

BEFORE THE  
WYOMING PUBLIC SERVICE COMMISSION

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**In the Matter of:**

The Application of PacifiCorp for )  
Approval of a Certificate of Public )  
Convenience and Necessity to Construct )  
Selective Catalytic Reduction Systems on )  
the Jim Bridger Units 3 and 4 )

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**Docket No. 2000-418-EA-12**

**Cross-Answering Testimony of  
Jeremy Fisher, Ph.D.**

**On Behalf of  
Sierra Club**

**March 4, 2013**

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1 **INTRODUCTION AND PURPOSE OF TESTIMONY**

2 **Q Please state your name, business address, and position.**

3 **A** My name is Jeremy Fisher. I am a scientist with Synapse Energy Economics, Inc.  
4 (Synapse), which is located at 485 Massachusetts Ave, Suite 2, in Cambridge  
5 Massachusetts.

6 **Q Are you the same Jeremy Fisher who submitted direct testimony in this**  
7 **docket on February 1, 2013?**

8 **A** I am.

9 **Q What is the purpose of your cross answering testimony?**

10 **A** In this testimony I respond to several points made by Mr. Bryce Freeman of the  
11 Wyoming Office of Consumer Advocate. First, I take ownership of one of the  
12 three “industry and academic studies” cited by Mr. Freeman as key to his  
13 decision, and acknowledge my role in the development of one of the other studies.  
14 I discuss why these are not sufficient or appropriate mechanisms by which to  
15 make a decision with hundreds of millions of dollars and two decades of  
16 continued operation remaining. Second, I respond to Mr. Freeman’s  
17 characterization of planned transmission investments as wholly separate from this  
18 proceeding and draw parallels to other planned investments that are considered,  
19 but are also not directly part of this proceeding.

20 **USE OF SCREENING STUDIES FOR PRUDENCE DETERMINATION**

21 **Q Please describe the three external studies cited by Mr. Freeman regarding**  
22 **the viability of retrofitting existing power plants.**

23 **A** Mr. Freeman references three industry studies regarding the viability of  
24 retrofitting existing coal units with environmental controls. These studies, from  
25 Brattle Group, Synapse Energy Economics, and the Union of Concerned  
26 Scientists (UCS) are of a cohort of industry papers published between 2010 and  
27 2012 that review impending EPA requirements and attempt to characterize the

1 costs of retrofitting and operating existing coal units against the cost of replacing  
2 those coal units with replacement generation, typically new natural gas combined  
3 cycle (NGCC) units. The first published study of which I am aware to make this  
4 comparison directly was a paper from the North American Reliability Council  
5 (NERC) in October 2010 entitled “2010 Special Reliability Scenario Assessment:  
6 Resource Adequacy Impacts of Potential US Environmental Regulations.”<sup>1</sup> This  
7 was followed shortly by reports and studies from Credit Suisse, Bernstein  
8 Research, Deutsche Bank, MJ Bradley and Associates, and the Brattle Group.  
9 Synapse, my firm, followed with a regionally specific paper in early 2011 focused  
10 on the Western Electricity Coordinating Council (WECC), and Edison Electric  
11 Institute (EEI) followed shortly thereafter with a national-scale paper. Finally,  
12 UCS followed by publishing unit-specific information in their late 2012 paper.

13 **Q What was your role in the papers cited by Mr. Freeman?**

14 **A** I am the primary author of the WECC paper from Synapse cited by Mr. Freeman.  
15 I was also an advisor to UCS as they developed their methodology for the late  
16 2012 paper,<sup>2</sup> but did not participate in their analysis, provide input assumptions,  
17 or review the unit-specific outcomes of that paper.

18 **Q How did Mr. Freeman characterize the value of these papers?**

19 **A** According to Mr. Freeman:

20 Consideration of the study work done by academic and industry  
21 experts, as discussed earlier in my testimony, is one important way  
22 in which the Commission can gauge the general prudence of the  
23 Company’s proposals. In this case, the fact that none of the

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<sup>1</sup> Available online at [http://www.nerc.com/files/EPA\\_Scenario\\_Final.pdf](http://www.nerc.com/files/EPA_Scenario_Final.pdf)

<sup>2</sup> See Acknowledgements section of UCS paper: “We particularly acknowledge the work of Synapse Energy Economics, Inc., whose prior work on this subject and core methodology served as the foundation for our analysis.”

1 independent studies that I have reviewed have found Bridger units  
2 3 and 4 to be good candidates for retirement, is meaningful.<sup>3</sup>

3 **Q Is it meaningful that none of the independent studies reviewed by Mr.**  
4 **Freeman have found Bridger units 3 and 4 to be good candidates for**  
5 **retirement?**

6 **A** No. These were broad-based screening studies, designed to raise awareness and  
7 test regional assumptions, rather than provide unit-specific analyses.

8 All of these studies made high level assumptions about the (generally proprietary)  
9 costs of operation, costs of fuel, costs of retrofits, availability and cost of  
10 replacement power, the dispatch of both coal and replacement power units both  
11 now and in the future, and the cost of capital available to different classes of  
12 utilities. Of particular note, these studies all made different assumptions about the  
13 impact of various environmental regulations at specific units, and assumed which  
14 types of retrofit equipment would be required – but none of them performed  
15 engineering-level unit-specific analysis. For example, in the Synapse study, we  
16 examined which types of environmental compliance equipment were already in  
17 place, and assumed that all units would eventually require state-of-the-art controls  
18 for emissions of sulfur dioxide, oxides of nitrogen, particulate matter, mercury,  
19 and effluent.

20 Some key data, such as the lack of off-site effluent from the Jim Bridger plant or  
21 the costs of coal remediation at the Bridger site, was not examined for these broad  
22 scale analyses. Other key pieces of information, such as the costs of SCRs at Jim  
23 Bridger, were assumed from EPA estimates<sup>4</sup> and, in the Synapse study,  
24 significantly underestimated the costs of the retrofits.

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<sup>3</sup> Direct Testimony of Bryce Freeman, page 21, lines 16-20.

<sup>4</sup> EPA worksheets provided by Sargent and Lundy (2010) for the evaluation of the Cross-State Air Pollution Rule in IPM version 4.1. See <http://www.epa.gov/airmarkets/progsregs/epa-ipm/docs/v410/Appendix52A.pdf>

1 Both the Synapse and UCS studies were constructed as levelized cost estimates,  
 2 and do not review changes in capacity factor over time, the potential for portfolio  
 3 replacement (such as combustion turbines, market purchases, renewables,  
 4 efficiency, or transmission investments), or expected changes in the cost of coal  
 5 over time. The Brattle Study relied on generic unit information from Ventyx, and  
 6 is also constructed as a broad-based screening study. Finally, each of these studies  
 7 simply assumed essentially on-site replacement with an NGCC, which may not be  
 8 the most effective replacement in all circumstances.

9 In addition, it should be noted that the Synapse study for the Western Grid Group  
 10 and WECC did not simply identify coal units that were non-economic. Synapse  
 11 was asked to evaluate which units were in the worst 25<sup>th</sup> percentile from a  
 12 forward-looking perspective, not which units should be retired from a cost  
 13 effective standpoint.

14 Both the Synapse and Brattle reports relied on 2010 vintage gas prices, which  
 15 have since fallen dramatically. In fact, in a 2012 update to the 2010 study, the  
 16 Brattle Group predicted a sharp increase in retirements compared to the 2010 (59-  
 17 77 GW instead of 40-55 GW), even without a carbon price. With a carbon price  
 18 of \$30/tCO<sub>2</sub> starting in 2020, Brattle Group estimates 127-149 GW of retirements  
 19 (see Figure 1, below).

**Table 4** Projected Retirements of Coal Capacity (GW)

		Market Scenario				
		Base (Recent Fwds)	Base Gas \$-1/MMBtu	Base Gas \$+1/MMBtu	Base \$+5/MWh in Power Prices	Base \$+30/ton CO <sub>2</sub> in 2020
Regulatory Scenario	Lenient	59	115	21	61	127
	Strict	77	141	35	77	149

**Figure 1. The Brattle Group, “Potential Coal Plant Retirements: 2012 Update,”  
 October 2012: 8. (Attached as Exhibit 327.)**

1 **Q What is your conclusion regarding the use of these screening studies in this**  
2 **case?**

3 **A** The primary value of these screening studies is to raise awareness of potential  
4 issues to stakeholders, lawmakers, commissions, and utilities; provide broad-  
5 based analytical estimates for regional studies (i.e. the WECC study or long-term  
6 policy studies); and provide a starting point for more detailed analysis. These  
7 studies may be generally informative, but cannot supplant rigorous analysis  
8 performed by the Company and vetted by stakeholders and Staff. These studies  
9 are simply unsuitable to “gauge the general prudence of the Company’s  
10 proposals.”

11 **Q Does the Company have a more rigorous analysis for the purposes of**  
12 **evaluating this decision?**

13 **A** It does. The System Optimizer (SO) Model can be well suited to this type of  
14 analysis, if correctly configured and executed.

15 **Q Do you have continued concerns regarding the configuration and execution**  
16 **of the Company’s model?**

17 I do. Based on questions that Mr. Falkenburg of Wyoming Industrial Energy  
18 Consumers (WIEC) and I raised in direct testimony, I do not think that the  
19 Company’s initial analysis correctly reflected the cost efficacy of retrofitting the  
20 Bridger units. In rebuttal testimony filed in the concurrent docket in Utah, Mr.  
21 Rick Link states that “the Company’s analysis has been updated to correct for  
22 errors and to reflect current assumptions that do not require manual adjustments to  
23 SO Model results, better align with assumptions used in net power cost filings,  
24 improve comparisons of forecasted unit generation levels with historical data, and  
25 incorporate contributions to the mine reclamation trust through 2037.”<sup>5</sup>  
26 Ultimately, the Company makes six changes to the core analysis. I would expect  
27 to be able to subject these changes to review in this Wyoming docket as well.

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<sup>5</sup> Rebuttal Testimony of Rick Link, page 40, lines 795 to 800 in concurrent Utah docket 12-035-92.

1 **Q Does Mr. Freeman have a finding on the errors found by other parties?**

2 **A** Yes. Mr. Freeman states that “the incidence of actual errors is quite small, at least  
3 according to the Company...”<sup>6</sup>

4 **Q Would you agree with Mr. Freeman that the incidence of actual errors is  
5 quite small?**

6 **A** No. The Company filed rebuttal testimony in the concurrent case in Utah with  
7 evidence that there were a number of cumulative errors in the initial filing. Just a  
8 few errors can lead to an incorrect outcome – the errors just have to be of a  
9 sufficient magnitude.

10 **Q Does Mr. Freeman comment on the viability of reviewing the SO Model?**

11 **A** Yes. According to Mr. Freeman, “the Commission [should not] dismiss the  
12 modeling analysis performed by the Company simply because they are based on a  
13 proprietary model whose operations cannot be replicated by the parties in this  
14 proceeding.”<sup>7</sup>

15 **Q Do you agree with Mr. Freeman regarding the viability of the modeling  
16 analysis?**

17 **A** Yes. The Commission should not dismiss the Company’s modeling analysis  
18 simply because it is based on a proprietary model. However, the fact that no other  
19 party has the ability to run the Company’s model does place a far heavier burden  
20 on the Company to show decisively that its analysis is performed, to the greatest  
21 extent feasible, without error or bias. As a testifying expert, I can only raise  
22 questions about particular variables that I identify, and cannot rigorously test the  
23 importance of many of these particular variables. In general, the Company is free  
24 to correct, implement or ignore the issues I raise. If the Company is to rely on  
25 their proprietary model as the basis of a public interest decision, parties must be  
26 able to verify that the model outcomes are fair and representative. At fine

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<sup>6</sup> Direct Testimony of Bryce Freeman, page 19, lines 20-22.

<sup>7</sup> Direct Testimony of Bryce Freeman, page 18, lines 13-16.



1 margins, critiques that raise questions or doubts that are on par with the margin  
2 estimated by the model should be thoroughly vetted and either corrected or  
3 dismissed with cause and justification.

4 **AVOIDABLE TRANSMISSION AT JIM BRIDGER**

5 **Q Did you testify regarding the potential to avoid transmission investments**  
6 **from Wyoming to Idaho if portions of Jim Bridger are retired?**

7 **A** Yes. I stated that “the Company has not demonstrated that the links in the  
8 Gateway West project westward of Jim Bridger are unavoidable... It is my  
9 opinion that many of the links to the west side of Jim Bridger could be avoided,  
10 deferred, or reduced if Jim Bridger 3 and 4 are retired.”<sup>8</sup>

11 **Q What is Mr. Freeman’s opinion regarding the opportunity to avoid**  
12 **transmission investments with the retirement of Jim Bridger?**

13 Mr. Freeman asked the following relevant question and answer:

14 Q. Mr. Freeman, do you believe that the Company’s planned  
15 transmission system investments should be a key driver in the  
16 commission’s determination in this case?

17 A. No, I do not, and there are a couple of reasons for that. First,  
18 RMP is not seeking a CPCN for any planned transmission  
19 investments in this case; RMP is required to do so, however, at the  
20 appropriate time under the terms of the stipulation cited earlier....  
21 Secondly, I am puzzled by some of the interrogatories posed by  
22 other parties in this proceeding that appear to argue that the  
23 Commission should determine the need for the Gateway  
24 transmission investments prior to determining whether or not it is  
25 prudent and cost effective to make the environmental upgrades at  
26 Bridger units 3 and 4. This is exactly the opposite of the decision

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<sup>8</sup> Direct Testimony of Jeremy Fisher, page 30, lines 19-23.

1 path that the Commission should use in making its determination  
2 on both generation and transmission investments in this and future  
3 cases.<sup>9</sup>

4 **Q Is the Company requesting any recovery for transmission infrastructure in**  
5 **this case?**

6 **A** Not at this time. The Company is requesting approval to retrofit a coal plant,  
7 which will extend its life an additional twenty years. Over that time, the Company  
8 expects to incur significant transmission costs that parallel today's infrastructure,  
9 and double the capacity of the line that passes directly through the Jim Bridger  
10 area. The Company has made significant expenditures already in planning for this  
11 line: thus far they have spent \$51 million on studies, scoping, permitting, and  
12 applications for the Gateway West project.<sup>10</sup> The Company indicates that they  
13 will file a CPCN in one year to approve construction costs for this project.<sup>11</sup> This  
14 is not simply a planning assumption – this project has real and tangible costs that  
15 will be experienced by ratepayers, and there is a distinct possibility that by  
16 retiring Jim Bridger, the Company may be able to avoid significant infrastructure  
17 costs.

18 **Q Does the avoidable future cost of the transmission expenditure have an**  
19 **analog for which the Company is currently budgeting in their model?**

20 **A** Yes. The cost of accelerating the remediation of the Bridger Coal Company  
21 surface mine is a fair comparison of an avoidable cost that is not subject to  
22 recovery in this case, but is under consideration by the Company. The Company  
23 has stated that “under a fueling plan for either a three unit or two unit coal  
24 operation at the Jim Bridger plant, coal production from the Bridger Coal  
25 Company's surface operation ceases... [this] results in higher final reclamation

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<sup>9</sup> Direct Testimony of Bryce Freeman, page 34, line 15 to page 35, line 4.

<sup>10</sup> Response to Sierra Club Data Request 5.13(a) in Utah docket 12-035-92 (Attached as Exhibit 328).

<sup>11</sup> Response to Sierra Club Data Request 5.15(d) in Utah docket 12-035-92 (Attached as Exhibit 329).

1 amortization costs through 2021, which increases coal costs on a dollar per  
2 mmBtu basis.”<sup>12</sup>

3 The higher reclamation costs and higher coal expenses are also not the subject of  
4 this CPCN, and yet are an explicit forward-looking assumption made by the  
5 Company to estimate the impacts of retirement on total present value revenue  
6 requirements. Since the Bridger Coal Company is a regulated, rate-based entity of  
7 PacifiCorp, the Company expects to fully recover this entity’s costs – either as a  
8 fuel expense or in higher capital costs passed through to ratepayers via future rate  
9 cases. The Company makes the appropriate assumption in this case that if the  
10 choice to retire or retrofit the Jim Bridger plant incurs a change in planning, those  
11 costs should be subject to analysis within this CPCN. It is my opinion that these  
12 avoidable costs are not restricted to the fuel costs only, but include other known  
13 and reasonably anticipated capital and operating costs that affect, and are affected  
14 by, Jim Bridger – including major retrofits, overhauls, upgrades, fueling plans,  
15 and transmission investments. Any costs reflected on ratepayers that could  
16 foreseeably be altered by the choice to retire or retrofit the Jim Bridger units  
17 should be part of the Company’s analysis in this case, regardless of how those  
18 costs will be justified in the future.

19 **Q Does this conclude your testimony?**

20 **A** It does.

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<sup>12</sup> Direct Testimony of Rick Link, page 17, lines 1-11.