

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

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**APPLICATION OF BLACK HILLS)
POWER INC. FOR AN INCREASE)
IN ELECTRIC RATES)** **DOCKET NO. EL09-_____**

PREPARED DIRECT TESTIMONY OF

MICHAEL J. MCFADDEN

Filed: September 29, 2009

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1 **DIRECT TESTIMONY OF MICHAEL J. MCFADDEN**

2 **I. INTRODUCTION AND QUALIFICATIONS**

3 **Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.**

4 A. My name is Michael J. McFadden and I am the president of McFadden
5 Consulting Group, Inc. (“McFadden Consulting”). My business address is 625 S.
6 York Street, Denver, Colorado 80209.

7 **Q. PLEASE PROVIDE A SUMMARY OF YOUR QUALIFICATIONS AND**
8 **EXPERIENCE.**

9 A. A copy of my resume is attached hereto as Exhibit MJM-1.

10 **Q. WAS THIS TESTIMONY PREPARED BY YOU OR UNDER YOUR**
11 **DIRECT SUPERVISION?**

12 A. Yes.

13 **II. PURPOSE OF TESTIMONY**

14 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS MATTER?**

15 A. McFadden Consulting Group, Inc. (“McFadden Consulting”) was retained by
16 Lynn, Jackson, Shultz & Lebrun, P.C., which represents Black Hills Power, Inc.
17 (“Black Hills Power” or “Company”) in the Company’s filing in this matter.
18 McFadden Consulting was specifically retained to review and help prepare the

1 Company's proposed cost of service and rate design studies. The purpose of my
2 testimony is to sponsor Black Hills Power's cost of service and rate design
3 studies, and is divided into the following sections:

- 4 • Provide overview of the cost of service & rate design process
- 5 • Provide the billing determinants used in the cost of service & rate
6 design studies, i.e., customers, demand, energy deliveries
- 7 • Compare and discuss the changes in customers, demand, and energy
8 deliveries from those used in the last rate case
- 9 • Present cost of service analysis
- 10 • Present rate structure
- 11 • Compare current & proposed rates

12 The overall purpose of this testimony is to present the observations,
13 findings, conclusions, and recommendations pertaining to my review and
14 evaluation.

15 **Q. BEFORE YOU ADDRESS SPECIFIC ISSUES, AREAS RELATED TO**
16 **THE BILLING DETERMINANTS, CLASS COST OF SERVICE, AND**
17 **RATE DESIGN, DO YOU HAVE ANY GENERAL OBSERVATIONS**
18 **ABOUT THE GOALS OF THE RATE MAKING PROCESS.**

19 A. When a utility makes a rate filing with a regulatory commission, it generally
20 provides an opportunity to explore different approaches in determination and
21 design of rates. However, in this case, as discussed by the Company's previous
22 witnesses, the driving force behind the Company's filing is to reflect its
23 investment in Wygen III in its rates. Changes in cost of service and rate design

1 generally pits groups of customers against each other. From a financial
2 perspective, the most critical concern is establishing the total revenue
3 requirements needed for the company to continue to provide safe and reliable
4 service at just and reasonable rates. While determining how much each class
5 should contribute to total revenue requirements is also critical, it is more critical
6 to the various customer classes than it is to the Company.

7 For these reasons, the Company decided the best course of action was to
8 follow past practices that have been approved by the South Dakota Public Utilities
9 Commission (the “Commission”) in previous rate proceedings. The class cost of
10 service and the rate design studies were prepared following this overall
11 philosophy.

12 **III. OVERVIEW OF COST OF SERVICE & RATE DESIGN**

13 **Q. PLEASE PROVIDE AN OVERVIEW OF A COST OF SERVICE AND** 14 **RATE DESIGN ANALYSIS.**

15 A. I believe it is important to discuss cost of service and rate design from a more
16 global view in order to provide a frame of reference for the Commission.

17 Generally, establishing rates requires three steps, which include:

- 18 • Establishing revenue requirements
- 19 • Identifying the cost of providing service for each customer class
- 20 • Designing the rates for each customer class

21 Exhibit MJM-2 contains a graphic representation of the revenue
22 requirements, cost of service, and rate design process. Establishing revenue
23 requirements focuses on determining the level of revenue necessary to permit the

1 utility to recover its cost of providing service to its customers. Some also call this
2 cost of service or total cost of service. The appropriate level of the Company's
3 revenue requirements has been addressed in the testimony of Christopher J.
4 Kilpatrick. I will address the cost of service and rate design aspects of the
5 Company's filing.

6 The purpose of a cost of service study is to identify the costs associated
7 with providing service to each customer class. The fundamental, underlying
8 principle of any cost of service study is the concept of cost causation, which
9 requires that customers be assigned costs that they cause the utility to incur.
10 Customers cause the costs to be incurred by using the products and services
11 offered by the utility.

12 Initially, if a cost can be specifically identified as being incurred to
13 provide service to specific customer classes, they are directly assigned to that
14 customer or customer class. Normally, the vast majority of costs cannot be
15 specifically assigned to a customer class.

16 Costs not identified as being related to a specific customer class, must be
17 allocated to the classes based on a fair and reasonable cost driver. A cost driver is
18 defined as a factor that can be identified as causing changes in a cost. The term
19 cost of service study is used throughout this testimony to refer to this process,
20 although some also call this the cost allocation, or the allocated cost of service.

21 A key factor in preparing a cost of service study is determining the
22 appropriate customer classes to which costs should be allocated. This is critical
23 because any time customers are grouped together there will be cross subsidies.

1 Most utilities will attempt to group customers of similar load characteristics
2 together, however, there will still be differences amongst the customers within the
3 class. Additionally, grouping the customers in a class can result in each customer
4 being treated as an average customer for that class. Without proper cost of
5 service and rate design, customers with more favorable usage patterns will
6 effectively subsidize customers with less favorable usage patterns.

7 By definition, costs that cannot be directly attributed to a specific
8 customer or customer class need to be allocated. The question that is usually at
9 the center of controversy in a cost of service study is what cost driver fairly
10 allocates costs to the various customer classes. Generally, the controversy
11 focuses on the allocation of fixed costs.

12 Rate design entails establishing an appropriate rate structure for a specific
13 customer class. In many instances the rate structure will be influenced by
14 technological considerations. For example, in most instances, residential
15 customers do not have demand meters and therefore do not have a demand
16 component to their rate structure. In other cases, usage might not be measured,
17 such as private area lights, in which case the utility may charge a flat rate per
18 month based on an assumed usage.

19 **Q. PLEASE EXPLAIN WHY ALLOCATING FIXED COSTS IS**
20 **GENERALLY THE MOST CONTROVERSIAL ASPECT OF A COST OF**
21 **SERVICE STUDY.**

22 A. The vast majority of a utility's non-fuel related costs are fixed. Fixed costs are
23 defined as costs that do not vary with throughput or deliveries. For the 12 months

1 ended June 30, 2009, the Company's per books Operating & Maintenance
2 Expenses ("O&M") totaled approximately \$162.8 million dollars. Approximately
3 \$108.9 million relates to fuel costs, purchased power, transmission of power by
4 others, and similar costs that are recovered through the Company's Energy Cost
5 Adjustment ("ECA"). The remaining O&M costs of \$53.9 million are non-fuel
6 related costs, of which, the overwhelming majority, if not all, are fixed costs.
7 Some may be variable, but from a practical standpoint they are so minimal, they
8 have very little impact on the cost of service. Therefore, the method of allocating
9 fixed costs to the various customer classes has a significant impact on the rates.

10 **Q. WHAT IS THE BASIS FOR ALLOCATING THE VAST MAJORITY OF**
11 **COSTS IN A COST OF SERVICE STUDY?**

12 A. At one end of the spectrum, all fixed costs could be allocated based on the
13 demand placed on the system by the various customer classes. Proponents of this
14 methodology generally argue that the system is designed, constructed, and
15 operated to meet customers' requirements and therefore costs should be allocated
16 based on the demand they place on the system.

17 At the other end of the spectrum, all fixed costs could be allocated based
18 on energy deliveries. Proponents of this methodology generally argue that
19 deliveries recognize the actual usage of the system by the various customer
20 classes and are a more accurate cost allocator.

21 Another allocator that is commonly used in a cost of service analysis is the
22 number of customers or meters. Normally, number of customers or meters is used

1 to allocate costs that can be directly attributable to specific customers.

2 Historically, this has been limited to meters and services.

3 These three factors, i.e., number of customers or meters, demand, and
4 energy deliveries, are the basis for allocating the vast majority of costs in a cost of
5 service study.

6 **Q. PLEASE ADDRESS THE ISSUES PERTAINING TO EACH OF THE**
7 **THREE MAJOR ALLOCATION FACTORS.**

8 A. There are issues pertaining to the determination and application of each of the
9 three major allocators. I will address the number of customers or meters first,
10 then demand, and finally deliveries.

11 The purpose of the customers or meters cost allocator is to allocate costs
12 for which the number of customers is the cost driver. It is common for the terms
13 customers, meters, accounts, and bills to be used interchangeably. However, there
14 is a difference between each of these. Generally, a customer is an individual or
15 organization that receives service from the utility. However, some customers may
16 have multiple meters at one location or may have multiple locations with multiple
17 meters. Depending on the practices of the utility, such customers may have one
18 account with multiple meters. Some may receive one bill for all the meters at one
19 location or may receive one bill for several different accounts. Some utilities,
20 including Black Hills Power, (General Service-Large Optional Combined
21 Account Billing rate GLC) may summarize multiple bills for customers that have
22 multiple meters and/or accounts. Historically, the cost allocated on the number of
23 meters has been a relatively small portion of a utility's total cost.

1 The second major cost allocator is referred to as demand. Demand is
2 defined as the energy requirements of the customers. In its simplest form,
3 demand means all the customers' energy requirements. However, in the context
4 of a cost of service study, demand generally relates to the peak demands placed
5 on the system by customers. Black Hills Power measures demand in fifteen-
6 minute increments. Peak demands would be the energy used during the fifteen
7 minute period of maximum use. This is a common time period used for
8 measuring peak demands in the electric utility industry. It is important to note
9 that maximum demand during a fifteen minute period can be measured on a daily,
10 a monthly, annual, or any other time frame that may be appropriate.

11 Another issue pertaining to the demand allocator is whether the demand
12 should be determined on a coincidental basis or a non-coincidental basis.
13 Coincidental demand is typically defined as the sum of all customers' usage
14 coincidental with the total system peak demand. Non-coincidental demand is the
15 sum of all customers' peak demand regardless of when it occurs. Demands
16 measured on a non-coincidental basis, will generally be higher than the total
17 demands measured on the coincidental basis. That is, the sum of the non-
18 coincidental peak demand for all customers will exceed the total system peak
19 demand.

20 The final cost allocator is based on deliveries. Energy deliveries are used
21 to allocate costs for which deliveries to customers is the cost driver. Generally,
22 annual energy deliveries are used to allocate costs. Normally, the starting point
23 for determining annual energy deliveries is the measured deliveries as contained

1 in the utility's billing system. Similar to the use of demand as a cost allocator, the
2 main controversy with the use of annual throughput as a cost allocator is what
3 portion of the fixed costs should be allocated using annual throughput.

4 **Q. PLEASE DESCRIBE THE FINAL STEP IN ESTABLISHING RATES FOR**
5 **EACH CUSTOMER CLASS.**

6 A. The final step in the ratemaking process is designing the actual rates. The rates
7 for service for each customer class should be based on the cost of service as
8 developed in the previous task. The structure of the rates, i.e., customer charge,
9 demand charge, and/or energy charge, generally depends on the availability of
10 information related to the customer class' usage. For example, regular residential
11 customers usually do not have meters capable of measuring peak usage, while
12 larger commercial and industrial customers always have such meters. Since
13 residential customers peak usage is not measured, incorporating a demand
14 component into the residential customer rates is problematic.

15 Additionally, other non-cost factors may affect rate structure. Such non-
16 cost factors include revenue stability, rate continuity, simplicity, customer
17 acceptance, administration, and ability to yield the total revenue requirement.

18 **IV. CUSTOMERS, DEMAND, AND ENERGY DELIVERIES**

19 **Q. PLEASE EXPLAIN THE SIGNIFICANCE OF DEMAND AND ENERGY**
20 **DELIVERIES IN A COST OF SERVICE ANALYSIS.**

21 A. The relationship between the three cost allocation factors (customers/meters,
22 demand, and energy deliveries) directly affects the costs allocated to each
23 customer class. For example, in most utilities, the residential customer class

1 generally has significantly more customers than commercial or industrial classes.
2 Therefore, costs allocated based on meters significantly increases the residential
3 customers' costs, and therefore, their rates.

4 Conversely, commercial and industrial customers tend to have
5 significantly higher usage per customer. Therefore, costs allocated based on
6 energy deliveries increases the commercial and industrial customers' costs, and
7 their rates.

8 **Q. PLEASE DISCUSS THE BILLING DETERMINANTS USED IN THIS**
9 **FILING.**

10 A. The billing determinants for each rate schedule are contained in Schedule I-1.
11 Page 1 summarizes the billing determinants for the various customer classes.
12 Pages 2 through 11 contain the billing determinants for each rate schedule. It is
13 important to note that in this Application, the Large General Service and
14 Industrial classes have been combined in accordance with paragraph 9 of the
15 Confidential Settlement Agreement that was part of the Settlement Stipulation
16 approved by the Commission in the Company's most recent rate filing, Docket
17 No. EL06-019.

18 Exhibit MJM-3 summarizes the billing units by customer class as
19 contained in Schedule I-1 for the test period. Exhibit MJM-3 also contains the
20 consolidated billing determinants as required in the Settlement Stipulation as
21 approved by the Commission in Docket No. EL06-019.

22 Overall, the kWh delivered increased 43,990,567 kWh from the December
23 31, 2005 test period to the June 30, 2009 test period, which equates to a 3.13%

1 increase. However, each customer class experienced different changes. The
2 number of residential customers increased 4.82%, yet the kWh energy delivered
3 increased 9.87%.

4 The Small General Service customer class experienced an increase in
5 customers of 13.47% but the kWh energy delivered increased only 9.68%. The
6 demand kW increased 8.09%.

7 The Large General Service & Industrial Customer Class lost 6 customers,
8 which is a decrease of 3.54% since the last rate proceeding. Likewise, the kWh
9 energy delivered to the Large General Service & Industrial Customer Class
10 declined by 37,845,399 or 6.84%. The demand kVA declined by 39,232.9 or
11 2.95%.

12 The number of units in the Lighting Customer Class increased. A lighting
13 unit is defined as a lighting fixture. A customer may have multiple lighting
14 fixtures. Additionally, a customer may have multiple lighting bills, depending on
15 the number of locations that receive service from the Company.

16 These billing determinants are used for developing the class cost of
17 service as discussed below.

18 **V. CLASS COST OF SERVICE STUDY**

19 **Q. PLEASE DESCRIBE BLACK HILLS POWER'S CLASS COST OF**
20 **SERVICE STUDY.**

21 A. The first step is to determine the South Dakota jurisdictional cost of service. A
22 jurisdictional cost of service is required for any utility that has customers in
23 different regulatory jurisdictions. Each jurisdiction has different customers that

1 usually have different load characteristics and utilize different facilities.
2 Therefore, jurisdictional cost of service determines the cost of service by each of
3 the jurisdictions based on the customers and facilities in that jurisdiction. Costs
4 that are used to serve customers in different jurisdictions are allocated. Black
5 Hills Power has used the Single Coincident Peak Method in this Application to
6 allocate costs to the various jurisdictions it serves. The Single Coincident Peak
7 Method is a common cost allocation method used in the electric utility industry,
8 and it is the same method used by Black Hills in its previous rate filing in Docket
9 No. EL06-019.

10 Once the cost of service for South Dakota jurisdictional customers is
11 determined, the class cost of service determines the costs for each of the different
12 customer classes.

13 **Q. WHAT ALLOCATION METHOD DID BLACK HILLS USE IN THE**
14 **CLASS COST OF SERVICE STUDY?**

15 A. Black Hills uses the Average and Excess Method for the class cost of service
16 study for several reasons. The Average and Excess Method considers customer's
17 peak and energy requirements in allocating costs to customer classes. It is a
18 commonly used allocation method in the electric utility industry.

19 Black Hills has used the Average and Excess Method in previous rate
20 filings. Additionally, using the Average and Excess Method in this rate filing will
21 provide continuity in the costs allocated to various customer classes.

22 **Q. HOW IS THE AVERAGE AND EXCESS METHOD USED IN THE CLASS**
23 **COST OF SERVICE STUDY?**

1 A. As stated earlier, number of customers or meters, demand, and energy delivered
2 are the basis for allocating the vast majority of costs in a cost of service study.
3 Allocating costs to various customer classes based on the classes' number of
4 customers or meters, demand, and energy delivered reflects the unique operating
5 characteristics of each class. For example, the residential class typically has the
6 most customers but kWh used per customer is the lowest of the customer classes.
7 As shown on Exhibit MJM-3 during the test period, there were 51,700 residential
8 customers that used 507,596,791 kWh, which means an average residential
9 customer used 9,818 kWh per year. An average Small General Service customer
10 used 33,646 kWh per year and an average Large General Service & Industrial
11 customer used 268,567 kWh per year.

12 Each cost category is reviewed to determine the cost driver. A cost driver
13 is a factor or activity that "drives" a cost upward or downward. For example, if
14 number of customers is considered the cost driver, then costs are allocated based
15 on the number of customers in each customer class. The cost of reading a
16 customer's meter may be considered a customer related cost because the total
17 costs are driven by the number of meters. Each meter must be read, regardless of
18 the energy deliveries to that customer. This is an example of the cost causation
19 concept.

20 Statement O and Schedule O-1 contain Black Hills Power's class cost of
21 service study. Statement O reflects the per books costs and Schedule O-1 reflects
22 the adjusted costs.

1 Referring to Schedule O-1, page 1 contains the various cost allocators
2 used in the study. There are 39 cost allocators. Page 2 shows the percentage of
3 costs that would be allocated to each Customer Class, for that allocator. In other
4 words, if a cost is based on energy it would allocate 35.07% of the costs to the
5 Residential class, 28.50% to the Small General Service class, and 35.46% to the
6 Large General Service & Industrial class. However, if a cost is allocated based on
7 number of customers, the Residential class would received 81.03% of the cost, the
8 Small General Service class would receive 18.24% of the cost, and the Large
9 General Service & Industrial class would receive 0.43% of the cost.

10 In the class cost of service each cost by function and type is reviewed and
11 the appropriate cost allocator identified. Pages 3 through 11 of Schedule O-1
12 shows each of the costs, the cost allocator used, and the allocated cost for each of
13 the customer classes.

14 **Q. WHAT WERE THE RESULTS OF THE CLASS COST OF SERVICE**
15 **STUDY?**

16 A. The results of the class cost of service study are contained on the bottom of page
17 11. The base revenue deficiency for the Residential Service is \$12,613,194,
18 which equates to a base rate increase of 28.56%. The Small General Service has a
19 base revenue deficiency of \$10,240,168, which equates to a base rate increase of
20 28.56%. The base revenue deficiency for the Large General Service & Industrial
21 class is \$11,507,249, which equates to a base rate increase of 37.82%. The class
22 cost of service study indicates the Lighting class is deficient by \$213,755, which
23 equates to a base rate increase of 12.66%.

1 **VI. RATE DESIGN**

2 **Q. DOES BLACK HILLS PROPOSE TO INCREASE THE RATES FOR**
3 **EACH OF THESE CLASSES BY THE PERCENTAGE INDICATED IN**
4 **THE CLASS COST OF SERVICE STUDY?**

5 A. No. The Company proposes to apply the additional revenue requirement to each
6 rate class and each rate component equally. The Company believes applying the
7 increase “across the board” to each rate component for each rate class is more
8 equitable. This across the board increase maintains rate continuity and all
9 customers will experience the same increase in their power costs.

10 A comparison of the current and proposed rates for each rate schedule is
11 contained in Schedule I-1, pages 2 through 11. In Schedule I-1 the proposed rates
12 were obtained by applying the percentage increase to each component for the vast
13 majority of the rates. However, there are some exceptions.

14 **Q. PLEASE EXPLAIN THE EXCEPTIONS.**

15 A. Rate Schedule R (Regular Residential) provides for a Customer Charge of \$8.00
16 per customer per month. However, residential customers in Ellsworth Military
17 Housing currently have a discounted Customer Charge of \$6.00 per customer per
18 month. The Ellsworth Military housing is reverting to the developer and military
19 personnel are no longer residing at these premises. As the units sell, service to
20 them will be provided under the Residential rate schedule. Schedule I-2 page 3
21 indicates there will be an increase in the Customer charge for Ellsworth Military
22 Housing of 78.9%. In reality, no customers will receive this increase. Customers
23 purchasing the properties will be served under the Residential rate schedule.

1 The same situation applies to Small General Service under General
2 Service Rate Schedule GS. General Service customers in Ellsworth Military
3 Housing receive a discounted Customer Charge. As these accounts transfer to
4 new ownership, the discounted Customer Charge will not long apply.

5 The only other exception applies to the Industrial Contract customers in
6 the Large General Service and Industrial customer class. Pursuant to the Exhibit
7 A of the Settlement Stipulation approved by the Commission in Docket No.
8 EL06-019, these customers were raised by a specified percentage on January 1,
9 2009. The rates effective January 1, 2009 were increased by the across the board
10 percentage. The comparison of current and proposed rates as contained on page
11 10 of Schedule I-1 compares their actual rates for the test period and therefore it
12 appears their rates increased by a different percentage. In reality, their rates
13 increased by the same percentage as all other rate classes.

14 **Q. BASED ON YOUR REVIEW OF THE COMPANY’S COST OF SERVICE**
15 **AND RATE DESIGN STUDIES, WHAT IS YOUR RECOMMENDATION?**

16 A. In conclusion, I agree with the Company’s rate design methodology. An across
17 the board increase is reasonable. Rates should be implemented as shown in the
18 tariff pages included with this Application.

19 **Q. DOES THIS CONCLUDE YOUR TESTIMONY IN THIS MATTER?**

20 A. Yes.