BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE COMPLAINT OF ENERGY OF UTAH, LLC AND FALL RIVER SOLAR, LLC AGAINST BLACK HILLS POWER INC. DBA BLACK HILLS ENERGY FOR DETERMINATION OF AVOIDED COSTS	**EL18-038**

REBUTTAL TESTIMONY AND EXHIBITS

OF

AMANDA M. THAMES

ON BEHALF OF

BLACK HILLS POWER, INC.
D/B/A BLACK HILLS ENERGY

Date: January 30, 2020

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I. INTRODUCTION

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is Amanda M. Thames and my business address is 7001 Mt. Rushmore Road, Rapid City, South Dakota 57702.

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

A: I am employed by Black Hills Service Company, LLC, a wholly-owned subsidiary of Black Hills Corporation ("BHC"), which provides centralized services to the companies within the BHC corporate family, including Black Hills Power, Inc. d/b/a Black Hills Energy (referred to as "Black Hills" or the "Company"). I am currently employed as a Senior Resource Planning Analyst in the Resource Planning Department.

Q: DID YOU DESCRIBE YOUR EDUCATIONAL BACKGROUND AND YOUR CURRENT DUTIES AND RESPONSIBILITIES IN YOUR DIRECT TESTIMONY.

A: Yes, I did.

Q: DO YOU ADOPT THAT PRIOR TESTIMONY FOR PURPOSES OF THIS REBUTTAL TESTIMONY?

A: Yes, I do.

Q: ON WHOSE BEHALF ARE YOU OFFERING THIS REBUTTAL TESTIMONY?

A: I am testifying on behalf of Black Hills Power Inc. d/b/a Black Hills Energy.

Q: IN HIS DIRECT TESTIMONY, STAFF WITNESS DARREN KEARNEY SUGGESTED THAT BLACK HILLS PROVIDE ADDITIONAL SUPPORT AND EXPLANATION AROUND THREE TOPICS: (1) ITS AVOIDED CAPACITY ANALYSIS; (2) ITS LOAD FORECAST, INCLUDING HOW ENERGY EFFICIENCY PROGRAMS WERE CONSIDERED; AND (3) ITS USE OF A 1.5% INLATION RATE. IS BLACK HILLS PROVIDING ADDITIONAL SUPPORT FOR SOME OF ITS INPUTS WITH ITS REBUTTAL TESTIMONY?

A: Yes, additional information is being provided in these areas through my rebuttal testimony, the rebuttal testimony of Kyle White and the rebuttal testimony of Jim McMahon.

Q: ARE YOU OFFERING REBUTTAL TESTIMONY ON ALL THREE ISSUES FOR WHICH MR. KEARNEY SOUGHT ADDITIONAL INFORMATION AND SUPPORT?

A: No. I am only offering rebuttal testimony on two of the three issues referenced above. Specifically, I am offering rebuttal testimony which provides requested detail surrounding the weather normalized econometric load forecast and also regarding Black Hills' avoided capacity cost analysis. In addition, for reference, I provide documentation of the release dates of various ABB pricing forecasts.

II. LOAD FORECASTS

Q: WHY WOULD A COMPANY UTILIZE AN ECONOMETRIC WEATHER NORMALIZED LOAD FORECAST AS OPPOSED TO A PURE HISTORICAL LOOKBACK AT LOAD WITH SOME TYPE OF PREDICTED GROWTH FACTOR?

A: The primary advantage of using econometric forecasting is the ability to measure the impacts of specific drivers on sales and demand, while controlling for the effect of all other included variables. For example, the models estimate the effect of economic conditions (like gross regional product or household income) on sales, while controlling for variations in weather conditions. An additional advantage is the ability to refine and adapt the models to reflect changing circumstances over time.

Q: WHAT SOFTWARE PROGRAM DOES BLACK HILLS USE TO CONDUCT ITS ECONOMETRIC WEATHER NORMALIZED LOAD FORECAST?

A: The Company uses a third-party statistical software package referred to as "Stata" when performing its econometric weather normalized load forecast.

Q: WHAT ARE THE BASIC STEPS YOU NEED TO PERFORM IN ORDER TO GENERATE AN ECONOMETRIC WEATHER NORMALIZED LOAD FORECAST?

A: The first step involves gathering a variety of different types of datasets including historical load, price of electricity, weather data, and historical and forecasted economic

data. The data is input into the Stata software to perform additional calculations that prepare the data for regression analysis (e.g., calculating heating and cooling degree days). In the second step, a variety of regression models are run using different combinations of variables, from the datasets described above, to find the "best-fit" regression model. The best-fitting regression model is determined by reviewing the statistical outputs and refining those models to ensure the estimated relationships are reasonable. These "best fit" models provide the base demand and energy forecasts. The third step adds large customer loads, including their anticipated future load growth, and the anticipated impact of energy efficiency programs. Finally, the major customer class energy forecasts require the addition of line losses to bring the data up to a system level forecast. Thus, the final monthly peak demand and final system level energy forecasts consider the anticipated future load growth of large customers and accounts for the effects of energy efficiency programs.

Q: WHAT TYPES OF INFORMATION DO YOU NEED TO UTILIZE IN THIS MODELNG AND WHAT ARE THE SOURCES OF THAT INFORMATION?

A: At least 5 general types information are considered during this modeling.

1. Historical hourly demand and monthly energy data. This information is sourced from Company records. As information from a calendar year becomes available, it is appended to the existing dataset. These values are not averaged together, but instead aggregated into energy classes or system level demand data.

2. Historical weather data (daily minimum and maximum temperatures). This information is downloaded from National Oceanic and Atmospheric Administration website (NOAA) and is taken from different weather stations throughout Black Hills' service territory.

3. Annual historic and future economic variables by county. This information is purchased on a subscription basis from a vendor, Woods & Poole. They provide historic and forecasted economic data for different counties throughout Black Hills' service territory.

4. Historic electricity prices for each customer class. This information is sourced from Black Hills' FERC Form 1 data.

5. Forecasted electricity prices for each customer class. The EIA Annual Energy Outlook electricity price index is used to forecast future electricity prices from Black Hills' FERC Form 1 data.

Q: WHAT EXPERIENCE AND/OR TRAINING DO YOU HAVE IN PREPARING AN ECONOMETRIC WEATHER NORMALIZED LOAD FORECAST?

A: In 2014, I worked closely with Christianson Associates, a consultant retained by one of Black Hills' affiliates, to complete the corporation's first econometric weather normalized load forecast for purposes of preparing a potential Integrated Resource Plan ("IRP"). In the fall of 2014, I participated in a training conducted by Christianson Associates to learn how to complete econometric load forecasts using the Stata software. In 2015, I

completed the first in-house econometric weather normalized load forecast for Black Hills Colorado Electric's Electric Resource Plan ("ERP"). Christianson Associates reviewed and confirmed the ERP load forecast that I prepared. Since 2016, I have been involved with incorporating econometric weather normalized load forecasting into the budgeting process for each of the corporation's electric utilities and have also performed similar modeling for a 2018 IRP filed by one of Black Hills' affiliates.

Q: DOES BLACK HILLS USE THIS LOAD FORECASTING METHOD, MODEL, AND PROCESS IN AREAS OTHER THAN AVOIDED COST RATE MODELING?

A: Yes. As described above, weather normalized econometric load forecasts and, more particularly, the Stata software has been used for IRP/ERP work since 2014. This same forecasting methodology is used in support of Black Hills' Co-generation and Small Power Production Service biennial tariff filing. In addition, weather normalized econometric load forecasts prepared with the Stata software are provided to the transmission planning group for use in developing transmission plans. Finally, these same forecasts are used in Western Electricity Coordinating Commission ("WECC") Load and Resource filings, as well as the corporation's budgeting and strategic planning.

Q: HOW WAS BLACK HILLS' ENERGY EFFICIENCY FORECAST INCORPORATED INTO YOUR LOAD FORECAST?

A: Black Hills files three-year Energy Efficiency Solution Plans with the South Dakota Public Utilities Commission. The Energy Efficiency Solution Plan includes plan budgets and participation and savings goals. The identified savings goals are incorporated into the load forecast by assuming that 100% of the plan's energy efficiency savings goals are achieved. The energy and demand savings goals are subtracted from the demand and energy forecast results.

Q: HOW DOES INCREASED ENERGY EFFICIENCY IMPACT BLACK HILLS' ENERGY FORECAST?

A: Increased energy efficiency lowers Black Hills' energy and demand forecast.

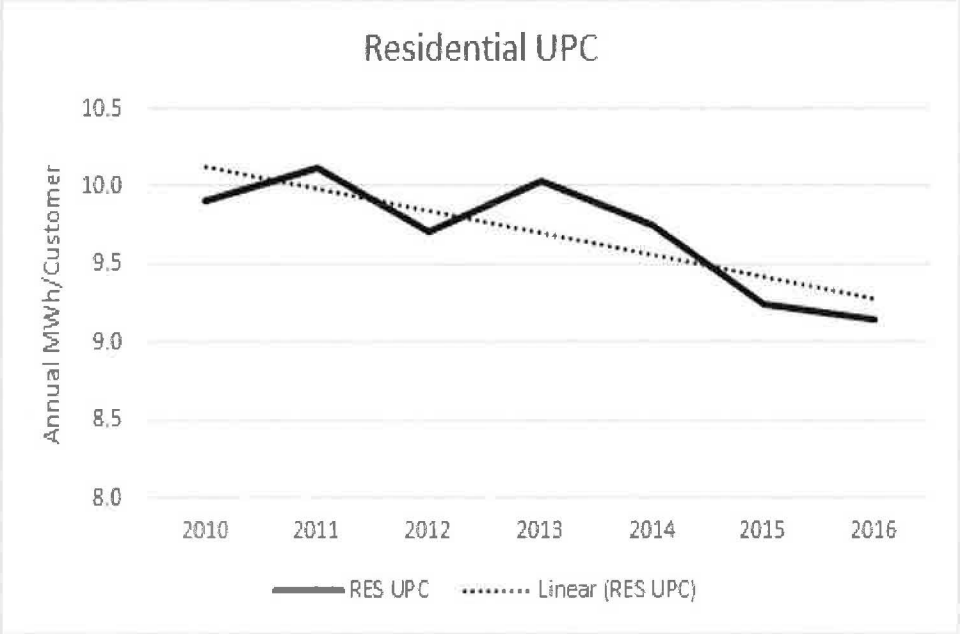
Q: HAVE YOU TAKEN THE OPPORTUNITY TO REVIEW YOUR WEATHER NORMALIZED ECONOMETRIC LOAD FORECASTING WORK IN ORDER TO RESPOND TO MR. KEARNEY'S QUESTION REGARDING WHAT HE DESCRIBES AS A NEGATIVE BLACK HILLS' ENERGY GROWTH FORECAST?

A: Yes, I have.

Q: CAN YOU PLEASE DESCRIBE THE DRIVER OR DRIVERS OF BLACK HILLS' FORECAST FOR ENERGY GROWTH FROM 2018-2040?

A: I would describe the energy growth forecast from 2018-2040 as essentially flat, rather than "negative." It appears that the essentially flat forecast is primarily driven by changes in the Residential Class. More specifically, within the Residential Class, usage per

customer ("UPC") is declining. All other classes have forecasted flat to minimal positive growth. The graph below illustrates the Residential Class actual declining UPC:



III. AVOIDED CAPACITY COST

Q: HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS MATTER DESCRIBING THE MANNER IN WHICH BLACK HILLS PROVIDED A CAPACITY CREDIT WITHIN ITS AVOIDED COST RATE MODELING?

A: Yes, I have.

Q: IN YOUR PRIOR TESTIMONY, DID YOU EXPLAIN THAT THE CAPACITY VALUE PROVIDED TO FALL RIVER WAS BASED ON THE AVOIDANCE OF SEASONAL FIRM ENERGY PURCHASES?

A: Yes, I did.

Q: PLEASE IDENTIFY OTHER SCENARIOS IN WHICH BLACK HILLS HAS UTILIZED SEASONAL FIRM ENERGY PURCHASES (PRICED AT THE AZ-PV HUB) TO REFLECT THE COST OF CAPACITY?

A: Black Hills utilized seasonal firm energy purchases priced at the AZ-PV hub to reflect the cost of capacity for its 2011 IRP. Black Hills has also utilized firm energy purchases priced at the AZ-PV hub plus a 20% premium to reflect the cost of capacity for budgeting and strategic planning. Black Hills' affiliates have also used seasonal firm energy priced at the AZ-PV hub plus a 20% premium to reflect a capacity cost in Black Hills Colorado Electric's 2016 ERP, and Cheyenne Light, Fuel and Power Company's 2018 IRP.

Q: DID THE AVOIDED CAPACITY CREDIT PROVIDED TO FALL RIVER IN YOUR MARCH 2019 AVOIDED COST CALCULATION INCREASE WHEN BLACK HILLS APPLIED AN INFLATION FACTOR TO ABB COMMODITY PRICING FOR NATURAL GAS AND PURCHASED POWER IN JULY OF 2019?

A: Yes, it did.

Q: DO YOU HAVE WORKPAPERS WHICH SHOW HOW YOU APPLIED AN INFLATION FACTOR TO THE ABB FORECASTED COMMODITY PRICING FOR NATURAL GAS AND PURCHASED POWER AND WHICH RESULTED IN AN AVOIDED COST RATE OF $28.30 PER MWh?

A: Yes, I do. Those workpapers are attached as Confidential Exhibits AMT 11 through 14.

Q: HOW DID YOUR AVOIDED CAPACITY ANALYSIS ACCOUNT FOR, OR INCORPORATE BLACK HILLS' REQUIRED PLANNING RESERVE MARGIN?

A: The load and resource balance accounts for a 15% planning reserve margin. This ensures the amount of resources that are necessary to serve anticipated loads and the planning reserve margin are incorporated into the production cost model. This margin is intended to ensure that the necessary resources are available to plan for unforeseen circumstances, such as an unusually hot day or unexpected generation or transmission forced outages. Using the resource planning parameters, the amount of seasonal firm purchases, if any, is determined by comparing the load (inclusive of the 15% planning reserve margin) to the available resources. To the extent seasonal firm purchases are needed (to address periodic short-term seasonal capacity deficits), they are entered into the model as a "must-take" resource in 25 MW blocks. This limits the model's ability to serve load with less expensive alternatives. The with and without QF analysis gives the QF the credit for reducing the need for seasonal firm market purchases because the seasonal firm purchases that are reduced or eliminated are not included as a must-take resource in the with QF model.

Q: HOW IS THE 15% PLANNING RESERVE MARGIN ACCOUNTED FOR IN YOUR AVOIDED COST MODELING?

A: The forecasted load input into the production cost model is the anticipated load that Black Hills is expecting to serve. To include the 15% planning reserve margin would be forecasting dispatch costs that are not necessary to serve expected customer load. However, as described above, Fall River still has the opportunity to offset the capacity associated with the 15% planning reserve margin, as it is considered within the seasonal firm purchases identified in the load and resource balance that are input into the production cost model as a must-take resource.

Q: HAVE YOU REVIEWED ANY INFORMATION FROM WHICH YOU COULD DETERMINE HOW AVOIDED CAPACITY WAS CREDITED IN THE PRIOR AVOIDED COST MODELING ACCOMPLISHED FOR ALL THREE SD SUN MODELS?

A: Yes. I reviewed the outputs of the avoided cost rate modeling which was prepared for South Dakota Sun I, II, and III.

Q: WAS THE SAME GENERNAL METHODOLOGY UTILIZED TO PROVIDE AN AVOIDED CAPACITY CREDIT FOR SD SUN I, II AND III, AS YOU UTILIZED IN MODELING THE AVOIDED CAPACITY CREDIT FOR FALL RIVER?

A: Yes. The PPA prices for SD Sun I and SD Sun II and the agreed upon avoided cost for SD Sun III (which did not result in a PPA), all utilized the avoidance of seasonal firm purchases in determining the avoided capacity credit. In addition, in all three instances,

the pricing for avoided seasonal firm purchases was based on forecast prices associated with the AZ-PV hub, and included a 20% adder or premium.

Q: IN THE PRIOR TESTIMONY IN THIS CASE BLACK HILLS' CAPACITY DEFICIENCY HAS BEEN DESCRIBED AS SEASONAL SHORT-TERM PERIODIC DEFICITS. CAN YOU PROVIDE MORE DETAIL AS TO THE NATURE OF THE CAPACITY DEFICITS DURING THE PPA PERIOD?

A: The load and resource balance identified 10 months (all July) in which Black Hills would otherwise be making seasonal firm purchases in 25 MW blocks during the 240 month PPA planning period without the Fall River project. Although operationally Black Hills may not actually buy seasonal firm purchases for an entire month, the model assumes purchases for the entire month of July when a capacity deficit is identified in the load and resource balance. Black Hills' avoided capacity calculation provided Fall River 100% of the value associated with the seasonal firm purchases contemplated during the PPA period.

IV. ABB REFERENCE CASES

Q: YOU HAVE TESTIFIED THAT YOUR APRIL 2018 MODELING UTILIZED THE 2017 ABB FALL REFERENCE CASE, WHEN WAS THAT REFERENCE CASE RELEASED?

A: The 2017 ABB Fall Reference Case was released November 3, 2017.

Q: WHEN WAS THE ABB SPRING 2018 REFERENCE CASE RELEASED?

A: The 2018 ABB Spring Reference Case was released May 9, 2018.

Q: WHEN WAS THE ABB FALL 2018 REFERENCE CASE RELEASED?

A: The 2018 ABB Fall Reference Case was released November 7, 2018.

V. CONCLUSION

Q: PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY.

A: My rebuttal testimony responds to Mr. Kearney's request for additional support for my load forecast and for additional information on how I determined the avoided capacity cost. As I have testified, the load forecast results are due to certain drivers within the econometric load forecast occurring within Black Hills' customers which are both supported historically and logically. In addition, I have demonstrated that the proposed Fall River solar project was provided the opportunity to avoid the only avoidable capacity, seasonal firm purchases, and the avoided cost rate includes the value of this avoided capacity.

Q: DO YOU HAVE ANY FURTHER TESTIMONY AT THIS TIME?

A: I do not.

Q: DO YOU ANTICIPATE HAVING ANY FURTHER OPINIONS?

A: The answer to this question largely depends on the nature of Fall River's rebuttal testimony. In their pre-filed testimony both Mr. Vrba and Mr. Klein reserved the right to change their positions, testimony and even avoided cost methodology. If that occurs, I

might well have additional testimony and opinion and reserve the right to supplement on that basis.

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EL18-038

STATE OF SOUTH DAKOTA)
)SS
COUNTY OF PENNINGTON)

I, Amanda M. Thames, being first duly sworn, on oath state that I am Sr. Resource Planning Analyst for Black Hills Service Company, LLC, which is a wholly-owned subsidiary of Black Hills Corporation and an affiliate of the Respondent, Black Hills Power, Inc. d/b/a Black Hills Energy, in this proceeding, whose Rebuttal Testimony and Exhibits were prepared by me or under my supervision. I am providing this testimony on behalf of Black Hills Power, Inc., and certify that the contents of the enclosed Rebuttal Testimony and Exhibits are true and correct to the best of my knowledge, information, and belief.

Amanda M. Thames

Subscribed and sworn to before me this 30 day of January, 2020.

Notary Public
My Commission Expires December 19, 2025

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I hereby certify that on the 30 day of January, 2020, I served the foregoing, Rebuttal Testimony and Exhibits of Amanda M. Thames on Behalf of Black Hills Power, Inc. d/b/a Black Hills Energy, via electronic mail to the following:

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