Direct Testimony and Exhibit
Michael J. Fredrich

Before the South Dakota Public Utilities Commission
of the State of South Dakota

In the Matter of the Application of
Black Hills Power, Inc., a South Dakota Corporation

For Authority to Increase Rates
in South Dakota

Docket No. EL14-___

March 31, 2014

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Exhibits

I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Michael J. Fredrich. My business address is 409 Deadwood Avenue, P.O. Box 1400, Rapid City, South Dakota, 57701.

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

A. I am employed by Black Hills Utility Holdings Company ("BHUH") as Director, Engineering Services.

Q. FOR WHOM ARE YOU TESTIFYING ON BEHALF OF TODAY?

A. I am testifying on behalf of Black Hills Power, Inc. ("Black Hills Power" or the "Company").

Q. PLEASE DESCRIBE YOUR EDUCATION AND BUSINESS BACKGROUND.

A. I graduated from the South Dakota School of Mines and Technology with a Bachelor of Science Degree in Electrical Engineering in 1981. Following graduation, I accepted a position with Black Hills Corporation ("BHC"). Since that time, I have held a variety of engineering related roles.

From 1981 through 1986, I served as an electrical engineer in the Power Resources Department where I was responsible for the operation and maintenance of the generation and transmission protective relaying systems. From 1987 to 1988, I served as the Substation Maintenance Supervisor for Black Hills Power's Electric Operations Department. From 1989 to 1991, I

served as the System Protection and Studies Engineer for the Black Hills Power System Engineering Department, where I performed system study work associated with the operational and planning requirements associated with the Black Hills Power 230 kV and 69 kV transmission networks. From 1991 to 2000, I was the Manager for Planning and Coordination for Black Hills Power. I was responsible for the development of operating and infrastructure plans associated with maintaining the adequacy and reliability of all 230 kV and 69 kV transmission electrical facilities. From 2000 to 2005, I was the Director of Transmission for Black Hills Power with responsibility for the entire transmission network, including transmission planning, transmission contracts, and Federal Energy Regulatory Commission ("FERC") tariff administration. From 2005 to 2008, I was the Director of System Operations and Maintenance, Engineering, and Transmission for Black Hills Power. I was responsible for the operation and maintenance of the transmission network, including electrical maintenance, the 24 hour System Control Dispatch Center, all transmission planning activities, transmission contract administration, and FERC Open Access Transmission Tariff administration. I also had management responsibility over the Black Hills Power Engineering Department, which was responsible for the design and construction of the transmission and distribution networks of Black Hills Power. In 2008, I was named Director, Engineering Services. I continue in this role today.

Q. WHAT ARE YOUR PRIMARY RESPONSIBILITIES IN YOUR CURRENT POSITION?

A. As Director, Engineering Services, I currently manage and oversee the engineering, design, construction, operation, and maintenance functions associated with the major transmission and distribution networks of all three electric utilities currently under BHC, those entities being Black Hills Power, Cheyenne Light, Fuel & Power Company, and Black Hills/Colorado Electric Utility Company. I also have responsibility for the metering services, distribution planning, Geographic Information Systems electronic mapping, and drafting support services for these organizations.

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide the Commission with a brief description of the Black Hills Power service territory and electrical network, a summary of the major capital distribution investments that are included in this rate case, and an overview of Black Hills Power's LIDAR project.

III. DISTRIBUTION GROWTH & RELIABILITY

Q. PLEASE DESCRIBE THE GEOGRAPHIC AREA OF BLACK HILLS POWER'S SERVICE TERRITORY.

A. Black Hills Power's service territory is located in the northeastern part of Wyoming, the western part of South Dakota (primarily the Black Hills of

South Dakota), and a portion of southeastern Montana. (See Exhibit MJF - 1 – Diagram of the BHP 230 & 69 kV transmission system). Please refer to the testimony of Vance Crocker for additional detail regarding Black Hills Power's service territory and business operations.

Q. PLEASE DESCRIBE THE METHODS THE COMPANY USES TO DETERMINE WHEN RELIABILITY AND GROWTH INVESTMENTS ARE APPROPRIATE OR REQUIRED.

A. Black Hills Power performs numerous power flow and voltage profile analyses on the Company's electrical transmission and distribution networks to determine the overall capability of the existing electric facilities to serve the projected customer peak loads during a typical near and long term planning cycle. It is through these planning studies that Black Hills Power is able to identify specific limitations associated with the existing transmission and distribution facilities that may prevent the Company from providing safe and reliable service to the Company's existing customers. It is also through this planning process that Black Hills Power will review, consider, and analyze specific system additions and improvements required to meet existing customer loads as well as the projected future customer loads. Black Hills Power has developed a detailed set of distribution planning standards and technical study criteria that it utilizes to evaluate and determine the best solutions required to meet load serving requirements of customers.

Q. PLEASE DESCRIBE THE TYPES OF INVESTMENTS NECESSARY TO MAINTAIN RELIABILITY OF THE DISTRIBUTION SYSTEM.

A. The types of investments associated with maintaining the reliability and integrity of the distribution and 69kV sub-transmission networks that have typically been considered in the Company's planning studies have been the following:

* Rebuilding of existing 69kV lines
* Upgrading of substation equipment
* New substation additions
* Rebuilding of distribution feeders
* New 69kV sub-transmission lines
* New distribution feeder circuits
* Voltage conversions
* Replacement of aged or damaged infrastructure

As potential projects are evaluated to address specific integrity, reliability, and growth requirements, Black Hills Power considers the cost benefit associated with the alternatives that may have been identified as reasonable solutions to a respective project. Black Hills Power takes into consideration a number of planning and economic variables as it reviews and evaluates a given project to consider reasonable cost alternatives for providing service to its customers.

IV. MAJOR CAPITAL DISTRIBUTION INVESTMENTS

Q. PLEASE IDENTIFY THE COMPANY'S RECENT MAJOR CAPITAL DISTRIBUTION INVESTMENTS.

A. The following provides a brief description of some of the major distribution capital investments that have been required to address various reliability and long term growth issues and that are included as part of this rate case.

a. The East Meade Substation Project.

The East Meade Substation Project consists of the construction of a 10.5/12/14 MVA – 69/12.4 kV substation and associated switchgear located in the southeastern part of Rapid City. This substation addition and associated distribution tie lines are required to support the loads currently served from the existing Robbinsdale Substation.

This project is necessary because the load service capability of the Robbinsdale Substation has reached its maximum capacity. The Robbinsdale Substation property site location is not conducive to physical expansion that would allow a larger transformer. The existing Robbinsdale Substation property site is also bordered by a drainage aqueduct on two sides of the property, which again poses various limitations to our ability to expand this location. Also, the ability to install additional distribution switchgear and associated distribution feeder exits was prohibited due to the geographical location of this substation.

The East Meade Substation location is outside of this residential area and will provide adequate access to the area distribution network. This new location will allow critical distribution ties to be constructed that will support the loads currently served from the Robbinsdale Substation. The additional transformer capacity at the East Meade Substation will also allow additional load support for loads served from adjacent substations during certain operating conditions and when back up support is needed during outage events. The location and capacity of the East Meade Substation will also provide additional system capacity and operating options to serve potential load growth in the southeastern portion of Black Hills Power's Rapid City service area.

The projected in service date for this project is September 30, 2014.

b. Neil Simpson Controls Project.

This project is associated with the decommissioning of the Neil Simpson I facility. This particular project will facilitate the relocation of all the control and protective relaying equipment required for the Neil Simpson 69 kV substation. This equipment is currently located within the physical confines of the Neil Simpson I power plant. The new control house will be located outside of the existing plant and be located near the 69 kV substation. The costs of this project include the installation of a new substation control building and the installation of new control and protective relaying equipment for the Neil Simpson 69 kV substation. The initial relocation of the existing controls from

their power plant location into the new control building is anticipated to start in April 2014 and is currently scheduled to be completed by the end of May 2014.

c. Jackson Boulevard 69 kV Relocation Project.

This project is associated with a major South Dakota Department of Transportation road expansion/rebuild along Jackson Boulevard in Rapid City. This project will require Black Hills Power to relocate and rebuild approximately 3000 feet of existing single pole 69kV lines with 12.47 kV underbuild. This project is expected to be completed in July 2014.

d. Rapid City Cemetery Transformer Replacement.

The Rapid City Cemetery Transformer Replacement project involves replacement of the smaller of the two existing transformers (10.5 MVA) at this location so that both transformers have the same 14 MVA rating. Replacement is necessary because the smaller 10.5 MVA transformer can no longer support the summer peak loads in this area. This upgrade is also required to address system outages and reliability situations. The projected in service date for this project is late April 2014.

V. LIDAR PROJECT

Q. WHAT IS LIDAR?

A. LIDAR (Light Detection and Ranging) is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. LIDAR surveys are performed by attaching the LIDAR device

to an aircraft used to fly along the right-of-ways of the electric transmission and distribution facilities. The LIDAR imaging, coupled with high-resolution cameras, measures the distances between the particular facility, the ground, vegetation and other objects or structures within the vicinity of the facility.

Q. WHAT ARE THE BENEFITS OF LIDAR IMAGING?

A. LIDAR provides an economically appropriate imaging tool for areas with rough terrain and significant vegetation, such as the Black Hills. In particular, LIDAR imaging will provide Black Hills Power another tool to more accurately identify hazard trees and vegetation. LIDAR imaging will also assist Black Hills Power in measuring the distance between its power lines and the ground. As a consequence, Black Hills Power will be able to address inadequate clearances in a timely manner and therefore minimize line de-ratings caused by clearance issues.

Q. DOES THE NORTH AMERICAN ELECTRIC RELIABILITY CORPRATION ("NERC") RECOMMEND LIDAR IMAGING ON BHP'S 230 kV TRANSMISSION LINES?

A. Under NERC's facility rating reliability standard FAC-008, Black Hills Power is required to ensure that the facility ratings used in the reliable planning and operation of the Bulk Electric System are determined based on technically sound principles. Black Hills Power's 230kV transmission facilities fall under the definition of Bulk Electric System. As Black Hills Power continues to meet

these facility rating requirements, it will utilize LIDAR surveys of its 230kV transmission facilities to validate and ensure it is maintaining the proper clearances so that it does not have to derate the loading on any of its facilities. In addition, Black Hills Power will also utilize these LIDAR surveys to better ensure compliance with the clearance requirements associated with NERC's Vegetation Management reliability standard FAC-003. The LIDAR technology and survey results will provide Black Hills Power with the most economical means of collecting electronic data on our facilities to perform these assessments.

Q. IS BLACK HILLS POWER PROPOSING TO PERFORM A LIDAR ANALYSIS OF ITS ENTIRE TRANSMISSION SYSTEM?

A. Yes. Black Hills Power plans to perform LIDAR imaging of all of its 230 kV and 69 kV facilities. This project will be started in 2014 after all snow is gone in the area and deciduous trees are fully leafed. Black Hills Power will hire an independent contractor to perform the LIDAR imaging. Based upon past experience of BHC, the cost estimate for this project is approximately $800,000 for the 69 kV system.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.