7] there are no such rules for gas utilities. From time to time, the Commission has considered creating similar rules for gas utilities, however, no rules have been implemented to date.

[7] See, e.g., Missouri Code of State Regulations, 4 CSR 240-22.010 through 4 CSR 240-22.080.

Q. PLEASE SUMMARIZE THE COMMISSION'S ACTIVITIES RELATED TO IRPs FOR GAS UTILITIES IN MISSOURI.

A. In response to the Federal Energy Policy Act of 1992, Staff filed a motion requesting that the Commission consider whether it:

> …should adopt standards, in accordance with Sections 115 and 303 of the Federal Energy Policy Act of 1992, establishing an integrated resource plan as a part of the Code of State Regulations for all local gas distribution companies over which the Commission has jurisdiction. (Missouri Public Service Commission, Order Approving Stipulation and Agreement, Case No. GO-94-171, March 4, 1994)

In that case, the Commission agreed to address the implementation of integrated resource planning rules for gas utilities through a rulemaking the following year.

That rulemaking was docketed as Case No. GO-95-329 and was initiated as a result of a joint motion filed on April 24, 1995 by certain gas utilities in Missouri (including MGE) to determine the need for integrated resource planning rules for gas utilities. In the final order, the Commission opposed additional burdensome regulation and declined to establish any IRP rules.[8] Overall, the Commission order postponed all efforts to advance the preparation of integrated resource planning rules for gas utilities.

Q. HAS THERE BEEN ANY RECENT ACTIVITY REGARDING IRP STANDARDS IN MISSOURI FOR LDCs?

A. Yes. In March 2005, the Commission indicated a desire to hold roundtable discussions regarding resource planning for both gas and electric utilities. The first installment of

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[8] Missouri Public Service Commission, Order Regarding Joint Motion to Determine the Need for Integrated Resource Planning Rules for Gas Utilities, Case No. GO-95-329, June 2, 1995

those roundtable discussions occurred on May 20, 2005. However, the outcome of those roundtable discussions was that further investigation and discussion is necessary.

Therefore, it can be concluded that while the Commission has considered rules regarding IRP development for LDCs, the Commission to this point has decided not to establish any requirements and, as a result, the Commission has left the details of capacity planning to the individual gas utilities. As such, there is no Commission-approved approach, methodology, or format with respect to the design day demand forecast and capacity planning process.

Q. SINCE THERE ARE NO PRE-ESTABLISHED GUIDELINES OR RULES IN MISSOURI FOR LDCs REGARDING CAPACITY PLANNING, WHAT STANDARD SHOULD THE COMMISSION UTILIZE TO EVALUATE MGE'S ACTIONS?

A. I believe that the appropriate standard by which to evaluate MGE's capacity planning decisions for the ACA periods in question in this proceeding should be the Commission's prudence standards.

IV. PRUDENCE STANDARDS

Q. WHAT IS THE PURPOSE OF A PRUDENCE REVIEW IN UTILITY RATEMAKING?

A. Utilities, as regulated monopolies, have to make investment decisions that balance their obligation to provide adequate and reliable service at reasonable rates with shareholders' requirement for an opportunity to earn a reasonable return on invested capital. Utility investments and expenses need to be reviewed and deemed "prudent" by regulators in order for utilities to be allowed to recover the costs associated with those investments and expenses from customers through rates. The concept of a "prudent investment" in public utility law is a regulatory oversight standard that attempts to serve as a legal basis for judging whether utilities have met their pubic interest obligations and should be able to recover those investments or costs.

<u>Generally Accepted Prudence Standards</u>

Q. WHAT IS THE PRUDENCE STANDARD IN UTILITY RATEMAKING?

A. In 1923, a United States Supreme Court decision articulated a standard commonly known as the "prudence standard" or "prudent investment rule". In a separate, concurring opinion, Justice Brandeis wrote ("Brandeis Opinion"):

> There should not be excluded from the finding of the [rate] base, investments which, under ordinary circumstances, would be deemed reasonable. The term is applied for the purpose of excluding what might be found to be dishonest or obviously wasteful or imprudent expenditures. Every investment may be assumed to have been made in the exercise of reasonable judgment, unless the contrary is shown… (Separate concurring opinion of Justice Brandeis, Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission, 262 US 276 (1923)).

That decision, and its application since, has established two fundamental principles of ratemaking. The first principle is that only reasonable or prudent expenditures are to be included in a utility's rates. The second principle is that a utility's expenditures are presumed to be prudent until it can be demonstrated that the expenditures were imprudent through clear evidence of utility misconduct.

Q. HAVE THERE BEEN ADDITIONAL PRUDENCE PRINCIPLES ESTABLISHED SPECIFICALLY FOR THE ENERGY INDUSTRY?

A. Yes. The National Regulatory Research Institute ("NRRI"), the regulatory research affiliate of the National Association of Regulatory Utility Commissioners ("NARUC"), has identified four principles to be followed by state utility commissions when evaluating the prudence of a utility's actions. In The Prudent Investment Test in the 1980s, NRRI identified the following four principles:

1) a presumption of prudence;
2) a rule of reasonableness under the circumstances;
3) a proscription against hindsight; and
4) a retrospective, factual inquiry. [9]

NRRI found that the above guidelines would likely be useful, and perhaps necessary, for a court to sustain a commission's findings regarding prudence.

Q. PLEASE EXPLAIN WHAT IS MEANT BY THE FIRST PRINCIPLE, i.e., A PRESUMPTION OF PRUDENCE.

A. The first principle when reviewing utility prudence matters is a presumption of prudence for utility actions and that this presumption must be rebutted sufficiently in order to proceed further. This presumption of prudence rests on case law stemming from the Brandeis Opinion, i.e., "every investment may be assumed to have been made in the exercise of reasonable judgment, unless the contrary is shown." Thus, this presumption of prudence creates a threshold requirement for a party to first overcome in order to challenge further the prudence of a utility's actions.

[9] The Prudent Investment Test in the 1980s, Burns, Poling, Whinihan and Kelly, 1984, p. 55.

Q. PLEASE EXPLAIN THE SECOND PRINCIPLE, i.e., A RULE OF REASONABLENESS UNDER THE CIRCUMSTANCES.

A. Once the prudence threshold has been crossed, the next step requires that the action of the utility's management be evaluated in light of what was known, or reasonably knowable, at the time the decisions in question were made. In particular, given the potential effect on customers, the commission needs to evaluate whether the decisions and conclusions were appropriate given the information available at the time. It is important to note the distinction here – that while the results of management conduct can be used to rebut a presumption of prudence, results of management conduct cannot be relied upon to determine whether that conduct was prudent.

Q. HOW IS THE SECOND PRINCIPLE RELATED TO THE THIRD PRINCIPLE, i.e., A PROSCRIPTION AGAINST HINDSIGHT?

A. Yes. Since the utility's actions must be judged based on the reasonableness of the circumstances that existed at the time, using hindsight to evaluate a utility's actions will not result in a supportable finding. Thus, any evaluation of a utility's actions must be based on the information available, and the circumstances that existed, at the time the decision was made. This requires that factual information from that period be collected and evaluated without consideration of the eventual outcome or result of that decision. In fact, NRRI has specifically stated that "if a state commission engages in hindsight, any finding of imprudence is subject to reversal."[10] In addition, in a presentation prepared by NRRI regarding the evaluation of utility actions and the prudence of those actions, NRRI

[10] The Prudent Investment Test in the 1980s, NRRI 84-16, p. 60.

stated that the "prudence standard establishes the basis for evaluation in terms of 'bad decisions' rather than 'bad outcomes' (no 20/20 hindsight)" and that information available after a decision was made is irrelevant to the prudence evaluation.[11]

Q. PLEASE EXPLAIN THE LAST PRINCIPLE, i.e., A RETROSPECTIVE, FACTUAL INQUIRY.

A. The last principle requires that a commission develop a record of the facts, not opinions, as they existed at the time the utility's decision was made. It is this record that should be used to measure and evaluate the utility's decisions against the prudence standard in effect.

Q. PLEASE DESCRIBE THE THEMES THESE PRINCIPLES SUPPORT.

A. The principles support two related themes:

1. The prudence standard applies to decisions, not to results; and
2. Costs cannot be imprudent, only actions.

The first theme is that the prudence standard is applied to the decisions and actions taken by management. This is distinct from the results of the action. If management uses available information to make reasonable decisions within the then-current framework, the decision is prudent, *regardless of the outcome*. The second theme follows the first, i.e., costs, in and of themselves, cannot be prudent or imprudent. Rather, costs are only imprudent if they arise out of imprudent management action.

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[11] http://www.nrri.ohio-state.edu/programs/gas.html ; See: "A Prudence Standard for Risk Management", Ken Costello, NRRI.

Q. WHEN JUDGING MANAGEMENT CONDUCT FOR PRUDENCE, IS THERE TYPICALLY A SINGLE CORRECT ACTION OR DECISION THAT IS APPROPRIATE OR REASONABLE?

A. No. Reasonable and appropriate management actions and decisions vary over a wide range. In addition, in times of unprecedented occurrence, the range of reasonable behavior is typically broader due to the lack of experience with such situations and the ability to rely on past practices to make informed decisions. Therefore, an important consideration when applying the four principles discussed above is to define a reasonable range of behavior, and a minimally acceptable level of conduct.

Q. SHOULD THE STANDARDS BY WHICH PRUDENCE IS TO BE EVALUATED BE KNOWN BY THE UTILITY IN ADVANCE?

A. Yes. There are two reasons why it is essential that the range of prudent behavior or the minimally acceptable level of behavior be communicated to the utility in advance of the utility being subject to those standards. First, unless a minimally acceptable level of behavior can be defined, then imprudence cannot be defined. This is consistent with the principle discussed above prohibiting hindsight review or second-guessing, meaning that without a defined standard communicated in advance, it is not reasonable to expect a utility to be able to necessarily meet that standard. In addition, not only does a minimally acceptable level of behavior need to be defined in advance of making a utility subject to that standard, but the minimally acceptable level needs to be communicated with sufficient time in order for the utility to reasonably meet the standards.

Second, setting a minimally acceptable level of behavior is also important for the calculation of costs associated with imprudent action. Assuming that there is a range of reasonable conduct, then only the costs associated with the conduct that is below the minimally acceptable level of behavior should be considered for disallowance.

Prudence Standard in Missouri

Q. DOES THE COMMISSION HAVE AN ESTABLISHED POLICY REGARDING UTILITY PRUDENCE ISSUES?

A. Yes. The Commission has articulated its policy regarding utility prudence issues in various cases in the past, in connection with both nuclear power plant construction costs and LDC gas costs.[12] In the Commission's decision regarding the construction of Union Electric's Callaway Nuclear Plant ("Callaway Decision"), the Commission addressed both the presumption of prudence, as well as the manner in which utility prudence should be evaluated.

First, in terms of the presumption of prudence, the Commission stated that it agreed with the conclusions of the Washington D.C. Circuit Court of Appeals and the Brandeis Opinion, in finding that:

> Utilities seeking a rate increase are not required to demonstrate in their cases-in-chief that all expenditures were prudent…However, where some other participant in the proceeding <u>creates serious doubt</u> as to the prudence of an expenditure, then the applicant has the burden of dispelling these doubts and proving the questioned expenditure to have been prudent. (emphasis added) (Missouri Public Service Commission, Case Nos. EO-85-17 and ER-85-160, March 29, 1985, mimeo p. 193)

[12] See, e.g., *Union Electric Company*, Missouri Public Service Commission, Case Nos. EO-85-17 and ER-85-160 (1985); *Western Resources*, Missouri Public Service Commission, Case No. GR-93-140 (1995).

Therefore, the Commission has found that there is a presumption of prudence for utility expenditures until a third-party creates "serious doubt" as to the prudence of a utility expenditure. Only after serious doubt has been created does the utility bear the burden of proving the expenditure was incurred as a result of prudent conduct.

Q. IN THE CALLAWAY DECISION, WHAT DID THE COMMISSION CONCLUDE REGARDING THE MANNER IN WHICH UTILITY PRUDENCE SHOULD BE EVALUATED?

A. The Commission has adopted a "reasonable care standard" regarding how utility prudence should be evaluated. In its Callaway Decision, the Commission found that the appropriate prudence standard was enunciated in an order issued by the New York Public Service Commission ("NYPSC") in a case involving Consolidated Edison of New York (the "ConEd Case"). The Commission quoted from the ConEd Case, in which the NYPSC found in favor of a reasonable care standard stating that:

> …the company's conduct should be judged by asking whether the conduct was reasonable at the time, under all circumstances, considering that the company had to solve its problem prospectively rather than in reliance on hindsight. In effect, our responsibility is to determine how reasonable people would have performed the tasks that confronted the company. (Ibid., mimeo p. 194)

The Commission went on to state in its Callaway Decision that it would not rely on hindsight and that it would assess management decisions at the time they were made by asking the question, "Given all the surrounding circumstances existing at the time, did management use due diligence to address all relevant factors and information known or available to it when it addressed the situation?"[13] The Commission specifically stated that, by accepting the reasonable care standard, it did not adopt a standard of perfection, but rather the relevant factors to consider were the "manner and timeliness in which problems were recognized and addressed."[14]

Q. WHAT HAS THE COMMISSION CONCLUDED REGARDING UTILITY PRUDENCE IN PRIOR GAS COST PROCEEDINGS?

A. In its 1995 decision in a Western Resources ACA proceeding ("Western Resources Decision"), the Commission reiterated its position that a party must first create serious doubt as to the prudence of a utility's expenditure(s), and then the utility has the burden of proof to demonstrate and prove that those expenditures were in fact prudently incurred.[15] In addition, in the same order, the Commission took the opportunity to further elaborate and clarify its prudence standard:

> The incurrence of expenditures or accrued liabilities on the part of local distribution companies in exchange for the physical delivery of natural gas results from action or inaction on the part of individuals in the employ of the local distribution company at some point in time. It appears to the Commission that it needs to clarify the parameters of gas cost prudence reviews. The Commission is of the opinion that a prudence review of this type must focus primarily on the <u>cause(s)</u> of the allegedly excessive gas costs. Put another way, the proponent of a gas cost adjustment must raise a serious doubt with the Commission as to the <u>prudence of the decision (or failure to make a decision) that caused what the proponent views as excessive gas costs.</u> The Commission is of the opinion that evidence relating to the decision-making process is relevant to the extent that the existence of a prudent decision-making process may preclude the adjustment. Specifically, the Commission needs evidence of the actual expenditure(s) incurred during the ACA period resulting from the alleged imprudent decision. In addition, it is helpful to the Commission to have

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13 Id.

14 Id.

15 *Western Resources*, Missouri Public Service Commission, Case No. GR-93-140, July 14, 1995, mimeo p. 14.

> evidence as to the amount that the expenditures would have been if the local distribution company had acted in a prudent manner. <u>The critical matter of proof is the prudence or imprudence of the decision from which the expenses result</u>. (emphasis added) (Ibid, pp. 14-15)

As can be seen from the order in the Western Resources Decision, the Commission has found that utility prudence or imprudence must focus on the utility's decisions, not the results or outcome of the utility's decisions.

Q. WERE THE COMMISSION'S PRUDENCE STANDARDS FURTHER ADDRESSED IN A WESTERN DISTRICT COURT OF APPEALS DECISION?

A. Yes. In 1997, the Western District Court of Appeals reversed a Commission decision regarding the prudence of costs related to a gas purchase contract of Associated Natural Gas Co. ("ANG"). In that case, the Court found that:

> … in order to disallow a utility's recovery of costs from its ratepayers, a regulatory agency must find both that (1) the utility acted imprudently (2) such imprudence resulted in harm to the utility's ratepayers… The PSC's standards for the recoverability of ANG's costs arise from the statutory mandate that all charges made by a gas company be just and reasonable. It would be beyond this statutory authority for the PSC to make a decision on the recoverability of costs, based on a prudency analysis of gas purchasing practices, without reference to any detrimental impact of those practices on ANG's charges to its customers, such as evidence that the costs which ANG is seeking to pass on to its customers are unjustifiably higher than if different purchasing practices had been employed." (footnote omitted) (State of Missouri ex rel. Associated Natural Gas Co. v. Public Service Comm'n of the State of Missouri, 954 S.W.2d 520, (Mo. App. 1997), September 23, 1997, mimeo p. 9)

In effect, the Western District Court of Appeals found that, even if imprudence had been demonstrated, if there was no harm to ratepayers associated with the imprudence, no action need be taken against the utility. In other words, "no harm, no foul". Therefore, it is imperative that it be demonstrated that a utility's imprudent decision resulted in harm to ratepayers prior to a disallowance being assessed to the utility.

Q. DO YOU BELIEVE THAT THE COMMISSION SHOULD USE THE SAME PRUDENCE PRINCIPLES AND STANDARDS THAT IT HAS IN THE PAST IN REVIEWING THE PRUDENCE OF MGE'S CONDUCT DURING THE 2001/2002 AND 2002/2003 ACA PERIODS?

A. Yes. I believe that the Commission's prudence standards represent sound regulatory policy, are consistent with the prudence standards of other regulatory agencies, and are an appropriate way in which to assess the prudence of MGE's conduct.

Q. WHAT ARE THE MOST IMPORTANT FACTORS THAT YOU BELIEVE SHOULD BE CONSIDERED IN THE COMMISSION'S REVIEW OF THIS CASE?

A. The most important considerations in determining the prudence of MGE's actions regarding its capacity planning are that:

(i) only the utility's actions or inaction should be reviewed for prudence, <u>not</u> the *results* of the action or inaction;

(ii) reasonable and appropriate management actions and decisions vary over a wide range, thus it is important to define a reasonable range of behavior, and a minimally acceptable level of conduct;

(iii) the minimally acceptable level of behavior not only needs to be defined, but also communicated with sufficient time in order for the utility to reasonably meet the standards;

(iv) hindsight should not be relied upon when reviewing a utility's actions; and

(v) costs should not be disallowed unless harm to utility ratepayers as a result of imprudence can be demonstrated, i.e., the "no harm, no foul" principle.

Q. DOES STAFF'S POSITION OUTLINED IN ITS DECEMBER 2003 AND DECEMBER 2004 MEMOS MEETS THE STANDARD FOR REVIEWING PRUDENCE PREVIOUSLY RELIED UPON BY THE COMMISSION?

A. No. Staff's position as outlined in the December 2003 and December 2004 Memos fails to meet the prudence standards outlined above on numerous fronts. First, there are no defined capacity planning standards in Missouri. Therefore, Staff's claim that MGE has surplus capacity is based upon its own, ad hoc methodology that has never been subjected to any sort of critical analysis, much less approved by the Commission or formally disseminated to the gas utilities subject to the jurisdiction of the Commission. Second, when I conducted an independent demand/supply analysis for the 2001/2002 and 2002/2003 ACA periods using the same robust design day planning methodology reflected in MGE's current reliability report, the analysis produced results that were not materially different than the analysis produced by MGE in its reliability reports for the 2001/2002 and 2002/2003 ACA periods. Lastly, the approach and analysis upon which Staff's proposed disallowance is based is fundamentally flawed, and thus, Staff's analysis cannot be relied upon as a means to calculate design day demand, let alone determine whether MGE had surplus capacity.

V. DESIGN DAY DEMAND FORECASTING

Q. IS THERE A SINGLE CORRECT WAY IN WHICH TO FORECAST DESIGN DAY DEMAND FOR A LDC?

A. No. There are many reasonable and appropriate ways in which design day demand can be forecasted. The important issue is that the forecast is within a range of reasonableness or meets a minimally acceptable threshold, but the range of reasonableness or minimally acceptable threshold can differ in each case depending on the specific circumstances of the LDC. For example, the definition of a reasonable design day demand forecast is dependent on numerous specific circumstances, including data availability, customer tolerances, regulatory provisions, supply availability, the cost of capacity, and the cost of capacity/supply failure, among other things.

Q. WHAT ARE THE PRIMARY COMPONENTS OF A DESIGN DAY DEMAND FORECAST?

A. As noted earlier, there are five primary components of any design day demand forecast. These components are: (i) the determination of design day weather; (i) the calculation of the baseload demand; (iii) the calculation of the heatload demand; (iv) the calculation of an appropriate reserve margin; and (v) the calculation of future demand growth and the timeframe over which design day demand is compared to supply/capacity. Generally, a LDC's design day demand forecast can be expressed by the following equation:

Design Day Demand = Baseload Demand + [Design Day Weather * Heatload Factor] + Reserve Margin

In other words, design day demand is simply calculated as baseload demand plus heatload demand plus a reserve margin.

Q. DID CEA CONDUCT AN INDEPENDENT DESIGN DAY DEMAND ANALYSIS?

A. Yes. CEA prepared a design day demand analysis independent of the analysis previously conducted by either MGE or Staff as part of the 2001/2002 or 2002/2003 ACA periods. Specifically, CEA's analysis considered the same demand and HDD data that was available at the time of the 2001/2002 and 2002/2003 ACA periods; however, CEA's analysis utilized a different approach than MGE utilized for purposes of preparing its 2001 and 2002 Reliability Reports, as well as a different approach than that utilized by Staff in its design day demand forecast in this proceeding. The approach utilized by CEA to project design day demand as of the 2001/2002 and 2002/2003 ACA periods was the same robust methodology that was utilized to prepare MGE's most recent reliability report, and incorporated many elements that Staff had previously criticized MGE for not including in its earlier reliability reports.

Design Day Weather

Q. WHAT IS THE IMPORTANCE OF THE DETERMINATION OF DESIGN DAY WEATHER AS PART OF A DESIGN DAY DEMAND FORECAST?

A. A critical factor in forecasting design day demand is the design day weather, i.e., the extreme cold weather conditions upon which a LDC designs its gas supply/capacity portfolio. MGE has an obligation to provide safe and reliable, i.e., continuous and uninterrupted, natural gas service to its customers on an on-going basis, including, and perhaps most importantly, during extreme cold weather events. LDCs plan to meet design day demand as opposed to peak day demand since, by definition, peak day demand occurs annually and will be different each year. As such, purchasing capacity to cover peak day weather as opposed to design day weather could result in frequent interruptions of customers' gas supplies, which would be completely unacceptable. Therefore, an important goal of design day demand forecasting is to assure that a LDC has adequate capacity to meet the natural gas demand of its firm customers on even the extreme coldest days.

In addition to the likelihood of exceeding peak day weather conditions and not having enough supplies, another reason for using design weather conditions in conducting design day demand forecasts for planning purposes is explained by MGE Witness Kirkland. Specifically, acquiring pipeline capacity can be a multi-year process with the LDC contracting for capacity in advance of its projected need. This can occur in one of two ways, i.e., either the pipeline holds an open season to solicit interest in additional capacity, or a LDC can approach the pipeline directly for additional facilities. In either case, sufficient time is needed for the interstate pipeline to plan, receive approval and actually construct the physical facilities to serve the LDC contract. Therefore, given the physical limitation of the infrastructure to deliver a finite supply of gas in conjunction with the lead time required to construct incremental capacity, the level of demand associated with design day weather is used for planning purposes. The question then becomes the level of cold temperatures that the LDC should utilize for capacity planning purposes.

Q. HOW IS DESIGN DAY WEATHER EXPRESSED?

A. The weather associated with design day conditions is often defined in terms of heating degree days ("HDDs"), which is simply a measure of coldness relative to a base temperature of 65° F.[16] In other words, to convert a daily temperature into HDD, the daily temperature is simply subtracted from 65° F. For example, a daily temperature of 10° F equates to 55 HDDs (i.e., 65 minus 10). Warm temperatures, i.e., temperatures above the base temperature of 65° F, are typically represented by zero HDDs as opposed to having a negative amount of HDDs.

Q. HOW IS DESIGN DAY WEATHER SPECIFIED FOR PURPOSES OF DESIGN DAY DEMAND FORECASTING?

A. There are two primary ways in which LDCs determine design day weather: (i) a probabilistic approach; and (ii) a coldest observed approach. First, the probabilistic approach determines the design day weather on the likelihood, or probability, of that weather being exceeded. When considering design day weather, the relevant probability is often characterized as a "one day in X number of years" likelihood of exceeding the specified number of HDDs. For example, if the likelihood of experiencing weather greater than 80 HDDs is one day in 100 years, then 80 HDDs is considered 1-in-100 year design day weather.

The calculations used to determine design day weather based on the probabilistic approach rely on probability theory. A sample of historical weather is examined and a distribution of possible outcomes is developed to represent the underlying data. The most common probability distribution is the normal distribution. A normal distribution looks

[16] See, e.g., www.aga.org; Natural Gas Glossary.

like a bell, which is why it is often called a "bell curve", and is characterized by its average (or mean) which identifies the center of the distribution and by its standard deviation which measures the width of the distribution. The average and standard deviation of a normal distribution allow one to calculate the probability associated with various events.

An alternative approach for determining design day weather is the coldest observed approach. Under this approach, design day weather is based on the number of HDDs associated with the coldest day observed in a defined historical period of time, which, for example, could be 30 years, 50 years, or since temperatures have been recorded. This approach presumes that since the weather has occurred in the past, it could occur again in the future, and thus the LDC should plan its system and capacity portfolio accordingly.

Q. HOW WAS THE DESIGN DAY WEATHER SPECIFIED FOR CEA'S DESIGN DAY DEMAND FORECAST?

A. For CEA's design day demand forecast, a probabilistic approach was utilized to calculate design day weather. Specifically, the design day weather was specified based on a 1-in-100 year probability of occurrence for Kansas City, St. Joseph and Joplin.

Q. PLEASE EXPLAIN HOW TO CALCULATE THE LEVEL OF HDDs ASSOCIATED WITH A 1-IN-100 YEAR DESIGN COLD DAY.

A. First, a data set comprised of 30 data points representing the HDDs associated with the coldest day of each of the most recent thirty years was obtained from weather data published by the National Oceanic and Atmospheric Administration ("NOAA"), and thus consistent with the source of data proposed by Staff for its analysis. Thirty years of data were utilized since this is an industry standard for determining normal weather.[17] This data set was then analyzed to ensure that it was normally distributed. Next, the mean (i.e., the average) and standard deviation of the data set was calculated, and the design HDD associated with a 1-in-100 year probability was then calculated from the normal distribution. This process was conducted for two locations, Kansas City, to represent weather for the Kansas City and St. Joseph service areas, and Springfield, to represent weather for the Joplin service area. The same weather data were utilized for both the Kansas City and St. Joseph service territories since there are not separate weather data recorded for these two locations, and Springfield was utilized for Joplin since there are no specific NOAA data for Joplin.

Q. WHAT IS THE DESIGN DAY WEATHER THAT CEA UTILIZED FOR FORECASTING DESIGN DAY DEMAND?

A. Based on a design day weather probability of a 1-in-100 year event, the design day weather utilized by CEA for the Kansas City/St. Joseph service territories was 81.9 HDDs. Applying the same design day weather probability to Joplin as done for Kansas City/St. Joseph, the design day weather criteria for Joplin was 76.3 HDDs. As such, the design day weather for both Kansas City/St. Joseph and Joplin represent a 1-in-100 year likelihood of occurrence, and are thus consistent with one another and provide the same level of reliability for both locations.

[17] See, e.g., NOAA, National Weather Service Glossary.

Q. WHAT APPROACH DID STAFF UTILIZE TO DETERMINE THE DESIGN DAY WEATHER RELIED UPON IN ITS DESIGN DAY DEMAND FORECAST?

A. Staff utilized the coldest observed approach. Specifically, as shown in Schedule JJR-3, Staff utilized design day weather for Kansas City/St. Joseph of 81.5 HDDs, and design day weather for Joplin of 72.1 HDD.[18] These represent the coldest observed weather at these locations (occurring on December 22, 1989) based on data from Accuweather and NOAA, respectively.

Q. IS THERE A PROBLEM WITH STAFF'S PROPOSED DESIGN DAY WEATHER DETERMINATION?

A. Yes. The problem with Staff's proposed design day weather calculation is not that it utilized the coldest observed approach, as this approach is utilized by numerous LDCs across the United States. The problem is that the coldest observed approach should not be utilized to calculate design day weather for two separate service territories if the level of design day weather is not consistent, and thereby does not provide a similar level of protection against extreme weather events to customers in both jurisdictions. Specifically, Staff failed to evaluate whether the likelihood of its proposed design day weather being exceeded was consistent across the two service territories. Based on the most recent 30 years of historical NOAA weather data for Kansas City/St. Joseph available at the time of the 2001/2002 ACA period, and taking the coldest day in each of those 30 years, Staff's proposed design day demand for Kansas City/St. Joseph of 81.5

[18] While Staff has separately forecast design day demand for Kansas City and St. Joseph, the design day weather was the same for both locations since there is not weather data published for each location separately.

HDDs represents a 1-in-87 year likelihood of occurrence. However, based on similar NOAA weather data set for Joplin, Staff's proposed design day demand for Joplin of 72.1 HDDs only represents a 1-in-25 year likelihood of occurrence. Therefore, under Staff's proposed approach for determining design day weather, Staff would have MGE plan its capacity portfolio to provide Kansas City and St. Joseph customers with sufficient protection to meet a 1-in-87 year cold event, while customers in Joplin would only be covered for a 1-in-25 year event. Schedule JJR-4 presents these design day weather calculations. Obviously, if MGE were to plan on such a standard, the likelihood of MGE not being able to reliably provide continuous service in Joplin would be much greater as opposed to service in Kansas City/St. Joseph.

Q. IS THE SPECIFICATION OF DESIGN DAY WEATHER BASED ON A 1-IN-100 YEAR PROBABILITY AS YOU HAVE PROPOSED REASONABLE?

A. Yes. Specifying design day weather for purposes of forecasting design day demand on a 1-in-100 year occurrence is appropriate for a number of reasons. First, the use of a design day weather planning standard that is representative of a 1-in-100 year probability is utilized elsewhere in the industry. For example, KeySpan Energy Delivery- New York and KeySpan Energy Delivery – Long Island (together "KeySpan"), which are two of the largest natural gas utilities in the United States, rely upon a design day weather planning standard of 65 HDDs.[19] Based on the coldest day observed for Central Park in New York City for the past 30 years using NOAA weather data, KeySpan's design day weather for

[19] See, e.g., KeySpan Energy Corp., 2004 SEC Form 10-K, page 8.

planning purposes represents an even stricter standard than a 1-in-100 year planning standard.

Second, there is effectively no cost difference between the use of a 1-in-100 year design weather planning standard for Kansas City and St. Joseph and the use of Staff's proposed coldest observed standard for those locations that represents a 1-in-87 year design weather standard. The primary difference, however, is that the use of 1-in-100 year design weather provides MGE's customers with a greater level of protection against extreme cold weather. Specifically, the number of HDDs associated with the probability of a 1-in-100 year occurrence for Kansas City and St. Joseph is 81.9 HDDs, or only 0.4 HDDs higher than Staff's proposal of 81.5 HDDs. Schedule JJR-5 presents the incremental capacity cost to MGE customers in Kansas City and St. Joseph that results from utilizing a design weather standard of 81.9 HDDs as opposed to 81.5 HDDs. As shown in Schedule JJR-5, the incremental capacity required to meet a 1-in-100 design weather standard as opposed to a 1-in-87 design weather standard would be less than $0.28 *per customer per year*. Clearly, the cost difference between providing 1-in-87 year protection as proposed by Staff and 1-in-100 year protection is de minimus, and thus a higher design day planning standard would be reasonable.

Third, the use of a 1-in-100 year design weather standard for both Kansas City/St. Joseph and Joplin provides not only a reasonable level of protection to both service areas, but also a consistent level of protection to both service areas. As noted earlier, Staff's proposed design day weather would produce a dramatically different level of protection without any support or justification for such a discrepancy. Specifically, Staff's approach relied upon design day weather with a 1-in-87 year likelihood of occurrence for Kansas City/St. Joseph, but relied upon design day weather with only a 1-in-25 year likelihood of occurrence for Joplin.

Baseload Demand

Q. WHAT IS BASELOAD DEMAND FOR LDCs?

A. Natural gas demand can be thought of as having two components, i.e., a variable portion that is responsive to changes in weather known as weather-sensitive or heatload demand, and a more constant portion that is not responsive to changes in weather, known as baseload demand. The AGA defines baseload demand as "a given consumption of gas remaining fairly constant over a period of time, usually not temperature-sensitive."[20] Since the typical residential baseload is defined by the AGA as "the gas consumed by the clothes driers, water heaters, ranges and cooling", baseload demand does not vary materially with the number of heating degree days.[21]

Q. WHAT IS THE IMPORTANCE OF BASELOAD DEMAND IN FORECASTING DESIGN DAY DEMAND?

A. It is important to identify the baseload demand when forecasting design day requirements because the baseload portion of total demand is constant and will not change with colder temperatures. Thus, by removing baseload demand from the total demand, it is the relationship between the heatload demand and temperature (as measured in HDDs) that

[20] See, e.g., AGA at www.aga.org; Natural Gas Glossary.

[21] Id.

can be used to estimate the weather sensitive portion of the forecasted design day demand.

Q. HOW IS BASELOAD DEMAND DETERMINED FOR PURPOSES OF DESIGN DAY DEMAND FORECASTING?

A. The primary methodology utilized by LDCs to calculate baseload demand is to calculate the average daily demand during the summer months in which there are few to no HDDs. LDCs typically calculate the average daily demand on their system associated with the months of June, July and/or August (depending on their specific weather conditions) since there are generally no HDDs in these months, and the demand is thus representative of the non-weather sensitive demand on the system. In other words, demand in these summer months does not vary due to cold weather since the average daily temperature is not typically below 65° F during these months.

Q. HOW WAS BASELOAD DEMAND CALCULATED FOR CEA'S DESIGN DAY DEMAND FORECAST?

A. In order to properly reflect baseload demand as non-weather sensitive demand, baseload demand was calculated as the average of the July and August demand for the summers of 1998, 1999 and 2000, thus utilizing the data that would have been available prior to the filing of the 2001 Reliability Report on July 1, 2001 and the filing of the 2002 Reliability Report on July 1, 2002. The baseload demand estimates for each of the service territories as of July 1, 2001 and July 1, 2002 are shown on Schedule JJR-6.

Q. WHAT IS THE BASELOAD DEMAND IN STAFF'S FORECAST OF DESIGN DAY DEMAND?

A. As shown in Schedule JJR-3, page 4 of 68 (see Staff's Scenario 2 Usage Estimates upon which its proposed disallowance is based), Staff's baseload demand estimate for 2001/2002 for Kansas City is **____** MMBtu, for St. Joseph is **___** MMBtu and Joplin is **____** MMBtu.

Q. IS THERE A PROBLEM WITH STAFF'S ESTIMATE OF BASELOAD DEMAND?

A. Yes. The results of Staff's projected baseload demand estimate are inconsistent with reality; the estimates are not representative of the non-heat sensitive demand on MGE's system. As noted earlier, the AGA defines baseload demand as demand that is not temperature-sensitive. However, as shown on Schedule JJR-3, page 4 of 68, Staff's baseload demand estimate for Kansas City is **_____** MMBtu, yet that amount is approximately half of the baseload demand that MGE actually experiences in the summer when there are zero HDDs. Specifically, as shown on Schedule JJR-6, the average daily demand in Kansas City for July and August, when there are zero HDDs, was **____** MMBtu. The same problem exists with Staff's baseload demand estimates for St. Joseph and Joplin as well. There is no justification for estimated baseload demand, as presented by Staff, being half of the actual baseload demand during the summer when there is no weather-related demand. Staff's approach simply produces an incorrect result.

Heatload Demand

Q. WHAT IS HEATLOAD DEMAND FOR LDCs?

A. As noted earlier, heatload demand is the variable, or weather-sensitive, component of total demand. Since gas is typically used as a source of heating (as opposed to cooling), heatload demand tends to increase as HDDs increase (i.e. when temperatures decrease). It is this relationship between heatload demand and HDDs that is used to forecast demand as weather changes. The relationship between heatload demand and HDDs is often thought of in terms of a heatload demand per HDD and is identified as a heatload factor. As noted above in the formula for calculating design day demand, once the heatload factor is established, it is multiplied by the design day weather and that product is then added to the baseload demand in order to determine the design day demand forecast.

Q. HOW SHOULD A HEATLOAD FACTOR BE CALCULATED?

A. There are many ways in which a heatload factor can be calculated. Staff has suggested, and I agree, that an appropriate approach to developing the heatload factor for design day demand forecasting purposes is to utilize a regression equation. Even with agreement that utilizing a regression equation is an appropriate approach, there are many different ways to specify the regression analysis that will have an impact on the final results. Unfortunately, there are no pre-defined guidelines or definitions to use when developing the data set to use in a regression analysis. Developing the appropriate data set requires balancing the needs and goals of the regression analysis with the data set that is available. In this case, the available data include daily demand for November 1, 1997 through March 31, 2001 and the daily HDD information for the same period. The goal is to find the subset of these data that is the best representation of potential design day demand to use in the regression analysis. It is extremely important to consider the data set used to conduct the regression analysis since the results represent the input data.

Q. HOW WAS HEATLOAD DEMAND CALCULATED FOR CEA'S DESIGN DAY DEMAND FORECAST?

A. First, to calculate the heatload factor, CEA utilized the three highest demand days that were also within the ten coldest days for the four winters for which data was available at the time of the 2001/2002 ACA period. In other words, from the data that were available, only data that were most representative of a design day was utilized. Thus, CEA's analysis utilized 12 data points (i.e., 3 per year for 4 years of available data) that would have been available for the 2001/2002 ACA period, and 15 data points (i.e., 3 per year for 5 years of available data) that would have been available for the 2002/2003 ACA period. Simply put, the data utilized by CEA (i.e., demand and HDDs associated with very cold days) was most representative of what was being predicted (i.e., a heatload factor for a design day).

In addition, in order to ensure that the regression equation was estimating the relationship between weather sensitive demand and the level of HDDs, the baseload demand was first subtracted from each particular total daily demand data point to be utilized in the regression prior to running the regression. For example, as shown on Schedule JJR-6, the Kansas City baseload demand for 1999 was **_____** MMBtu, and this amount was subtracted from each of the three demand data points selected from 1999 as most representative of design day demand prior to running the regression equation. Thus, in order to calculate the heatload factor, the demand data utilized for the regression were based only on weather sensitive demand (not both weather sensitive demand and non-weather sensitive demand).

Q. HOW DID STAFF CALCULATE THE HEATLOAD FACTOR UTILIZED IN ITS DESIGN DAY DEMAND FORECAST?

A. In order to calculate the heatload factor, Staff utilized total demand (i.e., both baseload and heatload demand) and HDD data for every winter day in its regression analysis, i.e., every day in the months of November through March - or 151 data points per year, for a 4 year period. Thus, Staff utilized 604 data points (i.e., 151 times 4).[22]

Q. IS STAFF'S APPROACH FOR ESTIMATING A HEATLOAD FACTOR APPROPRIATE?

A. Absolutely not. Staff's approach suffers from a fundamental flaw in that its regression equation was premised on input data that was not representative of the data that was to be forecasted with the regression equation, i.e., heatload demand on a design winter day. Rather, Staff relied upon demand data for all 151 winter days of each year, and as such, included both warm and cold winter days in its regression analysis as opposed to just winter days most reflective of design day conditions. As such, the result produced by its regression equation, i.e., an estimated heatload factor, is also incorrect. Simply put, Staff

[22] As shown in Schedule JJR-3, Staff removed two data points when calculating its heatload demand for Joplin, and thus utilized 602 data points as opposed to 604 data points.

utilized incorrect input data for its regression equation, and thus produced incorrect output results.

As I noted above, it is extremely important that the data utilized in the regression be representative of the output that is being sought. Since the goal of the regression equation was to calculate a heatload factor associated with design day demand, i.e., a level of demand during extreme weather conditions, the data that Staff utilized for its regression equation should have been limited solely to days during which MGE experienced high levels of demand and thus presumably were also quite cold. Since MGE has not experienced a design day during the time period for which MGE has demand data available, there are no actual data points available that are truly representative of design day demand. Therefore, due to an absence of actual design day demand data in the data set that is available to predict design day demand, it is critical that demand data that is most representative or closest to design day demand conditions be utilized in the regression equation.

Q. DOES STAFF'S APPROACH MAKE SENSE FROM A STATISTICAL PERSPECTIVE?

A. No. From a statistical perspective, Staff's approach does not make sense. Staff's approach of relying on data from all 151 winter days to estimate the heatload factor for a design day results in bias. A cite from a statistics textbook utilized by Penn State University highlights the problem with Staff's analysis:

> Sample statistics are used to estimate population parameters. Statisticians are almost never actually interested in the sample itself. Samples are used

> by researchers in order to gain knowledge about the population to which they belong. This process of using sample data to make statements about the population is statistical inference. Because samples are smaller than populations, it is almost always less expensive in terms of time or money to collect data using samples and calculate sample statistics rather than population parameters. *However, for a sample statistic to be a good estimator of a population parameter, the sample must be representative of the population.* Statisticians call these samples unbiased. (emphasis added) (Investigating Statistics, Penn State University, Robert Hale, Wadsworth, 2005.

In the context of this proceeding for purposes of calculating the heatload factor the sample would be the daily winter demand data Staff utilized for its regression, and the population would be the design day demand. In other words, as noted in the cite from the university statistics textbook above, in order for the daily winter HDD and daily demand data to be a good estimator of heatload factor, the input data utilized must be representative of design day demand. However, the input data utilized by Staff, i.e., the HDDs and demand for all winter days, is not representative of the design day demand.

For example, Staff's approach to calculating heatload factor would be analogous to a situation in which one were attempting to forecast the rate of car accidents per teenage driver. If such a study were being conducted, it would be illogical to utilize a data set that included all drivers, and instead it would be appropriate to utilize a data set that included only teenage drivers. Similarly, it is equally obvious that utilizing HDD and demand data for all 151 winter days to calculate the heatload factor associated with a design day is also illogical.

Q. CAN YOU GRAPHICALLY DEMONSTRATE THE PROBLEM WITH STAFF'S APPROACH OF RELYING ON DATA THAT IS NOT REPRESENTATIVE OF DESIGN DAY DEMAND TO FORECAST DESIGN DAY DEMAND?

A. Yes. Schedule JJR-7 graphically illustrates the demand data points utilized in CEA's analysis and the demand data points utilized in Staff's analysis, as compared to the design day demand that is trying to be forecast. Specifically, Schedule JJR-7 is a graph of the 12 demand data points that I utilized for Kansas City to calculate heatload factor (reflected as the dark black dots on Schedule JJR-7), and the 604 demand data points utilized by Staff to calculate heatload factor for Kansas City (reflected as the gray dots on Schedule JJR-7).[23] In addition, there is a large dotted oval on Schedule JJR-7 that is an illustrative representation of the area that would encompass demand data that would be representative of design day demand. However, as can be seen in Schedule JJR-7, there are no actual demand data currently available that fall within that dotted oval and would thus be characterized as "design day" demand, or demand that has occurred under extreme cold weather conditions. Rather, the design day demand previously experienced on MGE's system was when the system was formerly owned and operated by Western Resources, and data from that time period are not available. Therefore, since there is no actual demand data available representative of design day demand conditions, it is important to utilize from the demand data that are available the data that are as close to the design day demand that is trying to be projected (shown as the dotted oval on Schedule JJR-7).

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[23] Please note that the 12 data points utilized in my regression equation are a subset of the 604 data points utilized by Staff in its regression equation.

As shown on Schedule JJR-7, this is exactly what CEA's analysis has done. As seen in that schedule, the dark black points that utilized in CEA's regression analysis are all days of relatively high demand and relatively cold temperature, i.e., close to the dotted oval on Schedule JJR-7. In contrast, Staff utilized demand and HDD data for the entire winter for four years, or a data set that includes hundreds of days where the demand and HDDs would be characterized as average winter demand or below-average winter demand, i.e., far from the dotted oval on the graph, and thus nowhere close to being characterized as representative of design day demand.

Q. HAS STAFF'S APPROACH INCORRECTLY FOCUSED ON THE NUMBER OF OBSERVATIONS THAT SHOULD BE USED IN A REGRESSION EQUATION AT THE EXPENSE OF THE APPROPRIATENESS OF THE OBSERVATIONS THAT SHOULD BE USED?

A. Yes. As I noted earlier, there are no pre-defined guidelines or definitions to use when developing the data set to use in a regression analysis, and Staff has recognized this fact in various responses to data requests from MGE in this proceeding.[24] Therefore, there is no disagreement that there is an element of judgment that needs to be applied when selecting the data set to be utilized in the regression equation to calculate heatload demand. However, the problem is with Staff's understanding of *how to determine* an appropriate sample, as opposed to the *size* of the sample. For example, as noted in the response to a data request, Staff noted the following:

[24] See, e.g., Staff's responses to Data Request No. 31 in Case No. GR-2002-348 and Data Request Nos. 40 and 138 in Case No. GR-2003-0300.

> DR No. 31 - Please explain the amount of data that Staff believes is appropriate to conduct an effective regression analysis. Please provide any workpapers used to develop the response.
>
> Staff Response: There is not set amount of data. The Company [i.e., MGE] should review shifts in customer numbers by customer type and shifts in customer usage that cannot be explained by weather. Determining a reasonable sample size is part of the estimating process. Prudent planning requires gaining an understanding of the data that the Company is reviewing to make decisions about the number of variables to include and the amount of data to include. <u>**The Company may find that simply reviewing actual daily usage data and actual HDD provides a good correlation.**</u> The Company may find that adding day of the week to the analysis (weekday versus weekend or a separate daily analysis) does or does not add value to the analysis. (emphasis added) (Staff Response to Data Request No. 31 in Case No. GR-2002-348)

As noted above, Staff implies that if actual daily usage and actual HDD have a good correlation, then that data set would be appropriate to utilize for a regression. However, it is not simply the number of observations and whether the data is correlated that results in an appropriate regression equation, <u>but also the appropriateness of the data upon which the regression equation is based</u>. In fact, considering that MGE is a winter-peaking LDC, meaning that demand on its system increases as the weather gets colder, it would be expected that natural gas usage, regardless of whether it was daily data or some other data set, would be highly correlated with HDD. Therefore, no matter what demand and corresponding HDD data set was utilized, the data set would likely have a good correlation between customer usage and HDDs, but that does not mean that the data set is appropriate for determining heatload demand for a design day. This highlights the fact that Staff has incorrectly focused on the number of observations used in its regression equation to determine heatload demand at the expense of the appropriateness of those observations.

Reserve Margin

Q. WHAT IS A RESERVE MARGIN FOR PURPOSES OF FORECASTING DESIGN DAY DEMAND?

A. Reserve margin, as utilized for purposes of design day demand forecasting, is the difference between a LDC's peak day capacity and the design day demand. Assuming Staff has utilized peak day and design day interchangeably, this definition is consistent with the definition noted by Staff.[25] The concept of a reserve margin exists for a number of reasons. First, it is impossible to perfectly match pipeline capacity with design day demand. Pipeline capacity is purchased in blocks over periods of time, often over many years. As a result, capacity purchases are based on design day forecasts at the time the contract is signed, but often design day forecasts change. Second, capacity contracts are signed when the opportunity exists to purchase additional capacity. There are situations where utilities must act opportunistically and sign capacity in anticipation of needs in the future if they believe that the capacity may not be available or may come at a significant premium later when they need it. Third, it is understood that design day forecasts are just that - forecasts. Therefore, there is some level of imprecision embedded in the design day demand estimates used to determine how much capacity will be required. Lastly, due to the limitations of the physical infrastructure supplying and transporting the natural gas to the LDC citygate, there is no guarantee that this physical infrastructure will perform optimally during extreme weather conditions. Thus, having a reserve margin to cover

[25] In the response to a MGE data request, Staff indicated that reserve margin was defined as "the peak day capacity minus the peak day demand." (Staff Response to MGE Data Request-13, Case No. GR-2002-348).

such circumstances is reasonable and prudent to ensure that customers can be provided safe and reliable service.

Q. HOW WAS THE RESERVE MARGIN CALCULATED IN CEA'S ANALYSIS?

A. For purposes of CEA's design day demand forecast, the same basic approach was utilized for estimating a reserve margin as utilized by Staff in its analysis. Specifically, the reserve margin was estimated based on the standard error of the y-estimate produced by the heatload factor regression analysis, which is the same method utilized by Staff to estimate the reserve margin in its analysis.[26]

Q. DID CEA APPLY A GROWTH FACTOR TO ESTIMATE PROJECTED DESIGN DAY DEMAND IN FUTURE PERIODS?

A. Yes. For purposes of CEA's design day demand forecast, a **____** annual growth rate was applied to the baseload and heatload demand for Kansas City, St. Joseph and Joplin, which is the same growth rate utilized by Staff in its analysis.

Q. BASED ON THE DESIGN DAY DEMAND FORECAST APPROACH YOU HAVE DESCRIBED, WHAT ARE THE RESULTS OF CEA'S ANALYSIS?

A. The results of CEA's design day demand forecast for each of MGE's three service territories are shown in Schedule JJR-8. Schedule JJR-8 also presents a comparison of

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[26] In simple terms, the standard error of the y-estimate is a measurement of how far actual values are likely to be from the expected value produced by the regression equation. Therefore, since no forecast will exactly predict the actual future value, the standard error of the y-estimate, if included in the demand projection, provides more certainty that the actual value will fall within the regression equation's predicted value.

the result of CEA's design day demand forecast, the forecast conducted by MGE in the 2001 Reliability Report and Staff's proposed design day demand forecast.

As shown in Schedule JJR-8, the CEA analysis, which is a robust and reasonable design day demand forecast utilizing data that was available as of the 2001/2002 ACA period, resulted in projected design day demand as of 2005/2006 and as of 2010/2011 as follows:

Region	**2005/2006**	**2010/2011**
Kansas City	**___** MMBtu	**___** MMBtu
St. Joseph	**___** MMBtu	**___** MMBtu
Joplin	**___** MMBtu	**___** MMBtu

On a combined basis, CEA's projected design day demand for 2005/2006 resulted in a total demand for MGE of **____** MMBtu, or an amount that is not materially different than the **_____** MMBtu projected by MGE in its 2001 Reliability Report utilizing a different approach. As shown on Schedule JJR-8, comparing the projected demand to the capacity for each region, MGE would have a slight **____** of capacity in Kansas City and St. Joseph as of 2005/2006, and a **_____** of capacity in Joplin as of that same period. Based on the analysis, MGE would be projected to have a capacity **____** in both Kansas City and Joplin by 2010/2011.

Again, it is important to remember that design day demand forecasts are estimates, and there are numerous variables that can impact the projection. In addition, as noted by MGE Witness Kirkland, the design day demand forecast is one component of a prudent capacity planning and acquisition process that is conducted by a LDC, and that factors such as existing and future capacity availability, capacity and supply costs, reliability, diversity and economic considerations.

V. CONCLUSIONS

Q. IS STAFF'S RECOMMENDED DISALLOWANCE RELATING TO SURPLUS CAPACITY JUSTIFIED?

A. Absolutely not. Simply put, the design day demand analysis upon which Staff's disallowance is based includes errors and is thus not representative of a sound or reasonable analysis. As such, Staff's design day forecast does not meet a minimally acceptable threshold for forecasting design day demand, and is certainly not an analysis upon which a disallowance should be based.

As discussed, there is a wide range of reasonable ways in which design day demand planning can be conducted, and the specific circumstances of each LDC play a significant role in determining what is considered reasonable. As demonstrated by CEA's independent design day demand analysis, utilizing a robust and reasonable approach to design day demand forecasting for MGE, which in fact addresses many of the concerns related to MGE's reliability reports initially raised by Staff, produced a result that is not materially different than the design day demand projected by MGE prior to the 2001/2002 ACA period. In addition, as discussed in MGE Witness Kirkland's direct testimony, there are numerous other factors that need to be considered in the capacity planning and acquisition process, and there are additional benefits that customers have received from MGE's capacity portfolio. Therefore, no disallowance is warranted.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.