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

OF

JAMES MCMAHON

ON BEHALF OF

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

Date: January 30, 2020

Table of Contents

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, EMPLOYER, AND TITLE.

A. My name is James McMahon. I am a Vice President at Charles River Associates ("CRA") in the energy practice.

Q. ARE YOU THE SAME JIM MCMAHON WHO FILED A DIRECT TESTIMONY FOR THIS REGULATORY PROCEEDING ON MAY 7, 2019?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. In this rebuttal testimony, I respond to points made by Staff Witness Mr. Darren Kearney in his direct testimony regarding the appropriate method for determining avoided costs of Qualifying Facility ("QF") contracts in South Dakota. I also provide my understanding of Black Hills' June 2019 update to the avoided cost calculation and respond to concerns raised by Mr. Kearney surrounding the underlying inputs to Black Hills Power's ("Black Hills") avoided cost calculation, specifically the load forecast energy growth rate and the inflation rate.

II. BLACK HILLS' JUNE 2019 AVOIDED COST CALCULATION

Q. IN YOUR DIRECT TESTIMONY[1], YOU INDICATED THAT YOU HAD BEEN MADE AWARE THAT BLACK HILLS WAS PLANNING TO UPDATE ITS AVOIDED COST CALCULATION, CORRECT?

A. Yes, that is correct.

[1] Direct Testimony of James McMahon, p9.

Q. CAN YOU EXPLAIN WHAT CHANGED IN BLACK HILLS' AVOIDED COST CALCULATION THAT INCREASED THE AVOIDED COST CALCULATION FROM $24.95 TO $28.30/MWh?

A. Yes, Black Hills applied an inflation adjustment to ABB's forecasted energy and purchased power costs. Black Hills also adjusted the discount rate to reflect the settled rate of 7.76% in Docket No. EL14-026.

Q. HAVE YOU REVIEWED BLACK HILLS' ADJUSTMENTS AND THE REVISION TO THE AVOIDED COST RATE, AND DO YOU AGREE THAT THEY WERE PROPERLY MADE?

A. Yes, I have reviewed how Black Hills adjusted power costs to include inflation. I've also reviewed how Black Hills modified the discount rate and the impact this had on the avoided cost. I believe these adjustments were made correctly.

III. AVOIDED CAPACITY COSTS

Q. DOES MR. KEARNEY AGREE WITH BLACK HILLS' METHODOLOGY FOR DETERMINING THE CAPACITY VALUE OF THE FALL RIVER CONTRACT?

A. No. Mr. Kearney proposes a capacity price that is significantly higher than the price proposed by Black Hills.

Q. WHAT CAPACITY PRICE DOES MR. KEARNEY PROPOSE BE USED FOR DETERMINING THE CAPACITY VALUE OF FALL RIVER?

A. Mr. Kearney proposes a levelized capacity price that is based on the annualized cost of a new simple cycle peaking plant.

Q. WHY IN MR. KEARNEY'S OPINION IS IT APPROPRIATE TO USE THE PRICE OF A SIMPLE CYCLE TURBINE AS A PROXY FOR FALL RIVER'S CAPACITY VALUE?

A. In his direct testimony, Mr. Kearney states that a simple cycle peaking plant is generally regarded as the avoided capacity cost in resource planning. Mr. Kearney also references that the Commission in EL16-021 found that a simple cycle gas plant would be the next resource the utility could avoid[2].

Q. DO YOU AGREE WITH MR. KEARNEY THAT A SIMPLE CYCLE PEAKING PLANT IS GENERALLY REGARDED AS THE AVOIDED CAPACITY COST IN RESOURCE PLANNING?

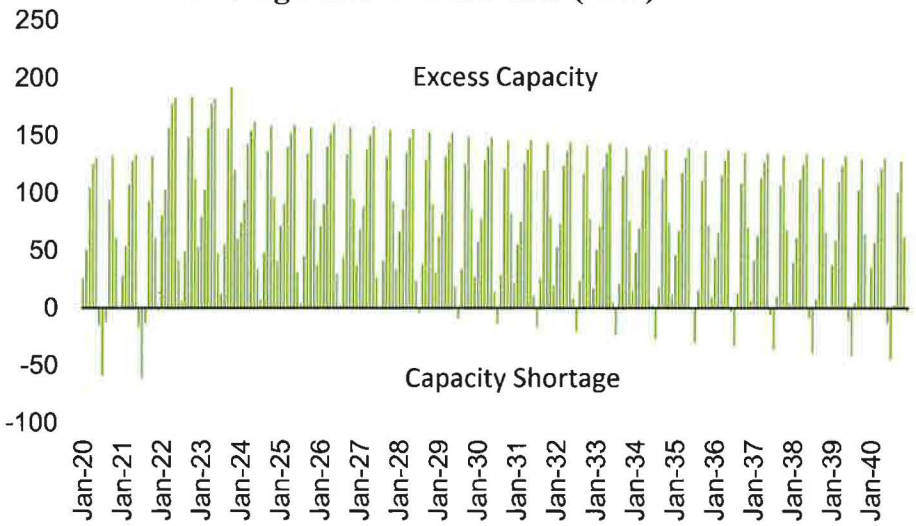
A. Only to the extent Mr. Kearney is referring to the cost of the next *new* resource that a utility would need to build or procure do I agree that a simple cycle peaking plant is generally the least cost new capacity addition in resource planning. In my experience, a new simple cycle gas-fired plant tends to be a lower capacity cost option than constructing or procuring new coal, gas combined cycle, nuclear, wind, and solar.

Q. WHY SHOULD BLACK HILLS NOT USE THE COST OF A NEW RESOURCE AS THE PROXY FOR THE CAPACITY COST THE COMPANY WOULD AVOID WITH FALL RIVER?

[2] Direct Testimony of Darren Kearney, p32.

A. Black Hills' forecasted load-resource balance does not support the need for a new resource over the next 20 years. In fact, in half of the next 10 years, the company expects to be in a capacity surplus situation.

Black Hills Monthly Forecast Capacity Position 2020-2040, Excluding Seasonal Purchases (MW)[3]



Under its resource planning parameters, the company's practice has been to meet capacity shortages up to 50 MW by procuring firm 6x16 bilateral energy contracts in 25 MW blocks in the months in which the company expects to be short[4]. Because Black Hills is not short capacity in a substantial number of the forecast years, and because Black Hills only procures seasonal firm energy in the one month per year when it expects to be short, it is cost effective for Black Hills to procure bilateral energy contracts for short-term periodic capacity shortages rather than build a new plant.

[3] Source: Black Hills
[4] See Rebuttal Testimony of Kyle White, p8-9.

Q. HOW MUCH DO YOU BELIEVE BLACK HILLS SAVES ITS CUSTOMERS TODAY BY NOT BUILDING A NEW PLANT TO MEET ITS PROJECTED CAPACITY NEEDS?

A. If Black Hills were to build a new 40 MW gas-fired plant, such as an LMS 6000, it could cost approximately $88/kW-year on a levelized basis[5]. If the asset were operated strictly as a capacity resource (available, but not used to produce energy), the cost of the asset to Black Hills customers through 2040 would be approximately $3.7 million per year, or $74 million over 20 years. Black Hills has estimated that the seasonal firm purchases over the same period are $6 million, a $68 million difference.

Q. BLACK HILLS WITNESS KYLE WHITE STATES[6] THAT A RESOURCE ADDITION WOULD BE CONSIDERED AND RECOMMENDED WHEN THE COMPANY BELIEVED THAT CUSTOMERS WERE UNREASONABLY EXPOSED TO THE MARKET. DO YOU AGREE WITH THIS RESOURCE PLANNING PRINCIPLE?

A. Yes. In my experience, most utilities would prefer to build or procure resources to meet their peak energy requirements and limit market exposure for their customers. However, this interest must be balanced with an interest in minimizing customer costs.

Q. DO YOU BELIEVE BLACK HILLS' APPROACH TO PROCURING FIRM ENERGY TO MEET A CAPACITY REQUIREMENT UP TO 50 MW IS REASONABLE?

---

[5] See Direct Testimony of Darren Kearney, p36
[6] Black Hills response to Staff Data Request 3-5

A. Yes. I agree with Mr. White's assertion that it is "more effective to buy firm energy for six weeks than to add a resource customer pay for year-round"[7]. Also, I believe that 50 MW is a reasonable breakpoint given my understanding that seasonal bilateral contracts are typically purchased in 25 MW increments.

Q. HOW DO YOU RESPOND TO MR. KEARNEY'S STATEMENT[8] IN HIS DIRECT TESTIMONY THAT ONE OF THE REASONS HE PROPOSES A NEW RESOURCE FOR THE CAPACITY PRICE PROXY IS THAT HE IS "NOT ENTIRELY CONVINCED" THAT BLACK HILLS WILL NOT CONSTRUCT A NEW RESOURCE OVER THE NEXT 20 YEARS?

A. I cannot reconcile Mr. Kearney's statement above with his statement, also in direct testimony, that Black Hills' forecasted peak load growth rate of 0.8% per annum "did not raise any red flags for me as this is comparable to peak demand forecasts for other electric utilities.[9]" Black Hills based its avoided cost estimate on its forecasted capacity balance, which reflects its current view on peak load growth against committed energy resources which are known today. Fall River is asking the Commission to order Black Hills to enter a long-term contract with the developer that will guarantee Fall River a fixed payment for capacity and energy for the next 20 years. While there is always the possibility that peak load will grow faster than expected, that uncertainty alone does not justify requiring a significantly higher capacity payment to Fall River for bringing a physical capacity resource where none is forecast to be needed.

---

[7] Deposition of Kyle White, p193
[8] Direct Testimony of Darren Kearney, p32
[9] Id. At 17

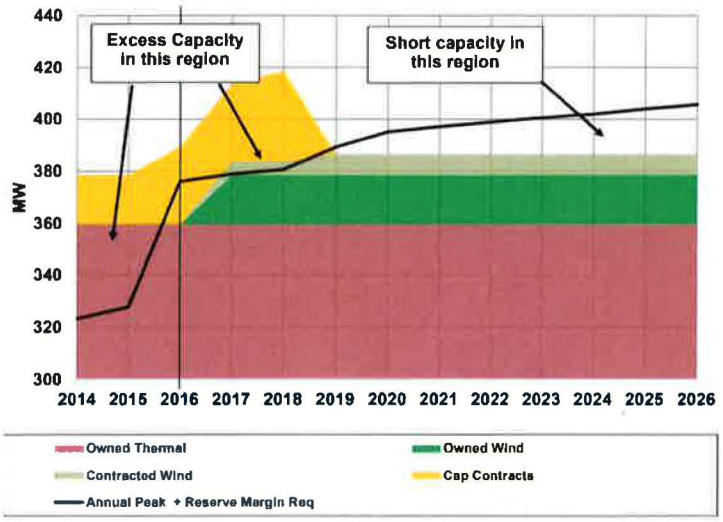
Q. MR. KEARNEY CITES EL16-021 IN HIS DIRECT TESTIMONY TO SUPPORT HIS VIEW THAT BLACK HILLS' APPROACH FOR PRICING AVOIDED CAPACITY SHOULD BE REJECTED. DO YOU AGREE WITH HIS INTERPRETATION?

A. No, I believe Black Hills' situation is distinct from the situation with NorthWestern Energy, the utility involved in EL16-021. In EL16-021, the Commission found that NorthWestern Energy's avoided capacity cost should reflect the cost of a new simple cycle peaking plant in 2019 because that is the first year that NorthWestern forecasts a capacity need. Commission finding of fact number 38 states,

> *"... NorthWestern has a need for capacity starting in 2019, and capacity payments for [ConEdison Development] shall reflect 2019 as the beginning date for determining levelized capacity payment obligations. NWE Exhibit 1 at 15: 17-20; CED Exhibit 2 at 39; and Staff Exhibit 2 at 28:5-6. The Commission further finds that the appropriate avoided capacity cost shall be based on the cost of a new simple cycle peaking plant. Staff Exhibit 2 at 28:6-8."*

NorthWestern Energy's 2016 IRP shows that the company was forecasting a capacity gap to emerge in 2019, then grow in the future.

NorthWestern Energy Capacity Requirements Forecast 2016-2026[10]



Black Hills is distinguishable from NorthWestern Energy because Black Hills is not forecasting a sustained capacity gap. As I stated earlier, Black Hills' capacity position fluctuates between shortage and surplus in the first 10 years of the forecast. Black Hills has found it cost effective to manage supply gaps of this nature with seasonal bilateral firm energy purchases.

IV. BLACK HILLS' AVOIDED CAPACITY COST CALCULATION

Q. ASIDE FROM RECOMMENDING BLACK HILLS USE THE COST OF A NEW PEAKER TO CALCULATE AVOIDED CAPACITY COSTS, WHAT OTHER CONCERNS DOES MR. KEARNEY RAISE REGARDING BLACK HILLS' CAPACITY COST CALCULATION?

[10] Source: Northwestern Energy 2016 IRP, Figure 5-8

A. Mr. Kearney indicates his main concern with how Black Hills determined avoided capacity cost is that he has "no way to verify that a 20% premium on market price is reflective of what capacity will cost in later years of the model.[11]"

Q. HOW DO YOU RESPOND TO MR. KEARNEY'S CONCERN?

A. First, I disagree with Mr. Kearney's characterization of Black Hills' methodology for determining avoided capacity costs. Mr. Kearney implies that capacity value is reflected only in the market price premium that Black Hills assumed in its modeling. This is incorrect. Black Hills is using seasonal on-peak energy purchases in lieu of building or buying capacity. Black Hills has found that this is a less costly alternative for customers.

Second, applying a 20% premium to forecast Palo Verde market prices for firming purposes is a practice that Black Hills' resource planning department uses in preparing IRPs and internal budgets[12]. Although Black Hills tends to transact bilaterally with utilities and other regional trading partners, Palo Verde is a liquid traded hub frequently used to index contracts.

To evaluate whether it was reasonable for Black Hills to forecast seasonal firm on-peak energy purchases at the Palo Verde plus 20% price, I reviewed Black Hills' historic seasonal energy purchase prices compared to actual prices at Palo Verde in 2017 and 2018. I found that Black Hills had in fact transacted for firm peaking energy at a substantial discount to Palo Verde. Thus, in assuming a 20% premium to Palo Verde for purposes of

[11] Direct Testimony of Darren Kearney, p28
[12] Black Hills response to Staff Data Request 1-15

costing avoided capacity for Fall River, I find that Black Hills is being especially conservative.

Q. WHAT IS YOUR CONCLUSION REGARDING BLACK HILLS' USE OF A 20% PREMIUM FOR PURPOSES OF COSTING AVOIDED CAPACITY?

A. I believe it was conservative assumption, given the history of bilateral seasonal purchase costs against Palo Verde traded prices.

V. INFLATION RATE ASSUMPTIONS

Q. DOES MR. KEARNEY RAISE ANY CONCERNS WITH RESPECT TO THE INFLATION RATE USED BY BLACK HILLS TO CALCULATE AVOIDED COSTS?

A. Yes, Mr. Kearney indicates that Black Hills needs to better support its inflation rate assumption of 1.5%, although he agrees this was the standard corporate rate used by the company.

Q. HAS BLACK HILLS PROVIDED ANY SUPPLEMENTAL INFORMATION TO STAFF REGARDING THE BASIS FOR ITS INFLATION RATE?

A. Yes. In response to Staff 3-9, Black Hills provided a table showing the Bureau of Labor Statistics PPI Commodity Data average annual inflation rate between 2014 and 2019. The average rate for this period was 1.5%.

Q. IS THIS A REASONABLE APPROACH TO FORECASTING INFLATION FOR POWER AND RELATED COSTS?

A. Yes, I believe this is a reasonable approach. First, this is the approach the company had used corporately and not specific to this proceeding. Second, in reviewing the data, I observe that if Black Hills were to extend the PPI commodity data set used to estimate the

inflation rate back another 1 or 2 years to 2013 or 2012, this would lower the estimate further. The growth rate from 2012 to 2013 was 0.9% while the growth rate from 2011 to 2012 was 1.7%.

Q. IF THE COMMISSION WERE TO ADJUST THE INFLATION RATE USED IN BLACK HILLS' AVOIDED COST CALCULATION, WHAT OTHER ADJUSTMENTS WOULD NEED TO BE MADE FOR CONSISTENCY?

A. The weighted average cost of capital used to discount future costs incorporates inflation in both the cost of debt and cost of equity. If the Commission were to adjust the inflation rate upward from 1.5%, a companion adjustment upward to the weighted average cost of capital would likely be appropriate for discounting.

VI. ACCREDITED CAPACITY FOR THE FALL RIVER PROJECT

Q. IN YOUR DIRECT TESTIMONY, YOU ALSO INDICATED THAT FROM YOUR RESEARCH THAT BLACK HILLS' ASSUMPTION WAS ON THE HIGH END FOR SOLAR RESOURCES IN MARKETS LIKE MISO AND PJM, WHERE YOU OBSERVED VALUES CLOSER TO 50%, CORRECT.

A. Yes, that is correct.

Q. MR. KEARNEY RECOMMENDS IN HIS DIRECT TESTIMONY USING 50% ACCREDITATION FOR FALL RIVER. DO YOU HAVE ANY OBJECTIONS TO HIS PROPOSAL?

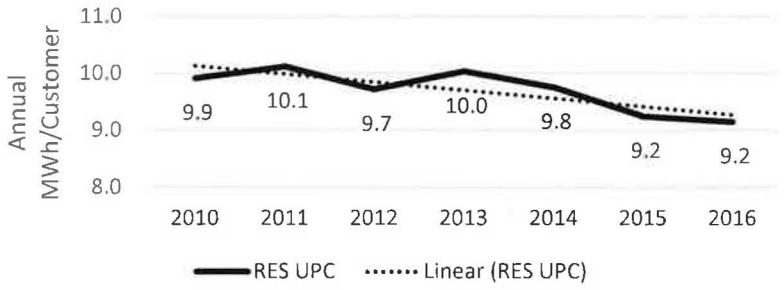
A. No, that value is consistent with what has been observed in other markets. Also, in my recent experience, I am observing pressure on the amount solar resources are able to contribute to peak reduction where system peaks are shifting to later in the day. This is a function of increased distributed generation that is reducing traditional peak hour loads.

VII. LOAD FORECAST

Q. MR. KEARNEY INDICATES THAT HE WAS SURPRISED BY BLACK HILLS' RELATIVELY FLAT ENERGY FORECAST. BASED ON YOUR REVIEW, WHAT FACTORS ARE CONTRIBUTING TO BLACK HILLS' FORECAST BEING LOWER THAN THE 2011 FORECAST MR. KEARNEY CITES?

A. One factor contributing to Black Hills' flat energy forecast is a decreasing forecast of usage per customer. The graphic below shows Black Hills' actual usage per customer fell 8% between 2010 and 2016[13].

Black Hills Residential Usage per Customer 2010-2016[14]



This is consistent with what I have observed in my work in other parts of the country where even non-programmatic energy efficiency (e.g., consumers changing light bulbs to LEDs without direct incentives) has significantly reduced usage per customer. From my discussions with Black Hills' staff, I also understand that the company's service territory

[13] At the time the 2018 forecast was completed, the most recent historical data available was 2016. The forecast was completed in 2017.
[14] Source: Black Hills

is becoming increasingly concentrated, with the housing stock shifting toward newer, smaller homes. This would also explain reductions in usage per customer.

Q. DOES MR. KEARNEY RAISE ANY SPECIFIC CONCERNS WITH BLACK HILLS' LOAD FORECASTING APPROACH?

A. No, not specifically. However, he does indicate that he wants to understand better the company's weather normalized econometric forecasting approach.

Q. DO YOU HAVE DIRECT EXPERIENCE IN UTILITY LOAD FORECASTING?

A. Over my career, I have led numerous resource planning engagements for U.S. utilities that have required my team to review and incorporate utility load forecasts into portfolio analysis. In addition, I have led several utility diligence engagements that required my team to produce bottom-up energy and peak demand forecasts.

Q. IS BLACK HILLS' APPROACH TO DEVELOPING ITS LOAD FORECAST CONSISTENT WITH OTHER UTILITIES WITH WHOM YOU'VE WORKED?

A. Yes, the approach is nearly identical. Black Hills runs econometric analysis to identify how macroeconomic variables (e.g., GDP, income), weather, and historic trends explain historic monthly customer growth and usage per customer. Energy is then forecast using an equation derived from these historic relationships and forecasts of independent variables. The resulting energy forecast is usually adjusted by a forecast of programmatic energy efficiency and other one-off adjustments.

Q. BLACK HILLS WITNESS AMANDA THAMES INDICATES THAT THE COMPANY USES STATA FOR CONDUCTING ITS ECONOMETRIC ANALYSIS. ARE YOU FAMILIAR WITH THIS SOFTWARE AND IS THIS INDUSTRY BEST PRACTICE?

A. Yes, I am familiar with the software. Stata is a widely recognized statistical software for econometric regression analysis and it has been commonly used by the utilities to forecast load.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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.

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**

STATE OF District of Columbia)
)SS
COUNTY OF District of Columbia)

I, James McMahon, being first duly sworn, on oath state that I am a Vice President at Charles River Associates and whose Rebuttal Testimony was prepared by me or under my supervision. I am providing this testimony on behalf of Black Hills Power, Inc. d/b/a Black Hills Energy, and certify that the contents of the enclosed Rebuttal and Supplemental Testimony is true and correct to the best of my knowledge, information, and belief.

James McMahon

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

Notary Public
My Commission Expires 3/31/21

DISTRICT OF COLUMBIA: SS
SUBSCRIBED AND SWORN TO BEFORE ME
THIS 30th DAY OF January, 2020
NOTARY PUBLIC
My Commission Expires 3/31/21

MEGAN LEWIS
NOTARY PUBLIC
Expiration Mar 31, 2021
DISTRICT OF COLUMBIA

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	* * * * * * *	**CERTIFICATE OF SERVICE** **EL18-038**

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

Ms. Patricia Van Gerpen
Executive Director
South Dakota Public Utilities Commission
500 E. Capitol Avenue
Pierre, SD 57501
Patty.Vangerpen@state.sd.us

Ms. Kristen Edwards
Staff Attorney
South Dakota Public Utilities Commission
500 E. Capitol Avenue
Pierre, SD 57501
Kristen.Edwards@state.sd.us

Mr. Darren Kearney
Staff Analyst
South Dakota Public Utilities Commission
500 E. Capitol Avenue
Pierre, SD 57501
Darren.Kearney@state.sd.us

Mr. Jon Thurber
Staff Analyst
South Dakota Public Utilities Commission
500 E. Capitol Avenue
Pierre, SD 57501
Jon.Thurber@state.sd.us

Mr. William Taylor
Mr. John E. Taylor
Mr. Jeremy Duff
4820 E. 57th Street, Ste. B
Sioux Falls, SD 57108
bill.taylor@taylorlawsd.com
john.taylor@taylorlawsd.com
jeremy.duff@taylorlawsd.com
Attorneys for Energy of Utah, LLC and Fall River Solar, LLC

Ms. Brittany Mehlhaff
Staff Analyst
South Dakota Public Utilities Commission
500 E. Capitol Avenue
Sioux Falls, SD 57108
Brittany.Mehlhaff@state.sd.us

By: _____
Catherine M. Sabers
Associate General Counsel
Black Hills Power, Inc.
7001 Mt. Rushmore Road
Rapid City, SD 57702
(605) 721-1914
Cathy.Sabers@blackhillscorp.com