BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF SOUTH DAKOTA

IN RE:	**)**	
MIDAMERICAN ENERGY COMPANY	**)**	**DOCKET NO. NG14-____**
	)	

DIRECT TESTIMONY
OF
CHARLES B. REA

Q. Please state your name and business address.

A. My name is Charles B. Rea. My business address is MidAmerican Energy Company ("MidAmerican"), 106 East Second Street, Davenport, Iowa 52801.

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

A. I am employed by MidAmerican as Manager, Regulatory Strategic Analysis.

Q. Please describe your education and business experience.

A. I received a B.A. in Computer Science from the University of Illinois at Springfield in 1986 and a M.A. in Statistics and Operations Research from Southern Illinois University at Edwardsville in 1990. I have been employed by MidAmerican and its predecessor companies since 1990 and have worked in electric system planning, forecasting, load research, marketing, rates, and energy efficiency.

Q. Have you testified before the South Dakota Public Utilities Commission ("Commission") or other regulatory bodies previously?

A. Yes, I have testified before the Commission in Docket No. GE12-005 pertaining to MidAmerican's natural gas and electric energy efficiency plans. I have also testified before the Iowa Utilities Board and the Illinois Commerce Commission on matters related to energy efficiency, electric cost of service and rate design, and weather normalization issues.

Q. What is the purpose of your direct testimony?

A. The purpose of my testimony is to sponsor MidAmerican's natural gas cost of service analysis and the calculation of MidAmerican's proposed natural gas rates. In addition, I am sponsoring MidAmerican's weather normalization pro forma adjustment.

Q. Are you sponsoring any exhibits in the filing?

A. Yes. I am sponsoring Exhibit CBR 1.1, which includes the following schedules:

- Schedule A: Gas Cost of Service Functional Allocators
- Schedule B: Gas Cost of Service Results
- Schedule C: Derivation of Gas Rates
- Schedule D: Proposed Gas Rates
- Schedule E: Gas Weather Normalization Pro Forma Results
- Schedule F: Gas Weather Normalization Methodologies

Q. How is your direct testimony organized?

A. My direct testimony is organized in three sections:

1. Natural Gas Cost of Service Model
2. Rate Design Consideration and Methods
3. Gas Weather Normalization

Natural Gas Cost of Service Model

Q. What is a cost of service analysis?

A. A natural gas cost of service analysis is a study that determines the cost of providing gas distribution service to the utility's various customer groups for the purpose of setting prices that are based on the utility's cost to provide gas distribution service. The provision of gas service requires many common and joint costs be incurred to supply service to multiple customers which requires the development of allocation methodologies to assign these common costs to customer groups. Historically, similar types of customers have been combined into customer groups for the process of cost determination and ratemaking. The resulting cost determination process based on the allocation of costs to defined customer groups is called a cost of service study.

Q. Please describe MidAmerican's approach to gas cost of service.

A. MidAmerican's gas cost of service analysis is a two-stage analysis. The first component of the cost of service analysis assigns MidAmerican's revenue requirement to business function where the sum across all business functions totals to MidAmerican's total revenue requirement for gas.

The second component of the cost of service analysis assigns the revenue requirement for each function to customer class using a single and separate allocation methodology. The result of the second phase of cost of service is a revenue requirement for each customer class, the sum of which also totals to MidAmerican's total revenue requirement.

Q. What are the various business functions that MidAmerican assigns its revenue requirements to in the first stage of the gas cost of service analysis?

A. MidAmerican assigns revenue requirements in the first stage of the gas cost of service analysis to the following business functions:

- Peaking facilities
- Mains (Average)
- Mains (Peaking)
- Services

- Meters
- Regulators
- Industrial meters
- Customer accounts
- Transportation administration

Q. Please describe how individual accounts that make up MidAmerican's revenue requirement are assigned to function.

A. The majority of the accounts that make up MidAmerican's revenue requirement are directly assigned to a single function. Examples of this include metering and compressor equipment plant. Accounts not directly assignable to a single function are allocated between functions based on appropriate allocation factors. Examples of this include general and intangible plant, accumulated deferred income taxes, administrative and general (A&G) expenses, and payroll taxes.

Q. Do you have a schedule that shows how each account is allocated to function?

A. Yes. Schedule A identifies each account in the functional gas cost of service analysis, whether that account is direct assigned or allocated, and if allocated, the specific method used to allocate that account. In addition, the schedule shows the percentage of each account that is assigned or allocated to each business function.

Q. What are the results of MidAmerican's functional cost of service analysis?

A. The breakdown of revenue requirements across functions in MidAmerican's gas cost of service analysis is shown below:

- Peaking Facilities: $791,086 (2.7%)
- Mains (Average): $3,470,284 (11.8%)
- Mains (Peaking): $9,060,186 (30.8%)
- Services: $7,421,696 (25.3%)
- Meters: $4,616,123 (15.7%)
- Regulators: $562,025 (1.9%)
- Industrial Meters: $38,003 (0.1%)
- Customer Accounts: $3,099,707 (10.5%)
- Transportation Administration: $79,668 (0.3%)
- Gas Supply – Non PGA: $250,091 (0.9%)

Q. What are the customer classes that MidAmerican assigns its functional revenue requirements to in the second stage of the gas cost of service analysis?

A. MidAmerican assigns revenue requirements from the first stage of the cost of service analysis to the following customer classes:

- Small Volume (defined as Rates SVF, ST, STM)
- Medium Volume (defined as MVF, MT, MTM)
- Large Volume (defined as LVF, LT, LVI, CPS)

Q. What method for allocating peaking facilities costs to customer class is MidAmerican using in its cost of service analyses?

A. MidAmerican allocates the cost of peaking facilities to customer class based on estimated design day peak demand for sales service customers in each class.

Q. How does MidAmerican estimate design day peak demand by customer class?

A. For each customer class, MidAmerican conducts a simple regression analysis of billing sales to billing month heating degree days similar to the weather normalization procedures that I explain later in this testimony. This analysis produces two values for each class; a constant value which represents the amount of billing sales for each class in a month assuming zero heating degree days (a summer month, for example), and a slope value that represents the incremental usage in a month for that class for every increase of one heating degree day. These two values can be used to describe a formula that can estimate monthly or daily usage for every class for any presumed number of heating degree days. For the purpose of estimating design day load, the calculation divides the constant value by 30.4 to convert from a monthly value to a daily value, and adds to that the product of the slope value multiplied by 85 degree days which is the assumed design day value. This calculation results in an estimate of design day load for each customer class.

Q. You mentioned that peaking facilities are allocated to customer class based on sales service design day loads. Why are transport loads excluded from this calculation?

A. MidAmerican's peaking facilities are used to provide MidAmerican-owned gas to sales service customers at times of high peak demand on the system. Peaking facilities are generally not used to provide service to transport customers. Therefore, peaking facilities are allocated to class on the basis of sales service design day loads.

Q. Please describe how MidAmerican allocates the revenue requirement associated with distribution mains to customer class.

A. Distribution mains costs are allocated to customer groups based on a combination of a design day allocator and a total throughput allocator and a split-system approach to distinguish the mains system between peaking functions and total throughput functions.

Q. Why are mains costs allocated between an average function and a peaking function?

A. MidAmerican's gas cost of service study recognizes that the primary purpose of the distribution mains system is to deliver gas to customers on a year-round basis, but that the mains system needs to be sized in order to accommodate gas loads on design day conditions. For this reason, the costs of owning, operating, and maintaining the mains system is split into two components; a peaking component and an average load component.

Q. How are the costs for distribution mains split between the peaking component and the average load component?

A. The cost associated with distribution mains is split between the peaking component and the average component based on the system annual capacity factor, where the system capacity factor is calculated as total weather-normalized system throughput divided by 365 days divided by estimated design day throughput. MidAmerican's South Dakota capacity factor in this case is estimated to be 25%. Therefore, 75% of the plant value and associated O&M for mains is assigned to the peaking component and 25% is assigned to the average component.

Q. How are the costs for the peaking component of distribution mains allocated to customer class?

A. The cost associated with the peaking component of mains is allocated to customer class based on estimated total design day throughput. The method used to estimate design day throughput is identical to the methods described above for peaking facilities, with the difference being that for mains, total throughput is used, including transport loads.

Q. How are the costs for the average component of distribution mains allocated to customer class?

A. The cost associated with the average component of mains is allocated to customer class based on total weather-normalized annual throughput, as estimated through the weather normalization process described later in my testimony.

Q. Please describe how MidAmerican allocates the revenue requirement associated with services to customer class.

A. Service costs are allocated to customer classes based on a weighted number of customers calculation. Customer weights in each class are calculated based on the ratio of the current average cost of service installations (per customer) required to serve particular customer groups to the current average cost of a service installation for small volume customers.

Q. Please describe how MidAmerican allocates the revenue requirement associated with meters to customer class.

A. In accordance with MidAmerican's proposal to establish a separate meter charge based on the specific type of meter installed at each customer location described later in my testimony, MidAmerican is not allocating the costs of meters directly to customer class. Instead, MidAmerican is allocating the cost of meters to four separate meter classes, and these classes will be the basis for the metering charge. These classes are as follows:

- Class 1: 0 to 675 cubic feet per hour
- Class 2: 675 to 3,000 cubic feet per hour
- Class 3: 3,000 to 11,000 cubic feet per hour
- Class 4: Over 11,000 cubic feet per hour

Metering costs are allocated to metering classes based on a weighted number of meters calculation in each class. Meter weights in each class are calculated based on the ratio of the current average cost of a meter installation in each class to the current average cost of a meter installation in Class 1.

Q. Please describe how MidAmerican allocates the revenue requirement associated with regulators to customer class.

A. Regulator costs are allocated to customer classes based on a weighted number of customers calculation. Customer weights in each class are calculated based on the ratio of the current average cost of regulator installations (per customer) required to serve particular customer groups to the current average cost of a regulator installation for small volume customers.

Q. Please describe how MidAmerican allocates the revenue requirement associated with industrial meters to customer class.

A. Industrial meter costs are allocated to customer classes based on the total number of industrial customers in each class.

Q. Please describe how MidAmerican allocates the revenue requirement associated with the customer accounts function to customer class.

A. Customer accounts costs are allocated to customer classes based on a weighted number of customers calculation. Customer weights in each class are calculated based on the ratio of the current cost of providing customer service and key account management functions (per customer) to particular customer groups to the current cost of providing customer service functions to small volume customers.

Q. Please describe how MidAmerican allocates the revenue requirement associated with transportation administration to customer class.

A. Transportation administration costs are allocated to customer classes based on the total number of transport customers in each class.

Q. What are the results of MidAmerican's gas cost of service study?

A. Schedule B shows the results of MidAmerican's cost of service analysis. Schedule B shows the allocation of revenue requirements to function and the allocation of the costs associated with each function to customer class.

Q. Has MidAmerican provided a copy of its gas cost of service study?

A. Yes. A full and complete working copy of MidAmerican's gas cost of service and rate design model has been provided as a workpaper to Statement O in the gas filing requirements.

<u>Rate Design Considerations and Methods</u>

Q. Please describe the relationship between cost of service results and the goals of rate design.

A. An important goal of rate design is to develop prices for natural gas service to retail customers that are intended to recover the Company's approved revenue requirement and that reflect the cost of providing service to retail customers. MidAmerican is submitting a full set of rates based upon the cost of service analysis provided in this case. The rate design offered by MidAmerican is based directly on cost of service, is designed to recover MidAmerican's proposed revenue requirement, and reflects the costing and pricing principles that were used to develop the cost of service study. Detailed financial information from the cost of service analysis is used to develop the individual components of the rate design.

Q. What rates is MidAmerican proposing to implement in this case?

A. MidAmerican is proposing to implement rates for the following rate classes:

- Small Volume (defined as Rates SVF, ST, STM)
- Medium Volume (defined as MVF, MT, MTM)
- Large Volume (defined as LVF, LT, LVI, CPS)

Rates for current rate classes within the general categories listed above are identical with the exception of LVI, which does not contain the demand charges that are included in rates LVF and LT. The current rate codes SSS, LSS, and SVI are being eliminated as described in the direct testimony of MidAmerican witness Debra Kutsunis. In addition, MidAmerican is proposing to establish a separate meter charge for customers based on the size of the gas meter installed at their location. Metering costs will not be included in the normal monthly customer charge, but will appear separately in the tariff and on the bill as a meter charge specific to each customer's meter type.

Q. **Please describe the basic structure of MidAmerican's proposed metering charge.**

A. MidAmerican's proposed metering charge will be a flat dollars per month charge to each customer based on the approximate size of the meter in place at the customer's location. Four different classifications are proposed based on the size and capacity of the meter. Because larger and higher capacity meters are more expensive than smaller and lower capacity meters, the charges increase for higher metering classes. The proposed classes are as follows:

- Class 1: 0 to 675 cubic feet per hour
- Class 2: 675 to 3,000 cubic feet per hour
- Class 3: 3,000 to 11,000 cubic feet per hour
- Class 4: Over 11,000 cubic feet per hour

Q. **Please explain MidAmerican's rationale for utilizing a separate meter charge instead of including the meter charge in the monthly service charge.**

A. The meter size required by a customer is dependent upon the connected load the customer may require to serve gas-fired equipment. Establishing a "typical" gas meter size and resulting average cost of metering for a customer class, particularly for the medium and large volume classes, can shift the higher cost of larger meters to smaller volume customers, thus providing a subsidy to larger volume customers.

Q. How are the various cost components of the class cost of service study used in the design of MidAmerican's proposed rates?

A. Schedule C shows the derivation of rates for each of MidAmerican's proposed rates. It maps out for each rate how the different components of cost of service are used to build the rate.

Q. Do you have a schedule that shows MidAmerican's proposed rates?

Schedule D provides a complete set of proposed rates for MidAmerican in this filing.

<u>Gas Weather Normalization</u>

Q. What is the purpose of the gas weather normalization pro forma and why is it an important issue in this case?

A. MidAmerican estimates that about 65% of total natural gas throughput on MidAmerican's South Dakota systems is used for heating and is therefore weather dependent. As a result, the level of annual revenue that is collected from volumetric charges associated with this natural gas usage is dependent on how cold the heating season is. Just as in the electric business, cold winters will result in MidAmerican collecting a higher level of revenue than it normally otherwise would, and mild winters will result in MidAmerican collecting a lower level of revenue. Just as in the electric business, the purpose of the weather normalization pro forma adjustment is to determine a level of retail sales and revenues under existing rates that could be reasonably expected given normal weather conditions, thus eliminating the effect on test year retail sales and revenues of having unusually mild or extreme weather during the test year.

Q. What classes is MidAmerican proposing to include in the weather normalization pro forma adjustment for natural gas sales?

A. MidAmerican is proposing weather normalization pro forma adjustments for the following rate classes:

- Rate SVF (residential and commercial)
- Rate MVF (residential and commercial)
- Rate ST
- Rate MT
- Rate LT
- Rate STM
- Rate LTM

Q. What is the value of the proposed weather normalization pro forma adjustment?

A. The weather normalization pro forma adjustment reduces total test year natural gas distribution revenue by $1,386,223. The weather normalization pro forma adjustment for both revenue and therm sales by class is provided in Schedule E.

Q. What weather data is MidAmerican using as the basis for the natural gas pro forma adjustment?

A. For natural gas, MidAmerican is basing its weather normalization adjustment on monthly weather data from the NOAA Sioux Falls weather station. Monthly heating degree days with a 55 degree base are used to model the heating component of weather-sensitive natural gas sales. Normal weather is defined to be the official 30-year NOAA daily normal (1981-2010) for Sioux Falls.

Q. Please describe the methodology MidAmerican is using to determine the sales component of the weather normalization pro forma.

A. MidAmerican's weather normalization methodology for normalizing annual therm sales by customer class is provided in Schedule F.

Q. Is the methodology MidAmerican is using to determine the sales component of the weather normalization pro forma a departure from previously used methodologies by MidAmerican in South Dakota?

A. Yes. MidAmerican's proposed methodology for determining the sales component of the weather normalization pro forma adjustment is a departure from previous methodologies in four significant ways:

- MidAmerican is using a simple regression analysis to estimate the heating sensitivity of natural gas sales for each customer class. This differs from the arithmetic methodology used in the past.
- MidAmerican is using weather data from a single weather station in South Dakota; that being the NOAA weather station at Sioux Falls (Foss Field). This is a departure from past practice that utilized weather data from seven different weather stations in MidAmerican's South Dakota service territory.

- MidAmerican is using a 55 degree day base for defining the value of heating degree days, which is different than the 65 degree day base traditionally used in the past.
- MidAmerican is defining billing month heating degree days using a 60/40 weighting instead of a traditional 50/50 weighting. This means that billing month degree days for a given month are to be defined to be 40% of the calendar month degree days for that month and 60% of the calendar month heating degree days for the month immediately preceding that month. This differs from the traditional 50/50 weighting used in the past.

Q. Why is MidAmerican moving away from the arithmetic model that has been used in the past for weather normalizing gas sales and moving towards a more statistical approach?

A. There are two reasons MidAmerican is moving from the previously used arithmetic method to a more statistical method. The first is that the statistical method is actually easier to calculate than the arithmetic method used in the past. The second, and far more important, reason is that use of statistical methods allow MidAmerican and other stakeholders to evaluate the accuracy of the assumptions used in weather normalization in a way that the old arithmetic model did not allow for. The arithmetic model produced results, but did not give any indication of whether the results were accurate or if the assumptions behind the results reflected the reality of how customers use natural gas. The only judgment that could be made as to the quality of the results was if the assumptions “seemed” reasonable. Use of statistical methods takes away the need for guesswork concerning the judgment of assumptions and allows MidAmerican and other stakeholders to objectively compare the accuracy of one model versus another, and by extension one set of assumptions versus another, with the goal of achieving the most accurate results possible.

Q. Why is MidAmerican using a definition of heating degree days based on a 55 degree base instead of 65 degrees, and using a 60/40 weighting instead of the 50/50 weighting that has been used in the past?

A. MidAmerican has found that defining heating degree days using a 55 degree base and a 60/40 weighting between previous month and current month degree days more accurately reflects the realities of how MidAmerican's customers use natural gas than the previous 65 degree base and 50/50 weighting. This improved accuracy improves the quality and accuracy of the weather normalization calculation.

The table below shows a comparison by rate of the accuracy achieved in modeling natural gas sales to weather for MidAmerican's proposed definition of weather and the status quo definition.

Rate	Standard Error Proposed Model (therms)	Standard Error Status Quo (therms)	Percentage Increase in Accuracy
SVF Residential	2.21	9.07	76%
SVF Commercial	19.54	40.16	51%
MVF Commercial	125.16	206.39	39%
STM	31.69	32.29	2%
MTM	158.80	349.77	55%
ST	145.85	183.59	19%
MT	612.26	449.30	-36%
LT	7406.12	6022.78	-23%

The data shows that for most classes, the standard error of the model (a common method of determining how well the model fits the data) is lower, and in some cases significantly lower, for MidAmerican's 55 degree 60/40 definition of weather than the standard 65 degree 50/50 definition. Given that data for degree days with a 55 degree base is just as easily obtainable as for the standard definition of degree days and the improvement in accuracy is considerable, especially in the rate classes where the impact of weather is highest (SVF and MVF), MidAmerican's use of the 55 degree base with a 60/40 weighting is appropriate and desirable.

Q. Please describe the methodology MidAmerican is using to determine the revenue component of the weather normalization pro forma.

A. MidAmerican's methodology for determining the revenue component of the weather normalization pro forma adjustment is provided in Schedule F.

Q. Does this conclude your prepared direct testimony?

A. Yes, it does.