

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

**APPLICATION OF BLACK HILLS)
POWER, INC. FOR AN INCREASE)
IN ELECTRIC RATES)**

DIRECT TESTIMONY OF MICHAEL J. FREDRICH

1 **I. BACKGROUND AND QUALIFICATIONS**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. Michael J. Fredrich, Black Hills Power, Inc., 409 Deadwood Avenue,
4 P.O. Box 1400, Rapid City, South Dakota, 57701.

5 **Q. WHAT IS YOUR OCCUPATION?**

6 A. I am an electrical engineer employed by Black Hills Power, Inc. (Black
7 Hills Power) as Director of System Operations and Maintenance,
8 Engineering and Transmission.

9 **Q. PLEASE DESCRIBE YOUR EDUCATION AND TRAINING.**

10 A. I graduated from the South Dakota School of Mines and Technology
11 with a Bachelor of Science Degree in Electrical Engineering in 1981.
12 Since my employment with Black Hills Power, I have held the following
13 positions: From 1981 through 1986 I served as an electrical engineer
14 in the Power Resources Department where I was responsible for the
15 operation and maintenance of the generation and transmission system
16 protective relaying systems and provided project engineering on a
17 number of projects associated with control and protective relaying for
18 the generating plants and the transmission system. I also participated

1 in a joint transmission power flow study to review high voltage
2 conditions during light load periods which studies continued through
3 1991.

4 From 1987 to 1988 I served as the Substation Maintenance Supervisor
5 for Electric Operations and was responsible for the operation and
6 maintenance of the bulk transmission system electrical equipment and
7 conducted in-house power flow studies.

8 From 1989 to 1991 I served as the System Protection and Studies
9 Engineer for the System Engineering Department where I performed
10 system study work for operational and planning requirements.

11 From 1991 to 2000 I was the Manager for Planning and Coordination
12 and developed operating and development plans, was responsible for
13 the adequacy and reliability of all electrical facilities, and participated in
14 joint transmission studies with Basin Electric Power Cooperative.

15 From 2000 to 2005 I was the Director of Transmission for Black Hills
16 Power with responsibility for the entire transmission network, including
17 transmission planning, transmission contracts, and tariff administration.

18 Since 2005 I have been the Director of System Operations and
19 Maintenance, Engineering, and Transmission.

20 **Q. WHAT ARE YOUR PRIMARY RESPONSIBILITIES FOR BLACK**
21 **HILLS POWER IN YOUR CURRENT POSITION?**

22 **A.** I have over-all responsibility for the operation and maintenance of the
23 transmission network, including electrical maintenance, the 24 hour

1 System Control Dispatch Center, all transmission planning activities,
2 transmission contract administration, and open access transmission
3 tariff administration. I also have management responsibility over the
4 Engineering Department, which is responsible for the design and
5 construction of both the transmission and distribution networks of Black
6 Hills Power.

7 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE ANY FEDERAL OR**
8 **STATE COMMISSION?**

9 A. Yes. I testified before the Federal Regulatory Commission for Black
10 Hills Power and Light Company, Black Hills Power's predecessor, with
11 respect to its open access transmission tariff, and with respect to a
12 joint open access transmission tariff for transmission facilities owned
13 by Black Hills Power, Basin Electric Power Cooperative and Powder
14 River Energy Corporation. I have also testified before the State of
15 South Dakota Public Utilities Commission (Commission) for Black Hills
16 Power in our Application for an Increase in Electric Rates, Docket No.
17 EL95-003, and before the Wyoming Public Service Commission.

18 **II. PURPOSE OF TESTIMONY**

19 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

20 A. The purpose of my testimony is to provide the Commission with an
21 overview of the transmission network that is utilized to serve Black Hills
22 Power's customers.

1 **III. SERVICE TERRITORY AND TRANSMISSION SYSTEM**

2 **Q. WHAT IS THE LOCATION OF BLACK HILLS POWER'S SERVICE**
3 **TERRITORY AND TRANSMISSION SYSTEM?**

4 A. Black Hills Power's generation and transmission system is located in
5 the northeastern part of Wyoming, the western part of South Dakota
6 (primarily the Black Hills of South Dakota), and a portion of
7 southeastern Montana.

8 **Q. DESCRIBE BLACK HILLS POWER'S ELECTRIC SYSTEM.**

9 A. The electric system utilized by Black Hills Power consists of a common
10 use transmission system with 570 miles of 230 kV transmission lines
11 and a distribution system with 910 miles of lower-voltage 69 kV and 47
12 kV distribution lines. Black Hills Power is interconnected with the
13 Western Area Power Administration (WAPA) Rocky Mountain Regions'
14 west 230 kV bus at Stegall, Nebraska located near Scottsbluff,
15 Nebraska; with PacifiCorp at the Wyodak Plant located near Gillette,
16 Wyoming; and with WAPA's Upper Great Plains Region, through the
17 Rapid City AC-DC-AC Tie which was placed into service in October
18 2003. The AC-DC-AC Tie is sometimes referred to as the Rapid City
19 Converter Station, or simply as the Tie.

20 **Q. DOES BLACK HILLS POWER SHARE THE USE OF ITS**
21 **TRANSMISSION SYSTEM WITH OTHERS?**

22 A. Yes. Black Hills Power, Basin Electric Power Cooperative (Basin
23 Electric), Rushmore Electric Power Cooperative, Inc. (Rushmore), and

1 Tri-County Electric Association, Inc. (currently known as Powder River
2 Energy Corporation, Inc. (PRECorp)), own 230 kV and 69 kV
3 transmission facilities in South Dakota, Wyoming, Montana, and
4 Nebraska, some of which they own jointly. Black Hills Power owns 230
5 kV facilities in South Dakota, Wyoming, and Nebraska and 69 kV
6 facilities in South Dakota, Wyoming, and Montana. Basin Electric
7 owns 230 kV facilities in South Dakota and Wyoming. PRECorp owns
8 230 kV and 69 kV facilities in Wyoming.

9 **IV. TRANSMISSION AGREEMENTS PRIOR TO 2001**

10 **Q. WHAT TRANSMISSION AGREEMENTS DID BLACK HILLS POWER**
11 **HAVE PRIOR TO 2001?**

12 A. Black Hills Power, Basin Electric, and PRECorp, together with three
13 other cooperative members of Basin Electric (Rushmore Electric
14 Power Cooperative, Inc., Black Hills Electric Cooperative, Inc., and
15 Butte Electric Cooperative, Inc. (together, the "South Dakota
16 Cooperatives"), were parties to the 1986 Agreement for Transmission
17 Service and the Common Use of Transmission Systems (Common
18 Use Agreement).

19 **Q. WHAT TRANSMISSION FACILITIES WERE COVERED BY THE**
20 **1986 COMMON USE AGREEMENT?**

21 A. The Common Use Agreement governed the following facilities: (1) the
22 230 kV facilities owned by Black Hills Power, Basin Electric, and
23 PRECorp; (2) the 69 kV facilities owned by Black Hills Power and

1 PRECorp in Wyoming; and (3) the 69 kV facilities owned by Black Hills
2 Power and the South Dakota Cooperatives in South Dakota. Basin
3 Electric did not own any 69 kV facilities governed by the Common Use
4 Agreement. A map depicting the facilities governed by the Common
5 Use Agreement is attached as Exhibit MJF-1.

6 **Q. WHAT WERE THE KEY PROVISIONS OF THE 1986 COMMON USE**
7 **AGREEMENT?**

8 A. Under the Common Use Agreement, each party was allowed to use
9 the other partys' 230 kV and 69 kV facilities to serve its own retail
10 customers, and each party was allowed to use its own 230 kV and 69
11 kV facilities to serve its own retail, wholesale, and transmission
12 customers. The parties also cooperated in planning and building
13 additional transmission facilities as needed to serve loads.

14 **Q. DID BLACK HILLS POWER ALSO HAVE AN OPEN ACCESS**
15 **TARIFF?**

16 A. Yes. Beginning in 1996, Black Hills Power had an open access
17 transmission tariff on file with the Federal Energy Regulatory
18 Commission (FERC) in Docket No. OA96-75-000 (Black Hills Power
19 OATT) that governed transmission service on Black Hills Power's 230
20 kV and 69 kV facilities to its customers in South Dakota, Wyoming, and
21 Montana other than those customers served under the Common Use
22 Agreement. Basin Electric also had a non-jurisdictional reciprocity
23 open access transmission tariff on file with FERC that governed

1 service over Basin Electric's transmission system located in the
2 Western grid (Basin Electric OATT).

3 **V. TRANSMISSION AGREEMENTS SINCE 2001**

4 **Q. HOW DO BLACK HILLS POWER, BASIN ELECTRIC, AND**
5 **PRECORP PRESENTLY PROVIDE SERVICE TO THEIR**
6 **TRANSMISSION CUSTOMERS?**

7 A. In 2001, Black Hills Power, Basin Electric, and PRECorp modified the
8 above referenced arrangements and combined them into a single
9 Common Use System under a joint open-access transmission tariff
10 (CUS Tariff). The CUS Tariff, which was approved by FERC in 2003,
11 governs all three companies' 230 kV transmission facilities which
12 perform a transmission function. In addition, they have placed their 69
13 kV facilities that perform a transmission function under that CUS Tariff.
14 By contrast, their service over 69 kV facilities in South Dakota and
15 Wyoming which were previously governed by the 1986 Common Use
16 Agreement but which perform only distribution functions are now
17 governed by replacement agreements among the companies. The
18 customers that were taking service under the Black Hills Power OATT
19 were offered replacement service agreements under the CUS Tariff at
20 comparable terms and conditions of service. Finally, Black Hills Power
21 and Basin Electric also placed their jointly owned Rapid City Converter
22 Tie under the CUS Tariff.

1 **Q. WHAT PROMPTED THE THREE COMPANIES TO PLACE THEIR**
2 **TRANSMISSION FACILITIES UNDER THE NEW CUS TARIFF?**

3 A. There were several good reasons why they filed the CUS Tariff. First,
4 Black Hills Power and Basin Electric were developing the new Rapid
5 City Converter Tie, which provided a new direct interconnection
6 between the asynchronous Eastern and Western grids. The Tie
7 enhances the reliability and improves the economics of electric service
8 to customers in the Common Use System area. Since the Tie is
9 subject to FERC's open access transmission rules, Black Hills Power
10 and Basin Electric were required to provide open access service over it
11 pursuant to FERC approved tariff rates, terms, and conditions. At
12 about this time FERC began encouraging the consolidation of
13 transmission systems. Therefore, Black Hills Power and Basin
14 Electric, together with PRECorp, decided to combine their transmission
15 systems into the Common Use System under the CUS Tariff.
16 Second, the CUS Tariff entitled all eligible customers to take open
17 access transmission service under standardized rates, terms, and
18 conditions on a non-fragmented system spanning three states. Thus,
19 the CUS Tariff provided "one-stop shopping" under a standardized
20 tariff for all eligible customers on the broad Common Use System.
21 Third, the CUS Tariff integrated the three companies' transmission
22 facilities, consistent with FERC's objective of encouraging utilities to
23 provide reciprocal open access transmission service.

1 Fourth, the CUS Tariff, together with the commencement of service on
2 the Tie, enhanced reliability of service to transmission customers and
3 retail customers and facilitated open access service under
4 standardized rates, terms, and conditions.

5 Finally, in Black Hills Power's original OATT, Black Hills Power had
6 committed to filing revised transmission service rates in the event an
7 AC-DC-AC tie was ever established. Thus, the CUS Tariff filing
8 satisfied Black Hills Power's commitment to file revised rates to reflect
9 the construction of the Tie and replaced the 1986 agreement to
10 conform with today's open access transmission practices.

11 **Q. WHICH FACILITIES COMPRISE THE COMMON USE SYSTEM**
12 **SUBJECT TO THE JOINT CUS TARIFF?**

13 A. A list of facilities comprising the Common Use System, and a map of
14 the Common Use System, are attached as Exhibit MJF-2 and Exhibit
15 MJF- 3, respectively.

16 **VI. RAPID CITY CONVERTER TIE**

17 **Q. WHY DID BLACK HILLS POWER AND BASIN ELECTRIC**
18 **CONSTRUCT THE RAPID CITY CONVERTER TIE?**

19 A. Since 1986, the Parties to the Common Use Agreement have been
20 performing joint transmission studies on the transmission facilities
21 located within the Common Use System. The purpose of these studies
22 has been to identify the capabilities and limitations of the existing
23 transmission facilities in providing reliable electrical service to the

1 customers served by those facilities. The ability of the Common Use
2 System to support the area load is adversely affected by outages of
3 the major 230 kV lines that interconnect this transmission network with
4 the remaining transmission network in the Western Electricity
5 Coordinating Council (WECC). A map of the WECC transmission
6 network is attached as Exhibit MJF-4.

7 Those major lines run from: (1) the West Hill Substation near Hot
8 Springs, South Dakota to Stegall, Nebraska; (2) the Wyodak Plant to
9 Buffalo, Wyoming; and (3) the Wyodak Plant to the Dave Johnston
10 facility near Douglas, Wyoming. Those three lines, along with power
11 generated from facilities in the local area, provide the support
12 necessary to serve the loads within the Common Use System. Loss of
13 any portion of that support network will reduce the capability of the
14 remaining transmission network to serve the area loads. If, in addition,
15 one of those line outages occurs when any of the major generation
16 facilities are also out of service, the capability of the system is further
17 reduced. In those instances operator action is often required to
18 prevent shedding of customer load. Therefore, one of the system
19 additions that was studied and later adopted was the Rapid City
20 Converter Tie, which was placed in service in 2003.

21 **Q. HOW DOES THE TIE SUPPORT THE RELIABILITY OF THE**
22 **SYSTEM?**

1 A. The Tie provides another injection point that will provide support to the
2 230 kV transmission network during outages of any of the previously
3 mentioned interconnection lines. In addition, the location of this facility
4 provides system support to those loads served from the eastern side of
5 the 230 kV bulk transmission network served from the Northern Hills
6 and Rapid City area during 230 kV line outages within the Common
7 Use System. Thus, the Tie provides an important interconnection
8 between the Eastern and Western power grids, and ensures a reliable
9 source of power, along with providing the additional reliability to the
10 transmission network, to serve the loads within the Common Use
11 System.

12 VII. TRANSMISSION RATES

13 Q. **HOW HAVE THE RATES BEEN ESTABLISHED FOR THE**
14 **TRANSMISSION SERVICE UNDER THE CUS TARIFF?**

15 A. Tariff schedules have been developed and filed with FERC for service
16 over all the transmission facilities that provide service on the Common
17 Use System. This includes all 230 kV transmission facilities, some
18 limited 69 kV facilities, and the Rapid City Converter Tie, in accordance
19 with FERC regulations.

20 Q. **DOES THE CUS TARIFF INCLUDE ALL THE FACILITIES**
21 **PREVIOUSLY GOVERNED BY THE COMMON USE AGREEMENT**
22 **AND THE BLACK HILLS OATT?**

1 A. No. Black Hills Power, Basin Electric, and PRECorp did not include in
2 the CUS Tariff some of the facilities that were previously governed by
3 the Common Use System Agreement and Black Hills Power's OATT.
4 The parties have included in the CUS Tariff all of their 230 kV facilities
5 and certain of their 69 kV facilities that perform a transmission function.
6 The parties have excluded from the CUS Tariff those 69 kV facilities
7 that do not perform transmission functions.

8 **Q. DOES BLACK HILLS POWER PROVIDE ANY OTHER SERVICES**
9 **UNDER THE CUS TARIFF?**

10 A. Yes. Black Hills Power provides Scheduling, System Control, and
11 Dispatch Service under Schedule 1 to the CUS Tariff, and Reactive
12 Supply and Voltage Control from Generation Sources Service under
13 Schedule 2 to the CUS Tariff.

14 **Q. HOW IS BLACK HILLS POWER'S LOAD TREATED UNDER THE**
15 **CUS TARIFF?**

16 A. Black Hills Power is no longer taking transmission service under its
17 own tariff. Instead, it has a network transmission service agreement
18 under the CUS Tariff.

19 **Q. HOW DOES BLACK HILLS POWER RECOVER THE COSTS OF ITS**
20 **INVESTMENTS IN TRANSMISSION FACILITIES?**

21 A. Black Hills Power's revenue requirements for its transmission
22 investments is included and recovered as a component of the total
23 CUS Tariff revenue requirement as authorized by FERC.

1 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

2 A. Yes.