

BEFORE THE  
PUBLIC SERVICE COMMISSION OF UTAH

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<b>In the Matter of:</b>	)	<b>Docket No. 12-035-92</b>
The Voluntary Request of Rocky	)	Rocky Mountain Power's Voluntary
Mountain Power for Approval of	)	Request for Approval of Resource
Resource Decision to Construct Selective	)	Decision to Construct Selective
Catalytic Reduction Systems on Jim	)	Catalytic Reduction Systems on Jim
Bridger 3 & 4	)	Bridger Units 3 & 4

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**Surrebuttal Testimony of  
Jeremy Fisher, Ph.D.**

**On Behalf of  
Sierra Club**

**REDACTED VERSION**

**February 28, 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 that submitted direct testimony in this case**  
7 **on November 30, 2012?**

8 **A** I am.

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

10 **A** My testimony responds to the rebuttal testimony of Company witnesses Mr. Chad  
11 Teply, Mr. Rick Link, and Ms. Cindy Crane. In particular, I respond to new  
12 estimates of coal remediation costs, and associated assumptions from Ms. Crane;  
13 rebut the Company's presumption of no avoidable costs in the Gateway West  
14 transmission project with the retirement of Jim Bridger Units 3 and 4 as discussed  
15 in the rebuttal testimony of Mr. Teply, respond to Mr. Link's updated CO<sub>2</sub> price  
16 forecasts, and provide evidence that the Company's assumed relationship between  
17 gas and CO<sub>2</sub> price forecasts is unfounded. In addition, I discuss the implications  
18 of the changing federal compliance obligations for the SCR on the Company's  
19 decision and timeline. Finally, I raise concerns regarding the pending BACT  
20 analysis for the Jim Bridger SCRs currently in progress as noted by Mr. Teply in  
21 rebuttal testimony.

22 **Q Did the Company provide a new analysis in rebuttal testimony?**

23 **A** Yes. The Company's rebuttal made several important changes to the analysis,  
24 including

- 1 a) Corrections to mine capital costs,<sup>1</sup>
- 2 b) Corrections to the implementation of capital costs associated with the SCR,<sup>2</sup>
- 3 c) Corrections to the operational characteristics of several units in the  
4 Company's model,<sup>3</sup>
- 5 d) An update of gas prices roughly consistent with the filing date of the  
6 Company's initial application (September 2012),<sup>4</sup>
- 7 e) Revisions to the Company's CO<sub>2</sub> prices,<sup>5</sup>
- 8 f) Updates to the cost of coal and Bridger Coal Company (BCC) capital,<sup>6</sup>
- 9 g) Updates to the BCC reclamation costs and contributions,<sup>7</sup> and
- 10 h) Updates and corrections to the mechanism by which the Company forecasts  
11 load requirements.<sup>8</sup>

12 **Q What is the impact of the Company's revised analysis on its decision to**  
13 **install SCR at Jim Bridger units 3 & 4?**

14 **A** Overall, the Company reduced its base case net present value assessment of  
15 retrofitting Jim Bridger units 3 & 4 from an initial estimate of [REDACTED] million to a  
16 revised estimate of [REDACTED] million, or a reduction of about 40%.

17 This shift, however, is the result of several changes that push the result in  
18 opposing directions.<sup>9</sup> Changes that favor the retrofit total [REDACTED] million, and  
19 changes that disfavor the retrofit total [REDACTED] million. In just six months (and  
20 numerous data requests), the cost efficacy of the units in the Company's

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<sup>1</sup> See Response to OCS 12.1 1<sup>st</sup> Revised and Rebuttal Testimony of Rick Link, Confidential Table 1R.

<sup>2</sup> See Response to OCS 12.3 1<sup>st</sup> Revised.

<sup>3</sup> Rebuttal Testimony of Rick Link, page 12, lines 235-241.

<sup>4</sup> Rebuttal Testimony of Rick Link, page 4, lines 84-86.

<sup>5</sup> Rebuttal Testimony of Rick Link, page 6, lines 115 to 123.

<sup>6</sup> Rebuttal Testimony of Cindy Crane, page 4, lines 80-90.

<sup>7</sup> Rebuttal Testimony of Cindy Crane, page 5, lines 93-98.

<sup>8</sup> Rebuttal Testimony of Rick Link, page 10, lines 208-217.

<sup>9</sup> See Rebuttal Testimony of Rick Link, page 19, Confidential Table 1R.

1 estimation has dropped by 40%, and fluctuated by +70% or -140%. At any given  
2 time, if the Company were to have updated only some of these assumptions, or  
3 made corrections to only some variables, the margin could have been as wide as  
4 [REDACTED], or as fine as [REDACTED] in favor of the retrofit – in the Company’s  
5 revised base case only.

6 **Q What is your conclusion regarding the Company’s revised analysis?**

7 **A** As I will discuss below, I am not satisfied with the Company’s lack of response  
8 on a number of important fronts, and I disagree with other important assumptions.  
9 However, even putting those concerns aside, if I rely only on the Company’s  
10 stated and revised analysis, I conclude that the retrofit is an unstable solution - i.e.  
11 the Company’s analysis is inconclusive.

12 In addition to the inconclusiveness of the Company’s own testimony, the revised  
13 analysis suffers from the following failures:

- 14 • The coal remediation analysis introduces a bias into the choice to retire or  
15 retrofit Jim Bridger 3 & 4;
- 16 • The Company ignores the fact that retiring Jim Bridger 3 & 4 could help  
17 alleviate transmission build out requirements and avoid components of  
18 Gateway West;
- 19 • The revised analysis makes unsupported reductions in CO<sub>2</sub> price forecast  
20 put forth by the Company; and
- 21 • The Company failed to explore the opportunity to defer the costs of  
22 building the SCRs until a federal mandate is in place.

23 Overall, I still conclude that the retrofits at Jim Bridger 3 & 4 are not in the best  
24 interests of ratepayers. Should the Company choose to move ahead on these SCRs  
25 at this time, they should do so without the benefit of preapproved cost recovery  
26 from the State of Utah and instead shoulder the risks without a guaranteed  
27 recovery of costs until they are approved in a rate case. Such a preapproval would  
28 indicate that the Company is truly acting in the best interests of customers – but  
29 the Company’s analysis does not bear out such a conclusion. The Company has

1 not shown that its proposal to spend [REDACTED]<sup>10</sup> on the proposed SCR is  
2 the lowest reasonable cost alternative, and therefore the Commission should deny  
3 the Company's application in this proceeding.

4 **1. COAL COSTS AND COAL REMEDIATION COSTS**

5 **Q Can you please describe the coal cost updates presented in Ms. Crane's**  
6 **February 2013 rebuttal testimony?**

7 **A** Yes. According to Ms. Crane, the coal cost updates reflect a new mining plan for  
8 Bridger<sup>11</sup> and as a result, "measured on a price related basis, cash coal costs  
9 increased by approximately [REDACTED] on a net present value ("NPV") basis"<sup>12</sup>  
10 for the 4-unit operation and "decreased by approximately [REDACTED] on a NPV  
11 basis" for the 2-unit operation.<sup>13</sup> Of the [REDACTED] change to the base case  
12 NPV, [REDACTED] was the result of "increased final reclamation contribution trust  
13 levels."<sup>14</sup>

14 **Q Does Ms. Crane use the same basic assumptions to estimate costs in the 4-**  
15 **unit and 3-unit operation cases?**

16 **A** No. In Ms. Crane's updated coal cost calculations for the 3-unit operation,  
17 accelerated withdrawals from the sinking fund that finances Bridger's reclamation  
18 begin in [REDACTED], five years in advance of surface mine retirement, and continue for  
19 nine years, until [REDACTED] (see Figure 1).<sup>15</sup>

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<sup>10</sup> Exhibit RMP\_\_(CAT-1.2)\_Confidential Initial Capital Cost Estimates Binder 20120724 CONF  
(Attached as Exhibit 25).

<sup>11</sup> Rebuttal Testimony of Cindy Crane, page 4, lines 70-76.

<sup>12</sup> Rebuttal Testimony of Cindy Crane, page 4, lines 81-82.

<sup>13</sup> Rebuttal Testimony of Cindy Crane, page 4, line 88.

<sup>14</sup> Rebuttal Testimony of Cindy Crane, page 5, lines 110-112.

<sup>15</sup> Sinking Fund for 4 and 3 Unit Operation - 3 Unit CONF (Attached as Exhibit 24).



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**Figure 1. Confidential. Bridger Mine 3-Unit surface operation: remediation sinking fund withdrawals (-) and contributions (+)**

In contrast, in the 4-unit case, withdrawals from the sinking fund resume in [REDACTED] after a near-hiatus of [REDACTED] years, just two years in advance of surface mine retirement in [REDACTED], and continue for 12 years until [REDACTED] (see Figure 2).<sup>16</sup>



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**Figure 2. Confidential. Bridger Mine 4-Unit surface operation: remediation sinking fund withdrawals (-) and contributions (+)**

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**Q** Where are the inconsistencies between these two remediation assumptions?

**A** It is unclear how the very low withdrawals modeled in the 4-unit operation for the period [REDACTED] through [REDACTED] – which are literally zero in seven of those years – is consistent with the state’s requirement for “rough backfilling and grading shall follow coal removal as contemporaneously as possible based upon mining conditions.”<sup>17</sup> In the reclamation plan filed by Bridger with Wyoming Department of Environmental Quality, the average topsoil placement commitment is

<sup>16</sup> Sinking Fund for 4 and 3 Unit Operation - 4 Unit CONF (Attached as Exhibit 26).  
<sup>17</sup> Wyoming LQD Coal Rules Chapter 4, Section 2(b)(i).

1 approximately 144 acres/year for 2013 to 2017, 405 acres/year for 2018 to 2022,  
2 and 411 acres/year for 2023 to 2031.<sup>18</sup> Again, this does not seem consistent with  
3 Ms. Crane's modeling of the base case.

4 If, however, the final remediation schedule presented by the company for the 4-  
5 unit operation – beginning two years before the end of surface mining and  
6 continuing for a full nine years after the end of surface mining – is lawful under  
7 the Wyoming Land Quality Coal Rules, Chapter 4, Section 2 and the Wyoming  
8 Environmental Quality Act Section 35-11-401(e)(viii), then it seems appropriate  
9 to apply this same timing to the 3-unit operation. Accelerating the remediation  
10 process faster than regulatory requirements dictate for the base case would clearly  
11 disadvantage ratepayers.

12 As presented by the Company, the 2012 net present value impact of the 3-unit  
13 operation's sinking fund withdrawals is [REDACTED] (see Figure 2). If, instead,  
14 the 3-unit operation's reclamation withdrawals, and associated activities, were  
15 adjusted to conform with the schedule presented in the 4-unit case – beginning  
16 two years before surface mine retirement in [REDACTED] and continuing for 12 years –  
17 their 2012 net present value<sup>19</sup> would be [REDACTED]. Similarly, if contributions  
18 are allowed to accrue interest over the twelve year remediation period, the  
19 ratepayer contribution will ultimately be lower.

20 **Q Have you performed any additional calculations to assess the impact of the**  
21 **schedule of reclamation on the net present value of sinking fund**  
22 **contributions in the 3-unit case?**

23 **A** Yes. Using Ms. Crane's spreadsheet for sinking fund calculations, I estimated the  
24 fund contributions required under this revised reclamation schedule.<sup>20</sup> A near-zero  
25 end-of-reclamation ([REDACTED] in the revised schedule) sinking fund balance is

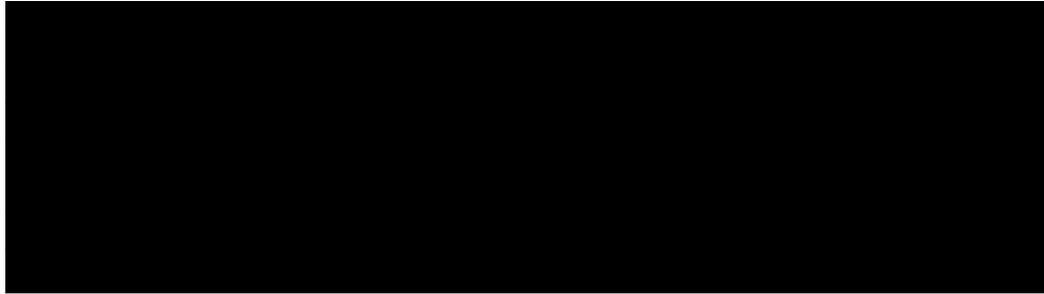
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<sup>18</sup> Communication with Amy Boyle, Land Quality Division at Wyoming Department of Environmental Quality. Reference to State of Wyoming, Land Quality Division Permit 338 - T6 (Term 6), Section RP4 Topsoil and Subsoil Replacement, Table RP4-1.

<sup>19</sup> Assuming a 7.15% discount rate.

<sup>20</sup> Shifting Reclamation Forward for 3 Unit Operation CONF (Attached as Exhibit 27).

1 maintained when [REDACTED] through [REDACTED] fund contributions are reduced from [REDACTED]  
2 [REDACTED] to [REDACTED] per year, lowering the 2012 net present value of the  
3 contribution stream from [REDACTED] to [REDACTED] (see Figure 3 and Table 1,  
4 below).<sup>21</sup>



5  
6 **Figure 3. Confidential. Adjustments to Bridger Mine 3-Unit surface operation:**  
7 **remediation sinking fund withdrawals (-) and contributions (+)**  
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9 By changing the reclamation schedule – such that it begins three years later in  
10 [REDACTED] and lasts for 12 years instead of nine years – the net present value of fund  
11 contributions is reduced by [REDACTED] million while maintaining the same schedule of  
12 fund contribution payments (ending in [REDACTED]).

13 **Table 1. 2012 Net Present Value of Contributions to the Surface Remediation**  
14 **Sinking Fund for 3-unit Operation (Millions 2012\$)**

Company's estimate	[REDACTED]
Synapse's adjusted estimate	[REDACTED]
Difference	[REDACTED]

15

16 **Q Do Ms. Crane's coal cost calculations include both surface and underground**  
17 **remediation costs?**

18 **A** Not in every scenario. The contributions and withdrawals to and from Bridger's  
19 remediation sinking fund shown above in Figures 1, 2, and 3 and Table 1 reflect  
20 costs related to the surface mine only. For the 3-unit and 2-unit cases, Ms. Crane

<sup>21</sup> Shifting Reclamation Forward for 3 Unit Operation CONF (Attached as Exhibit 27).

1 presents additional estimates of contributions and withdrawals for remediation of  
2 the underground mine (see Figure 4). The 2012 net present value of contributions  
3 to the sinking fund for underground remediation in the 3-unit operation is [REDACTED]  
4 [REDACTED].<sup>22</sup> Strangely, contributions and withdrawals for underground remediation  
5 do not appear in Ms. Crane's calculation of costs associated with the 4-unit  
6 operation. Omitting these costs for the 4-unit operation introduces a [REDACTED]  
7 bias against the 3-unit and 2-unit operations.



8  
9 **Figure 4. Confidential. Bridger Mine 3-Unit underground operation: remediation**  
10 **sinking fund withdrawals (-) and contributions (+)**

11 **Q What is your conclusion regarding the remediation schedule of the Bridger**  
12 **Coal Company surface mine?**

13 **A** By accelerating and compressing the remediation of the surface mine, even  
14 assuming a 2018 closure, the Company has introduced a [REDACTED] bias  
15 against the 2- and 3-unit Jim Bridger scenarios. By failing to include the costs of  
16 underground coal remediation in the 4-unit scenario, or inadvertently including  
17 this cost in the 2- and 3-unit scenarios, the Company further introduces a [REDACTED]  
18 [REDACTED] bias against the 2- and 3-unit scenarios, for a total of an [REDACTED]  
19 discrepancy.

20 **Q Do you have additional concerns regarding the Company's coal pricing?**

21 **A** Yes. I am concerned that the Company is uncertain of both its closure costs and  
22 procedures, and the incumbent long costs of obtaining coal (or not) from the

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<sup>22</sup> Sinking Fund for 4 and 3 Unit Operation - 3 Unit CONF (Attached as Exhibit 24).

1 Bridger Coal Company. Ms. Crane's testimony explains that in the six month  
2 period between the initial filing and this rebuttal filing, the Company discovered  
3 [REDACTED] (net present value) of "variances" in their coal costs, effectively  
4 increasing the nominal levelized cost of coal in the 4-unit case by 7% (from  
5 [REDACTED]/MMBtu<sup>23</sup> to [REDACTED]/MMBtu<sup>24</sup>).

6 The Company has not tested the net present value of the Bridger retrofits under a  
7 range of coal prices, and has implied in response to discovery that because much  
8 of the coal is not provided by a third party, there is no uncertainty in its pricing.<sup>25</sup>  
9 It is clear that third party pricing, however, is not the only source of uncertainty in  
10 the Company's coal price forecast.

11 The assumption that the Company will have to close the Bridger Coal Company  
12 (BCC) surface mine is predicated on the assumed inability to sell coal from the  
13 surface mine to other parties past 2018 if Bridger 3 and/or 4 are closed. However,  
14 the Company provides scant evidence that such an action would be absolutely  
15 required. Asked for due diligence reports or analyses regarding the ability to sell  
16 BCC coal, the Company simply responded that it had "discussed the likelihood of  
17 shuttering another coal mine in Southwest Wyoming,"<sup>26</sup> and noted that "the  
18 quality of [Bridger Coal Mine and Black Butte Coal Mine] coal is substantially  
19 different from other coal supplies in the Western U.S.,"<sup>27</sup> but the Company did  
20 not provide support for the contention that this coal could not be sold. The  
21 Company has not issued solicitations to sell BCC coal to other parties,<sup>28</sup> and  
22 despite a discussion by Ms. Crane of the relatively poor quality of this coal,<sup>29</sup> the

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<sup>23</sup> See Direct Testimony Workpapers of Rick Link, PVRR\_Tables\_Final\_JB3+4, "Coal Adjustments," cell D111.

<sup>24</sup> Similar NPV calculation performed on Rebuttal Testimony Workpapers of Rick Link, Exhibit 5R and Sensitivities\_PVRR, CONF, "9 - Coal Fuel Cost No Refuel", cells G23:T23.

<sup>25</sup> Response to Sierra Club Data Request 6.6 in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>26</sup> Response to Sierra Club Data Request 6.7(b) in Utah docket 12-035-92 (Attached as Exhibit 38), also Rebuttal Testimony of Cindy Crane, page 10, lines 209-211

<sup>27</sup> Response to DPU Data Request 17.3 (Attached as Exhibit 40).

<sup>28</sup> Response to Sierra Club Data Request 6.7(e) in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>29</sup> Rebuttal Testimony of Cindy Crane, page 10, lines 212-214.

1 Company has not determined if there is a domestic market for this coal.<sup>30</sup> The  
2 Company has not reviewed the outcome of their retrofit analysis assuming that  
3 excesses Bridger coal could be sold to a third party at cost.<sup>31</sup>

4 **2. AVOIDED TRANSMISSION COSTS FOR GATEWAY WEST**

5 **Q Did you raise questions regarding the ability of the Company to avoid**  
6 **impending transmission investments if units at Jim Bridger were retired?**

7 **A** Yes. I showed that

8 The Bridger 3 & 4 units currently have a combined capacity of  
9 about 700 MW. If the [proposed Gateway West] transmission line  
10 from Bridger to Populus no longer had to carry this load, the  
11 existing infrastructure could carry an additional 700 MW of  
12 capacity from other locations (i.e. wind further upstream, as  
13 suggested by the Company).<sup>32</sup>

14 Simply stated, if one or more units at Jim Bridger are retired in the next few years,  
15 this would open several hundred MW of capacity on the existing lines connecting  
16 Jim Bridger and Populus, potentially allowing the Company to defer any  
17 immediate or impending expenditures on the segment connecting those two  
18 substations, and to points beyond as well. If replacement generation and capacity  
19 is sited closer to the Utah or Oregon load centers, the Company may be able to  
20 further relieve other constraints.

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<sup>30</sup> Response to Sierra Club Data Request 6.7(d) in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>31</sup> Response to DPU Data Request 17.5 (Attached as Exhibit 40).

<sup>32</sup> Direct Testimony of Jeremy Fisher, page 21, lines 15-18. Note that the 700 MW represents PacifiCorp's 2/3 share of Jim Bridger 3 & 4.

1 **Q Did the Company respond to this point?**

2 **A** No. The Company simply refused to acknowledge any relationship between  
3 transmission planning and generation planning, stating that they would occur  
4 independently and on separate schedules.

5 Mr. Teply simply dismissed the question, stating:

6 The Company included the Energy Gateway transmission project  
7 as an underlying modeling assumption in its System Optimizer  
8 models supporting the application in this docket. However, the Jim  
9 Bridger Units 3 and 4 SCR Project decision-making process at  
10 hand is not dictated by the future configuration possibilities of the  
11 Energy Gateway transmission project, nor is the Energy Gateway  
12 project decision-making dictated by the outcome of the Jim  
13 Bridger Units 3 and 4 SCR Project.<sup>33</sup>

14 Mr. Link similarly skirted the issue:

15 The decision to install SCR equipment at the Jim Bridger plant is  
16 not influential to the decision-making process for Energy Gateway  
17 transmission investments. Independent of the decision to install  
18 SCRs at the Jim Bridger facility, the Gateway West segment will  
19 provide reliability benefits, increase access to low cost generation  
20 resources, and allow for a more efficient use of system resources.<sup>34</sup>

21 **Q Do you agree with Mr. Teply and Mr. Link?**

22 **A** Not at all. The Gateway West project will largely parallel the existing  
23 transmission infrastructure which is designed and maintained to carry the  
24 Company's thermal resources to load centers. If those thermal resources no longer  
25 exist, then some of the parallel infrastructure may be overbuilt or redundant. The

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<sup>33</sup> Rebuttal Testimony of Chad Teply, page 4, line 15 through page 5 line 5.

<sup>34</sup> Rebuttal Testimony of Rick Link, page 36, lines 709-716.

1 fate of the Company's thermal resources should be highly influential in the  
2 decision-making process for Energy Gateway transmission expenditures.

3 **Q Is it common for transmission planning to occur independently of generation**  
4 **planning?**

5 **A** No. Logically, there is a good reason that PacifiCorp reviewed transmission  
6 planning options in the 2011 IRP,<sup>35</sup> and that transmission expenditures will form  
7 such an integral backbone of the current 2013 IRP process. These processes are  
8 intrinsically linked: improvements in transmission ease congestion and allow for  
9 new generation resources, and changing loads and resources require different  
10 transmission utilization and build-out. This is not a one-way street, however. The  
11 Company should be actively and aggressively pursuing opportunities to reduce  
12 costs to ratepayers by avoiding unnecessary transmission expenditures.

13 **Q Did the Company examine the economics of removing the Gateway**  
14 **Transmission project?**

15 **A** Yes. But rather than simply removing or deferring the segment connecting Jim  
16 Bridger to PacifiCorp load, the Company instead reviewed a case in which all of  
17 the Gateway segments are removed and the anticipated wind resource in  
18 Wyoming, and both components are removed for both the Jim Bridger SCR  
19 retrofit and replace scenarios.<sup>36</sup> The results of this scenario was that the  
20 replacement of Jim Bridger 3 & 4 with a new combined cycle unit in Utah was  
21 favorable towards the SCR investment by [REDACTED].<sup>37</sup>

22 **Q Did this scenario address your concerns?**

23 **A** Not at all. This scenario completely fails to examine the opportunity to avoid  
24 incremental transmission investments in the segment of Gateway connecting Jim  
25 Bridger to Utah and Oregon load centers. Such a scenario would remove, reduce,

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<sup>35</sup> See Chapter 4 of the 2011 IRP, March 31, 2011.

<sup>36</sup> Rebuttal Testimony of Rick Link, page 37, lines 737-740.

<sup>37</sup> Rebuttal Testimony of Rick Link, page 39, line 767.

1 or defer the Gateway West segment between Anticline and Populus with the  
2 retirement of Jim Bridger 3 & 4. In such a scenario, I would expect to see avoided  
3 or deferred capital costs of transmission investment of around [REDACTED] (see  
4 Table 2 on page 18),<sup>38</sup> and avoided fixed O&M on the order of [REDACTED],<sup>39</sup>  
5 reflecting the avoided segment from Anticline to Populus. In addition, it is  
6 feasible that other Gateway segments, such as the sections connecting Populus to  
7 Utah load centers, might also be avoidable or deferrable. This magnitude of  
8 avoidable costs would warrant serious inquiry into this option. However, the  
9 Company declined to perform this sensitivity, simply declaring it “not  
10 reasonable.”<sup>40</sup>

11 **Q Has the Company considered how early retirement of the Jim Bridger 3 & 4**  
12 **units could impact Gateway transmission planning or costs?**

13 **A** No. According to the Company “the impact of Bridger 3 and 4 retirements at any  
14 point in the (2015-2020) timeframe and associated impacts to Company’s  
15 proposed Gateway expansion west of Bridger have not been analyzed or  
16 studied,”<sup>41</sup> and “there have not been any specific studies performed regarding  
17 impact of the retirement or gas conversions of Bridger Units 3 and 4 on the need  
18 for the Company’s Energy Gateway projects.”<sup>42</sup>

19 **Q Why has the Company not considered how early retirement of Jim Bridger 3**  
20 **& 4 could impact Gateway planning transmission or costs?**

21 **A** According to the Company, “it is not practical to determine with any certainty the  
22 change in need, modifications or delays in various Energy Gateway segments due

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<sup>38</sup> Confidential Attachment to Response to Sierra Club 5.14 in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>39</sup> Confidential Attachment to Response to Sierra Club 3.7 in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>40</sup> Response to Sierra Club Data Request 5.10 in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>41</sup> Response to WIEC Data Request 22.15 in concurrent Wyoming docket 20000-418-EA-12 (Attached as Exhibit 28).

<sup>42</sup> Response to WIEC Data Request 23.13 in concurrent Wyoming docket 20000-418-EA-12 (Attached as Exhibit 29).

1 to Bridger Unit 3 and 4 retirements, until the timing, location, type and size of the  
2 resources that replace the units has been determined.”<sup>43</sup>

3 **Q Is there an appropriate forum in which the Company could have evaluated**  
4 **the “timing, location, type and size of resources that replace” Jim Bridger 3**  
5 **& 4?**

6 **A** Yes. The analysis for this docket or the preceding 2011 IRP would have been the  
7 correct forum for this analysis. However, having failed to examine this scenario in  
8 the 2011 IRP, this docket becomes the correct venue. By neglecting to review the  
9 “change in need” for Gateway due to Bridger Unit 3 and 4 retirements in this  
10 docket, which is ostensibly about the economics of retrofitting versus retiring  
11 these same units, the Company denies ratepayers the opportunity to avoid  
12 unnecessary and non-useful infrastructure and costs, and biases this analysis  
13 against a retirement decision.

14 **Q Do the materials provided by the Company as justifications for any planned**  
15 **transmission capacity expansions west of Jim Bridger clearly demonstrate**  
16 **the need for this new transmission for reliability purposes or to relieve**  
17 **current constraints?**

18 **A** No. The company provided two study reports, namely, (a) ‘2011 Loads &  
19 Resource Study for PacifiCorp’s Eastern Control Area (PACE)’ (“2011 Loads and  
20 Resources Study”) and (b) ‘2011 PacifiCorp East TPL Summary Assessment’  
21 (“2011 TPL Assessment”) in response to WIEC Data Request 22.16-2 ,to serve as  
22 justifications for planned transmission capacity expansion west of Jim Bridger.

23 For the 2011 Loads and Resources Study, the entire PACE area was divided into  
24 11 ‘load bubbles’ as regional demarcations that share similar geography or other  
25 characteristics such as transmission (see map in Figure 5). Each of the 11 bubbles

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<sup>43</sup> Response to WIEC Data Request 8.28 in concurrent Wyoming docket 20000-418-EA-12 (Attached as Exhibit 30) and Response to Sierra Club Data Request 5.12 in Utah docket 12-035-92 (Attached as Exhibit 38).

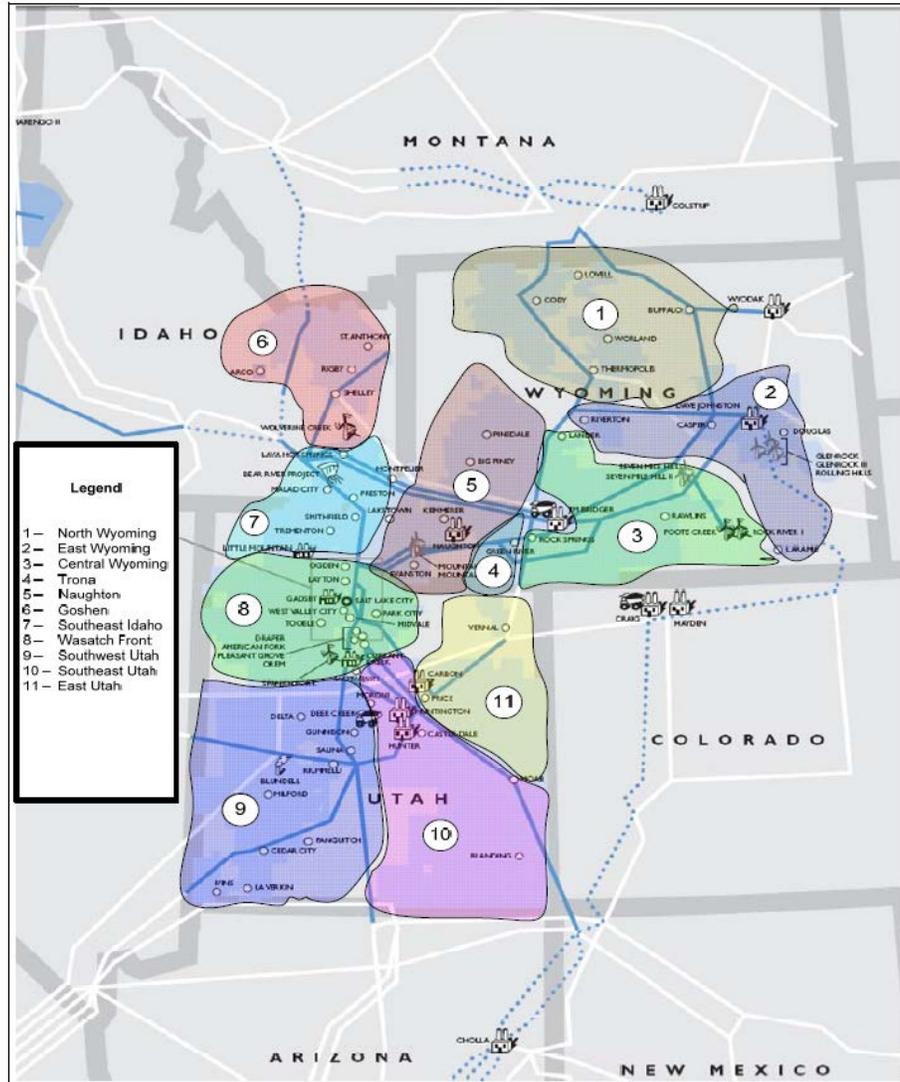
1 was examined with respect to existing and planned generation for determining  
2 required transmission capability into each of the bubble (area).

3 The study refers to the Energy Gateway transmission improvements as projects  
4 that will eliminate transmission constraints in the region to the east of Bridger,<sup>44</sup>  
5 and will enhance the ability to move generation resources, including new wind  
6 resources to other areas to serve network load. The document indicates, however,  
7 that none of the 11 load bubbles are expected to be deficient in meeting projected  
8 load due to any transmission constraints and specifically, are not dependent on  
9 any transmission expansion west of Bridger to meet projected load.

10 One segment of the Energy Gateway West project would connect Jim Bridger  
11 Generating Station to the Populus substation. However, neither the Bridger  
12 Generating Station nor the Populus substation appear to be considered as a  
13 generation resource and load in any of the 11 load bubbles. Therefore, there is no  
14 justification for the need of this project in the aforementioned report.

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<sup>44</sup> Specifically, relieving a “nomogram” of two paths of transmission leading from eastern Wyoming to the center of the state.



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Figure 5. Resource bubbles in 2011 Loads and Resource Study.<sup>45</sup>

The 2011 TPL assessment is essentially a transmission reliability study that studies the Company’s transmission system for North American Electric Reliability Corporation (NERC) Transmission Planning Standards. The study involves evaluating the transmission system for reliability under normal and contingency events such as outage of one or more transmission lines. In case of this study, the company developed 2012 heavy summer, 2012-2013 light winter

<sup>45</sup> See Attachment to WIEC 22.16 -2 in concurrent Wyoming docket 20000-418-EA-12, Excerpt pp. 10 (Attached as Exhibit 31).

1 and 2016 heavy summer base cases to study near term and a 2021 heavy summer  
2 base case to study long term load periods. However, it is not clear as to which  
3 base cases specifically contain the Gateway West Transmission Projects (new  
4 transmission lines west of Bridger). In this assessment, the company has  
5 formulated a list of required facilities for mitigation of reliability concerns to meet  
6 applicable NERC standards. However, none of the required facilities are  
7 associated directly with the Gateway West Transmission project, and specifically,  
8 none are associated with the links west of Bridger.

9 **Q How will the enhanced Bridger West Path be utilized in the future?**

10 **A** From a forward looking congestion analysis based on production cost model runs  
11 of 2019 and 2020 data sets, the Bridger West Path would not be heavily utilized  
12 or congested in 2020. In this expected future case, the Bridger West Path operated  
13 above 75% utilization for only 2.71% of the year.<sup>46</sup> This study assumed that only  
14 Phase 1 of the Gateway West transmission project was in service with a 3,700  
15 MW rating for the Bridger West Path.

16 **Q Please summarize why these planning and reliability studies matter in the**  
17 **context of avoiding transmission expenses with the retirement of Bridger 3**  
18 **and 4.**

19 **A** Very simply, the Company has not demonstrated that the links in the Gateway  
20 West project westward of Jim Bridger are unavoidable. The proposed links do not  
21 relieve current constraints and do not address specific reliability concerns. It is my  
22 opinion that many of the links to the west side of Jim Bridger could be avoided,  
23 deferred, or reduced if Jim Bridger 3 and 4 are retired.

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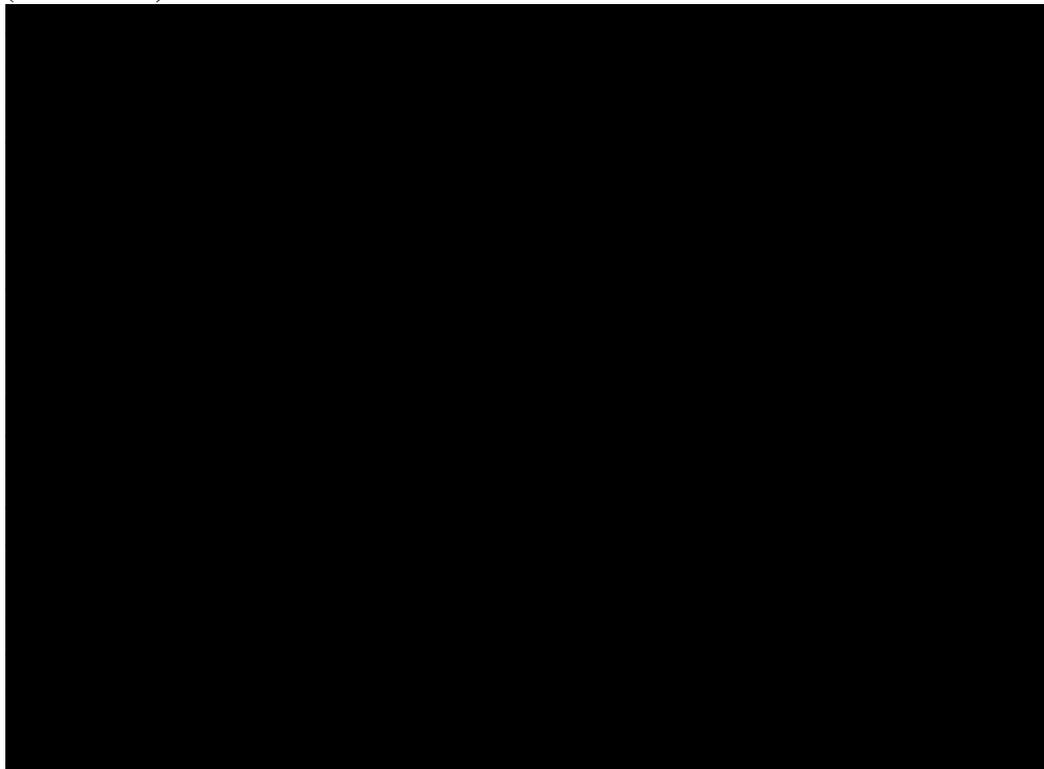
<sup>46</sup> WECC Path Reports, 10-Year Regional Transmission Plan, Western Electricity Coordinating Council, September 2011. Available online at [http://www.wecc.biz/library/StudyReport/Documents/Plan\\_Summary.pdf](http://www.wecc.biz/library/StudyReport/Documents/Plan_Summary.pdf).

1 **Q Has the Company provided additional detail on the cost of the Gateway West**  
2 **project?**

3 **A** Yes. The Company had previously indicated a total cost of [REDACTED] for the  
4 Windstar to Populus line, with about [REDACTED] allocated to the Bridger to  
5 Populus segment.<sup>47</sup>

6 Subsequently, the Company provided additional files with cost information.  
7 According to Sierra Club 5.14 (also Feb 20, 2013), the Company estimates about  
8 [REDACTED], with an approximate [REDACTED] price tag for the Bridger to  
9 Populus segment (see Table 2, below).

10 **Table 2. Costs for Gateway West (Segment D): Windstar to Populus**  
11 **(Confidential)**<sup>48,49</sup>



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<sup>47</sup> Confidential Attachment OCS 11.2 (Exhibit 15 to Sierra Club Direct Testimony of Jeremy Fisher).

<sup>48</sup> Attachment to Sierra Club 3.5(c) in Utah docket 12-035-92, Table1: Gateway West – Stage 1 Facilities and In-Service Dates (Attached as Exhibit 38).

<sup>49</sup> Attachment to Sierra Club 5.14 Windstar to Populus 230/500 kV Line Cost Breakdown 2013-2022 Capital Plan CONF (Attached as Exhibit 39).

1           However, according to Sierra Club 3.7 (Feb 20, 2013), the capital cost for the  
2           Windstar to Populus segment as modeled in the SO Model was [REDACTED]. The  
3           Company states that these “updated values are based on most recent information  
4           available.”<sup>50</sup>

5           **Q     How much will the segment from Jim Bridger (Anticline) to Populus cost,**  
6           **according to the Company’s model?**

7           **A     As filed, the Company models the costs of each link explicitly in System**  
8           **Optimizer. A [REDACTED] MW west-bound link in [REDACTED] from Jim Bridger to “Path C(N)”**  
9           **is modeled at [REDACTED] million, while an [REDACTED] MW link in [REDACTED] (at the same**  
10           **location) is modeled at [REDACTED] million.**<sup>51</sup>

11          **Q     Do these costs include the costs of operations and maintenance (O&M)?**

12          **A     No. In addition, O&M costs for the transmission line are not included in the SO**  
13          **model.**<sup>52</sup> **O&M costs for the entire Windstar to Populus segment are estimated at**  
14          **about [REDACTED] per year in 2019, for a net present value in 2013 of [REDACTED]**  
15          **[REDACTED].**<sup>53</sup>

16          **Q     Mr. Teply states that “the Company included the Energy Gateway**  
17          **transmission project as an underlying modeling assumption in its System**  
18          **Optimizer models supporting the application in this docket.”<sup>54</sup> Is the Energy**  
19          **Gateway West project just a modeling assumption?**

20          **A     No. The Energy Gateway West project is not simply a convenient assumption for**  
21          **this model. The Company indicates that thus far they have spent \$51 million on**  
22          **studies, scoping, permitting, and applications for the Gateway West project.**<sup>55</sup> **The**

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<sup>50</sup> See Response to Sierra Club 3.7(e) in Utah docket 12-035-92.

<sup>51</sup> See Confidential Attachment CapEx\_TransmissionOptions CONF (Attached as Exhibit 32), Tie Option-I Bridger E-PathCS and Tie Option I Bridger E-PathCS2.

<sup>52</sup> See Response to Sierra Club 3.7(e) in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>53</sup> Attachment to Sierra Club 3.7 in Utah docket 12-035-92 CONF (Attached as Exhibit 39).

<sup>54</sup> Rebuttal Testimony of Chad Teply, page 4, lines 19-21.

<sup>55</sup> Response to Sierra Club Data Request 5.13(a) in Utah docket 12-035-92 (Attached as Exhibit 38). Confidential response to Sierra Club Data Request 5.14(a) in Utah docket 12-035-92 indicates spending through 2012 of [REDACTED] on the Windstar to Populus segment alone.

1 Company expects to bring a case in front of this Commission in one year (August  
2 2014) to approve of costs incurred in the Gateway West project. This is very  
3 clearly an ongoing project with avoidable components.

4 **Q Please summarize your concerns on the relationship between the Gateway**  
5 **West transmission line and this case.**

6 **A** According to Company documents, the Gateway West line is currently slated to  
7 add about 1,700 MW of capacity to the transmission path between  
8 Bridger/Anticline and the Populus terminal, nearly doubling the capacity of this  
9 path. However, the planning for this line assumes that Jim Bridger will remain a  
10 2,300 MW facility (joint ownership), rather than a 1,200 MW facility. Removing  
11 Jim Bridger units 3 & 4 opens up a sizable transmission space between  
12 Bridger/Anticline and Populus – over 60% of the planned transmission between  
13 those two nodes. The Company should either (a) decisively demonstrate that the  
14 planned expenditures for Gateway West are completely independent of the  
15 decision to retire or retrofit Jim Bridger and justify the prudence of this  
16 assumption, or (b) rigorously review and model opportunities to avoid or defer  
17 transmission investments if the Jim Bridger units are retired rather than retrofit.

18 **3. CO<sub>2</sub> PRICE FORECASTS**

19 **Q Has the Company adjusted their CO<sub>2</sub> price forecasts from the original**  
20 **filing?**

21 **A** Yes. The Company effectively lowered its base CO<sub>2</sub> price since the 2011  
22 “Official Forward Price Curve” (OFPC). The assumption begins one year later,<sup>56</sup>  
23 at the same nominal level (i.e. lower in real dollars), and thus has a lower impact  
24 on the Company’s choices in this docket.<sup>57</sup> The effective nominal levelized cost

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<sup>56</sup> See Rebuttal Testimony of Rick Link, page 22, line 432.

<sup>57</sup> See workpapers Exhibit RMP\_\_(RTL-4R)-Gas & CO<sub>2</sub>.xlsx in rebuttal testimony against Exhibit RMP\_\_(RTL-2)-Gas & CO<sub>2</sub> in direct testimony.

1 from 2016 to 2030 (as performed by Mr. Link in direct and rebuttal testimony)<sup>58</sup>  
2 is lower by about 15% than in the original filing.<sup>59</sup> The Company's high CO<sub>2</sub>  
3 price forecast has also been pushed back by two years (from 2018 to 2020) and  
4 lowered, reduced on a nominal levelized basis by nearly 40%.<sup>60</sup> The low CO<sub>2</sub>  
5 price forecast remains at zero.

6 **Q Did the Company provide an explanation for their CO<sub>2</sub> price adjustments?**

7 **A** Yes. Mr. Link states that “the fundamental approach of reviewing the range of  
8 third party price forecasts in relation to the base case price projections is identical  
9 to the approach used to develop natural gas and CO<sub>2</sub> price scenarios in the  
10 Company's original analysis. We simply included in our review more recent third  
11 party forecast data.”<sup>61</sup>

12 While this explanation sounds innocuous and objective, the Company's  
13 mechanism for choosing a base forecast is completely opaque. Of the four “third-  
14 party” forecasts reviewed from three organizations, two declined, one increased  
15 and one stayed almost precisely the same.<sup>62</sup> The federal proposals reviewed by  
16 the Company have not changed.

17 **Q How does the Company justify its new CO<sub>2</sub> price forecasts?**

18 **A** Mr. Link explains that the Company “focus[es] on recent [CO<sub>2</sub> price] projections  
19 from reputable forecast services.” Presumably, the reference to a “reputable  
20 forecast service” is meant to draw a contrast with the forecast produced by my  
21 firm, Synapse Energy Economics, referenced in the next paragraph. Mr. Link

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<sup>58</sup> See Rebuttal Testimony of Rick Link, pages 31 to 32, lines 617 to 630.

<sup>59</sup> 15% reduction, from █████ /tCO<sub>2</sub> to █████ /tCO<sub>2</sub>.

<sup>60</sup> 38% reduction, from █████ /tCO<sub>2</sub> to █████ /tCO<sub>2</sub>.

<sup>61</sup> Rebuttal Testimony of Rick Link page 21, lines 414 through 417.

<sup>62</sup> The nominal levelized cost from 2016 through 2030 for █████ dropped by 17%, the base  
█████ forecast remained the same, the high █████ forecast decreased by 29%, and █████ increased by 29%.

1           disparages the Synapse forecast from October 2012 by suggesting that it relies on  
2           outdated data.<sup>63</sup>

3       **Q     Does the Synapse CO<sub>2</sub> forecast rely on outdated data?**

4       **A     No.** Of the utility Integrated Resource Plans (IRP) reviewed in the 2012 forecast,  
5           one was from late 2009. All other IRP were from 2010-2012. Since the forecast  
6           was developed, we have collected additional public IRP, all filed in 2012, from  
7           another twenty utilities. Our forecast remains consistent with findings from the  
8           more recent IRP.

9           To develop carbon price forecasts, Synapse reviews recent state, regional, federal  
10          and agency proposals for greenhouse gas legislation and regulation, tracks  
11          integrated model results from federal agencies and other modeling groups, tracks  
12          the cost of realized and potential mitigation technologies, methods and costs, and  
13          reviews utility and other stakeholder plans for greenhouse gas regulation. Synapse  
14          does not employ a curve fit or weighting to particular utility plans; rather, as one  
15          of the forecast mechanisms employed, we review the cohort of utility plans filed  
16          and type of policies they represent, and estimate a range of prices that are likely  
17          high enough to impact planning procedures yet are politically viable, and that are  
18          informed by likely mitigation costs and a trajectory of falling emissions.  
19          Nonetheless, in a *post-hoc* review of 91 forecasts from public IRP between 2011  
20          and 2012, the Synapse price forecast is just higher than the median estimate on a  
21          real-levelized basis (55<sup>th</sup> percentile), while the new PacifiCorp base case is  
22          substantially lower – down at the 22<sup>nd</sup> percentile. In other words, of all of the  
23          public IRP forecast that we have been able to obtain to date, including zero price  
24          forecasts, planning documents that do not include CO<sub>2</sub> prices or mention CO<sub>2</sub>  
25          considerations (considered a zero price), the 2012 Synapse CO<sub>2</sub> price forecast  
26          represents a cost impact right in the middle of the pack, while nearly 78% of the  
27          forecasts are above the PacifiCorp base case.

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<sup>63</sup> Rebuttal testimony of Rick Link, page 28, lines 538 through 542.

1           Regardless of the size of the utility or client base of the forecast firm, it is clear  
2           that many other utilities (with forecasts in the public domain) have used higher  
3           CO<sub>2</sub> price forecasts than PacifiCorp in the last two years.

4           To be clear, there is little useful market data on CO<sub>2</sub> price forecasts in the US  
5           domestic market. The only historically operational market, the Regional  
6           Greenhouse Gas Initiative (RGGI) served as a testbed with a very high cap (i.e.  
7           far more allowances than emissions), and thus very low emissions prices. RGGI is  
8           preparing to tighten emissions limits, and the California market, while  
9           operational, does not have a cap until next year. Aside from national-scale  
10          models, there is little market data to draw on – either at Synapse or at the three  
11          “reputable forecast services” drawn on by the Company. To a large extent,  
12          reviewing the range of CO<sub>2</sub> prices used by other entities in planning is an  
13          effective mechanism of “taking the temperature” of the climate debate – all else  
14          being equal, it measures the extent to which utilities, Commissions, and other  
15          stakeholders are willing to hedge against the risk of climate regulations or  
16          legislation. PacifiCorp’s choice of a very low base CO<sub>2</sub> forecast means that the  
17          Company is casting particularly long odds on any form of climate regulation or  
18          legislation relative to its counterparts. It is my opinion that the Company’s outlier  
19          position is neither prudent nor safe, and exposes ratepayers to significant risk.

20       **Q     Is Synapse a “reputable forecast service”?**

21       **A**Synapse does not charge for the use of our CO<sub>2</sub> price forecast, and as such we are  
22          not a “forecast service”. We provide the CO<sub>2</sub> price forecast for use by any party  
23          in an open access document with clearly stated assumptions. However, we do  
24          meet the Company’s definition of “reputable,” where our “offerings” are “widely  
25          used and respected.”<sup>64</sup> We do not regularly track the use of our forecast – users  
26          are not required to register or request permission, and we do not seek payment –  
27          however, a simple search reveals at least twenty-six entities, unaffiliated with our

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<sup>64</sup> See Response to Sierra Club Data Request 5.9(a) (Attached as Exhibit 38).

1 consultancy, that have used our forecast for planning purposes, including six  
2 utilities and five state regulatory commissions. Of particular note, Idaho Power,  
3 the other co-owner of the Jim Bridger station, draws on the Synapse 2012 CO<sub>2</sub>  
4 price forecast as one of the basis for their 2013 IRP assumptions.<sup>65</sup>

5 **Q The Company lowered their CO<sub>2</sub> price forecast from the December 2011**  
6 **OFPC to an update filed in February 2013. Have events between December**  
7 **2011 and February 2013 suggested a lower risk for carbon emissions?**

8 **A** No. In fact, quite the opposite. In late March 2012, the EPA proposed New Source  
9 Performance Standards (NSPS) for greenhouse gasses for electric utility  
10 generating plants, effectively restricting emissions for new utility plants to the  
11 equivalent of natural-gas fired units. Further, Section 111(d) of the Clean Air Act  
12 requires that once a performance standard is set for new sources, the EPA is  
13 required to develop a standard of performance for existing sources as well. The  
14 last electoral cycle in November 2012 kept an Administration with a stated policy  
15 goal of enacting significant climate regulation, if not legislation, and the President  
16 reiterated that goal at the forefront of his energy policy in the 2013 State of the  
17 Union address. Following that address, Senators Sanders and Boxer proposed two  
18 new climate bills that, respectively, reduce subsidies to fossil-fuel producers and  
19 impose a carbon fee at fossil-fuel sources.

20 **Q What is Mr. Link's opinion on the relationship between CO<sub>2</sub> and gas prices?**

21 **A** According to Mr. Link, the Company assumes a connection between a CO<sub>2</sub> price  
22 and the demand for natural gas, and thus the price for natural gas. As CO<sub>2</sub> prices  
23 increase, the Company assumes that utilities will increasingly rely on natural gas,  
24 increasing demand and raising prices.<sup>66</sup>

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<sup>65</sup> See Idaho Power 2013 Advisory Council Materials. Online at:  
[http://www.idahopower.com/AboutUs/PlanningForFuture/irp/2013/IRPAC\\_Materials.cfm](http://www.idahopower.com/AboutUs/PlanningForFuture/irp/2013/IRPAC_Materials.cfm).

<sup>66</sup> See Rebuttal Testimony of Rick Link, page 23, lines 451-456.

1 I would expect, based on Mr. Link's description that gas prices should remain  
2 essentially identical across cases up until the date that a CO<sub>2</sub> price is introduced,  
3 at which point the cases would diverge.

4 **Q Do the gas prices across CO<sub>2</sub> price scenarios remain the same up until the**  
5 **date that the CO<sub>2</sub> price is introduced?**

6 **A** No. The gas prices in the different CO<sub>2</sub> price scenarios actually start to diverge in  
7 2016, five years ahead of the CO<sub>2</sub> price.

8 **Q What is the implication of the Company's assumed correlation?**

9 **A** The assertion that "natural gas prices would likely be positively correlated with  
10 CO<sub>2</sub> prices" means that it would be his underlying assumption that in the  
11 presence of CO<sub>2</sub> prices, natural gas prices must rise. Such a restriction prevents  
12 the Company from reviewing any scenario in which CO<sub>2</sub> prices are implemented  
13 and natural gas prices remain at their normally projected prices.

14 **Q Why would natural gas prices feasibly remain at their normally projected**  
15 **prices in the presence of a carbon price?**

16 **A** The assumption that natural gas prices would rise in the presence of a carbon  
17 price is predicated on the assumption that natural gas would replace coal as the  
18 sole, or dominant form of greenhouse gas reductions. From an immediate  
19 operational standpoint, this is not an unreasonable outcome – given low gas prices  
20 and a carbon price, we might expect to see some coal/gas switching in the short  
21 term as such capacity already exists.<sup>67</sup> However, as a long-term planning  
22 assumption, this isn't necessarily a reasonable assumption. On a forward-looking  
23 basis under pressure of continuously rising CO<sub>2</sub> prices, power providers may  
24 choose to not build a plethora of gas generators that would also pay carbon prices,  
25 instead opting for other low-emissions options such as renewable energy, or even  
26 nuclear energy. At higher CO<sub>2</sub> prices, the same dynamic that could compel a

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<sup>67</sup> Gas has about half of the stack emissions of CO<sub>2</sub> as coal. Therefore, providing the same quantity energy from gas produces about half of the stack emissions as coal.

1 short-term switch from coal to gas would also compel a switch from gas to zero-  
2 emissions sources. Overall, the net interaction between gas prices and CO<sub>2</sub> prices  
3 will be a complex interplay of factors, including the cost to switch fuels, the  
4 availability of infrastructure to allow a fuel switch, the costs and long-term  
5 benefits of building low or zero emissions generation, and even the structure of  
6 the carbon market.

7 **Q Does the Company provide supporting evidence for the assumption that gas**  
8 **prices will rise in the presence of a carbon price?**

9 **A** Mr. Link shows trends put forward by the US Energy Information Administration  
10 (EIA) and one of the forecast services relied upon by the Company. Both  
11 organizations show increasing gas consumption and moderately increasing gas  
12 prices with rising CO<sub>2</sub> prices.<sup>68</sup>

13 **Q Is there information available about the potential linkage between gas prices**  
14 **and CO<sub>2</sub> prices?**

15 **A** There is very little, if any, independent research on the connection between gas  
16 and CO<sub>2</sub> prices, and while others have asserted such a connection, the evidence  
17 for such a correlation is thin.

18 The Energy Modeling Forum (EMF) is a collaborative independent research  
19 group that draws together a large number of expert “individuals represent[ing] a  
20 mix of corporate, academic, and government perspectives.”<sup>69</sup> Leading institutions  
21 at EMF include such entities as the Edison Electric Institute (EEI), the Electric  
22 Power Research Institute (EPRI), Brattle, the Energy Information Administration  
23 (EIA), the American Petroleum Institute, a number of U.S. national laboratories,  
24 international academic programs, and energy companies. EMF working groups  
25 design, run and evaluate integrated energy economic models designed to explore  
26 integrated market fundamentals.

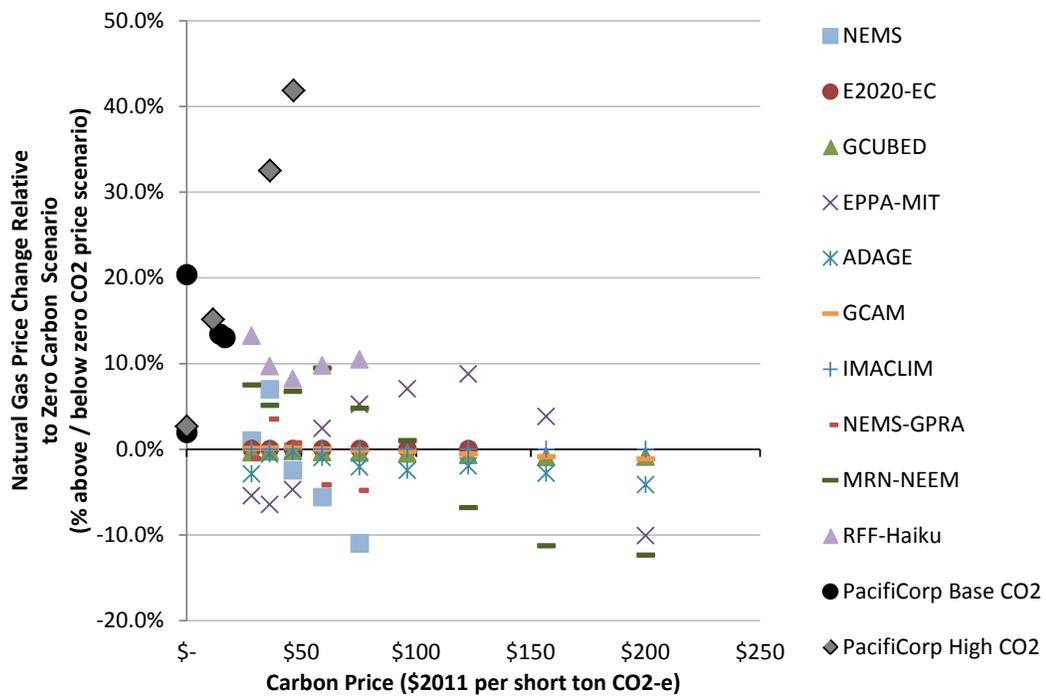
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<sup>68</sup> Rebuttal Testimony of Rick Link, pages 24 to 28, lines 473 to 513.

<sup>69</sup> [http://emf.stanford.edu/docs/about\\_emf](http://emf.stanford.edu/docs/about_emf).

1 The latest released EMF working group report from March 2011 included long-  
 2 run models from ten independent organizations, including (amongst others) EIA,  
 3 Massachusetts Institute of Technology (MIT), the Pacific Northwest National  
 4 Laboratory, Charles River Associates, and Resources for the Future. Among the  
 5 scenarios modeled were base-case and carbon-tax scenarios.<sup>70</sup>

6 In Figure 6, below, I have plotted the percentage change in natural gas prices in  
 7 relation to a range of carbon prices as output by each model in this study.



8

9 **Figure 6. Model results from EMF indicating natural gas changes with rising CO<sub>2</sub>**  
 10 **prices,<sup>71</sup> PacifiCorp prices plotted in black circles and outlined grey diamonds.**

11 Figure 6 clearly shows that some of the most advanced integrated energy  
 12 economics models disagree with one another regarding the extent of gas price

<sup>70</sup> In these scenarios, the carbon tax is imposed on all fossil energy users.

<sup>71</sup> Data available at <http://emf.stanford.edu/docs/263>. NEMS (US Energy Information Administration), E2020-EC (Environment Canada), GCUBED (Brookings Institution), EPPA-MIT (Massachusetts Institute of Technology), ADAGE (Research Triangle Institute), GCAM (Joint Global Change Research Institute, Pacific Northwest National Laboratory), IMACLIM (Centre International de Recherche sur l'Environnement et le Développement), NEMS-GPRA (US Department of Energy & Onlocation, Inc.) MRN-NEEM (Charles River Associates), and RFF-Haiku (Resources for the Future).

1 sensitivity to carbon prices. Of the ten models portrayed here, four predict lower  
2 gas prices, four predict higher gas prices, and two are unchanged compared to the  
3 baseline at any carbon price below \$60/ton CO<sub>2</sub>.<sup>72</sup> At carbon prices above \$60/ton  
4 the majority of models consistently predict lower gas prices than the baseline.

5 I have also plotted PacifiCorp's assumed increase in natural gas prices associated  
6 with particular carbon prices. These points are shown in dark black circles and  
7 gray outlined diamonds for the base and high case, respectively, relative to the  
8 zero CO<sub>2</sub> price case. PacifiCorp's assumed gas price adders with rising carbon  
9 prices are well out of bound with any other model shown here. First, the Company  
10 shows increasing gas prices when the CO<sub>2</sub> price is still zero (the points that lie on  
11 the zero carbon price vertical line). Secondly, the Company's increase in natural  
12 gas prices easily double and even triple the very highest price adders found across  
13 all of these models.

14 It is my opinion that the Company's assumed gas price adder in the presence of a  
15 CO<sub>2</sub> price is unfounded and overemphasized. By including these adders, the  
16 Company has biased their result against reasonable replacement portfolios.

17 **4. REQUIREMENT FOR SCR IS NOT NECESSARY UNTIL 2018**

18 **Q Does the Company need to move forward with construction of SCR on Jim**  
19 **Bridger 3 & 4?**

20 **A** No. As my testimony above shows, moving forward with construction of SCR is  
21 not in the best interests of ratepayers. However, even if you set aside all of my  
22 previous testimony regarding the lack of economic merit for the proposed  
23 construction, there is no reason for the Company to move forward with the  
24 proposed construction right now.

25 The Company proposes to complete the projects at Units 3 and 4 by December  
26 31, 2015 and December 31, 2016, respectively. The Company filed its application

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<sup>72</sup> With the exception of the \$36/ton CO<sub>2</sub> mark, in which 5 of 10 predict a higher gas price.

1 with the Commission based in part on its requirement to comply with the  
2 Environmental Protection Agency's ("EPA") final BART determination for all  
3 four of the Jim Bridger coal-fired power plant units.<sup>73</sup> When the Company  
4 initiated this proceeding, EPA had already issued a proposed BART  
5 determination to install SCR on Units 1 and 2, which would have accelerated the  
6 requirement from 2021 and 2022 to within five years of EPA's final rule (i.e.  
7 2017).<sup>74</sup> The Company believed that EPA would issue a final BART  
8 determination for the Jim Bridger facility by mid-October of 2012, which would  
9 have allowed sufficient time to incorporate EPA's final rule into the evidentiary  
10 record of this proceeding. However, in December 2012, EPA requested and  
11 received an extension to a court-ordered deadline to issue a final BART  
12 determination for Jim Bridger and the other Wyoming facilities subject to BART  
13 (the "Consent Decree"). As a result, the Company and the Commission will not  
14 be able to make a decision in this proceeding based on a final BART  
15 determination. This prevents the Commission and the parties from considering the  
16 additional economic impacts that would result from the final rule, including but  
17 not limited to: the impact of accelerating the installation of SCR on Units 1 and 2,  
18 the increased capital and operational costs necessary to meet a potentially more  
19 aggressive NOx limit, or the impact of installing SCR on all four Jim Bridger  
20 units within a five year window.

21 **Q Please briefly describe the recent revisions to the Consent Decree governing**  
22 **the schedule under which EPA is required to issue a final rulemaking with**  
23 **respect to BART determinations for Wyoming facilities subject to BART.**

24 **A** On December 13, 2012, EPA notified the public that it was delaying its final  
25 BART determination for the Jim Bridger facility. Rather than issuing a final  
26 decision in October 2012, EPA will now issue a new proposed BART  
27 determination for Jim Bridger by March 29, 2013, with a final rule to follow by

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<sup>73</sup> Direct Testimony of Chad A. Teply, page 41.

<sup>74</sup> 77 Fed. Reg. 33036. June 4, 2012.

1 September 27, 2013. All four of the Jim Bridger units are subject to BART;  
2 therefore, EPA's final BART determination will affect the entire plant. EPA's  
3 proposed rule, now being revised, had proposed to approve the state's submittal  
4 on timing and configuration to install SCR at Jim Bridger units 3 and 4, but  
5 rejected the state's plan for units 1 and 2 and accelerated the requirement to install  
6 SCR on those units.<sup>75</sup> However, EPA also solicited comments on alternative  
7 proposals for Jim Bridger that would have allowed for more flexible timing to  
8 install SCR at Units 3 and 4.<sup>76</sup> The fact that EPA has withdrawn its prior draft  
9 rule and will issue a new draft rule addressing facilities in Wyoming that are  
10 subject to BART makes it reasonable to assume that EPA intends to significantly  
11 revise its prior proposal.

12 **Q What impact does the EPA delay have on the Company's timeline for**  
13 **compliance with the Regional Haze Rule?**

14 **A** With the delay in issuing the final BART determination and the withdrawal of  
15 EPA's previous proposal to approve the timing of installation of SCRs as BART  
16 for Bridger Units 3 and 4, the Company's compliance obligations with regard to  
17 the Regional Haze Rule are uncertain. Even assuming EPA does ultimately  
18 approve the SCRs as BART, it is quite possible that the final rule could impose a  
19 more stringent emission limit, which in turn could cost more money. PacifiCorp  
20 acknowledged that it has not factored in these potential cost increases into its  
21 analysis of the proposed SCR projects.<sup>77</sup>

22 In addition, the proposed EPA deadline that the Company previously relied upon  
23 to justify installation of SCRs by the end of 2015 and 2016 will certainly not  
24 materialize. Under the Visibility Protection section of the Clean Air Act, the  
25 Company has a maximum of five years from the date of approval of a plan

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<sup>75</sup> 77 Fed. Reg. 33053. June 4, 2012.

<sup>76</sup> *Id.*

<sup>77</sup> Rocky Mountain Power's Mem. in Opp'n to Sierra Club's Mot. for a Stay or Continuance Pending Final Action, January 10, 2013 at fn 5.

1 revision (or, in this case, of promulgation of a plan revision by EPA) to procure,  
2 install, and operate the best available retrofit technology.<sup>78</sup> If the final  
3 promulgation of EPA's BART determination for the Jim Bridger facility will take  
4 place on September 27, 2013, assuming the determination is published  
5 immediately, then the new compliance deadline for the installation and operation  
6 of BART controls in Wyoming would be no earlier than September 27, 2018.  
7 This timeframe gives the Company nearly 3 additional years before controls must  
8 be in place, or in the alternative, before replacement capacity must be procured.

9 **Q What about the Company's claim that it must install the SCRs on units 3 and**  
10 **4 by the ends of 2015 and 2016, respectively, in order to comply with the 2010**  
11 **BART Settlement Agreement and the Wyoming Environmental Quality**  
12 **Council's subsequent order incorporating the terms of the Settlement**  
13 **Agreement?**

14 **A** The Company refers to the 2010 BART Settlement Agreement with the Wyoming  
15 Department of Environmental Quality ("WDEQ") and the subsequent  
16 Environmental Quality Council order that included deadlines for the company to  
17 install SCRs on Bridger units 3 and 4 by December 31, 2015 and December 31,  
18 2016, respectively. Those deadlines can and should be modified. I agree that if the  
19 Company were to take no action, those state-based deadlines would remain in  
20 place. However, given EPA's recent action to delay its final BART determination,  
21 it is very likely that PacifiCorp and WDEQ could reach an agreement to modify  
22 the applicable deadlines.

23 Section 7 of the Settlement Agreement states that the Agreement may be modified  
24 "if future changes in either: (i) federal or state requirements or (ii) technology  
25 would materially alter the emissions controls and rates that otherwise are required  
26 hereunder."<sup>79</sup> The Environmental Quality Council order further provides that it  
27 retains jurisdiction over the Settlement Agreement for purposes of Section 7

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<sup>78</sup> 42 U.S.C. 7491(b)(2)(A).

<sup>79</sup> BART Settlement Agreement (Attached as Exhibit 33).

1 (“Changed Circumstance”).<sup>80</sup> Therefore, both the Settlement Agreement and the  
2 subsequent EQC order can be modified if there are “changed circumstances.”

3 With the delay in EPA’s issuance of its final BART determination for Bridger  
4 units 3 and 4, the actual emissions control requirements for these units have been  
5 delayed until at least September 27, 2018. With this date as the new backstop for  
6 compliance with the Federal Regional Haze Rule, the Company should, for the  
7 benefit of its ratepayers, seek to amend the Settlement Agreement and the  
8 Environmental Quality Council order to delay installation of the SCRs at Bridger  
9 units 3 and 4, in accordance with the new EPA compliance deadline.

10 **Q Is there any indication that WDEQ and the Environmental Quality Council**  
11 **would be amenable to a request to modify of the BART Settlement**  
12 **Agreement?**

13 **A** Yes. In fact, PacifiCorp is currently pursuing this exact request with respect to its  
14 Naughton 3 facility. In Docket No. 20000-400-EA-11, Rocky Mountain Power  
15 witness Mr. Chad Teply explained in rebuttal testimony that the Company was  
16 pursuing a delayed timeframe to implement the Regional Haze Rule requirements  
17 at Naughton 3: “The Company does plan to pursue an extended regional haze  
18 compliance timeframe with the state of Wyoming Department of Environmental  
19 Quality and the EPA.”<sup>81</sup> Ms. Cathy Woollums, the senior vice president of  
20 environmental services and chief environmental counsel for PacifiCorp’s parent  
21 company, MidAmerican Energy Holdings Company, later appeared before the  
22 Environmental Quality Council on January 10, 2013 to update the council on the  
23 Company’s plans to modify the BART Settlement Agreement and related permits  
24 with respect to Naughton Unit 3. These actions by the Company show that it is  
25 very possible – and according to the Company, potentially beneficial for  
26 ratepayers – to approach WDEQ and request a modification to the BART

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<sup>80</sup> Environmental Quality Council Order (Attached as Exhibit 34).

<sup>81</sup> Docket No. 20000-400-EA-11, Rebuttal Testimony of Chad A. Teply, April 2012, page 9.

1 Settlement Agreement due to changed circumstances, as contemplated by Section  
2 7 of that agreement.

3 It is also my understanding that at the January 10, 2013 Environmental Quality  
4 Council meeting, the Environmental Quality Council indicated that it would be  
5 amenable to considering a request to change the Jim Bridger compliance dates in  
6 the order and the Settlement Agreement to reflect EPA's revised timeframe if  
7 WDEQ or the Company asked for it. However, the Company has not made any  
8 request to either WDEQ or the Environmental Quality Council seeking an  
9 extension of the state deadlines.<sup>82</sup>

10 **Q Should PacifiCorp seek a delay in the state Regional Haze compliance**  
11 **deadlines for Jim Bridger?**

12 **A** Yes. PacifiCorp's apparent refusal to even request an extension is irrational. The  
13 Company's own revised analysis changed dramatically in the few months  
14 between the application and rebuttal testimony, and the Company concedes that  
15 its conclusions are highly dependent on natural gas and CO<sub>2</sub> price forecasts.<sup>83</sup>  
16 Further adjusting the Company's analysis to account for the issues addressed in  
17 my testimony renders the Company's conclusions even more suspect. In  
18 summary, the narrow window of economic benefit purported by the Company, the  
19 rapidly changing economic outcome, and the additional errors or biases in the  
20 Company's analysis demonstrates that the decision to install SCR is currently  
21 unsupported. Given that the Company will not face a federal requirement to  
22 install SCR controls until September 2018 at the earliest, it would be beneficial  
23 for ratepayers for the Company to take the extra time to evaluate whether changes  
24 in either the gas market or the cost of CO<sub>2</sub> affect the reasonableness of the  
25 Company's plan. Rushing the decision now puts the risk on ratepayers that

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<sup>82</sup> Response to Sierra Club Data Request 4.1 in Utah docket 12-035-92 (Attached as Exhibit 38).

<sup>83</sup> Rebuttal Testimony of Rick Link, pages 29 to 30, lines 568-579.

1 circumstances will change in such a way that makes the SCR expenses even more  
2 unfavorable.

3 Waiting for more certainty from EPA would also allow the Company to consider  
4 any potential changes in the economics of the project if EPA imposes stricter  
5 emission limits on 3 and 4, and it would allow the Company to fully consider the  
6 economic impact of SCR at all four of the Jim Bridger units instead of  
7 considering only units 3 and 4 independently in the current proceeding. EPA  
8 specifically identified this potential approach in its prior draft ruling on the  
9 Wyoming Regional Haze plan:

10 EPA is also seeking comment on an alternative approach (“second  
11 proposed approach”) that differs from our first proposed approach  
12 only with regard to Units 3 and 4 at Jim Bridger. The second  
13 proposed approach would only differ from the first proposed  
14 approach by allowing PacifiCorp to install SCR at Jim Bridger  
15 Units 3 and 4 within five years from the date of our final action.  
16 This would differ from the first proposed approach that requires  
17 PacifiCorp to install SCR at Unit 3 by 2015 and Unit 4 by 2016,  
18 while we would still propose SCR on Units 1 and 2 within the five  
19 year BART installation timeframe. This second proposed approach  
20 would allow PacifiCorp flexibility on timing for the installation of  
21 SCR on all four Jim Bridger Units within the BART installation  
22 timeline allowed by the RHR. Installing SCR on all four units  
23 within the statutory five year period would provide PacifiCorp  
24 maximum flexibility to manage the implementation of controls on  
25 all the units.<sup>84</sup>

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<sup>84</sup> 77 Fed. Reg. 33053-54.

1 EPA specifically contemplated a more flexible deadline for Jim Bridger  
2 Units 3 and 4.<sup>85</sup> It is entirely possible that EPA could restate a similar  
3 strategy when it issues its proposed action on March 29, 2013. The  
4 Company has not made any effort to avail itself of this proposed flexible  
5 approach.

6 **Q Has the Company signaled that it could feasibly implement a flexible**  
7 **schedule and modify the Wyoming BART Settlement Agreement?**

8 **A** Yes, the Company is modeling this scenario in its 2013 IRP. In a 2013 IRP  
9 Stakeholder meeting on February 27, 2013, the Company presented new portfolio  
10 sensitivities, including one titled “Sensitivity S-4 (Hypothetical Regional Haze  
11 Compliance Alternative).”<sup>86</sup> The sensitivity is described as follows:

12 For this sensitivity, it is assumed that near-term SCR investments  
13 currently required at Jim Bridger Units 3&4 and at Cholla Unit 4  
14 can be avoided if a commitment is made to retire those coal units  
15 early.<sup>87</sup>

16 and

17 The Jim Bridger Unit 3 and Unit 4 S-4 Sensitivity will assume that  
18 if Units 3 and 4 are retired at the end of 2020 and 2021,  
19 respectively, SCR investments currently required in 2015 and 2016  
20 can be avoided. The selection of the hypothetical retirement dates  
21 of 2020 and 2021 in this sensitivity is informed by an evaluation of  
22 the cost per ton of pollutant removed. In the case of Jim Bridger  
23 Units 3 and 4, the cost per ton of pollutant removed does not  
24 exceed a value that would likely be deemed excessive by EPA

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<sup>85</sup> See, also, July 12, 2012 Comments of PacifiCorp, Docket ID No. EPA-R08-OAR-2012-0026, Table 1, pp. 4-5 (Attached as Exhibit 35).

<sup>86</sup> 2013 Integration [sic] Resource Plan. Portfolio Development Cases Sensitivity Case Fact Sheets. February 27, 2013, Excerpt pp. 7-8 (Attached as Exhibit 36).

<sup>87</sup> *Id.* Page 7.

1           until the outer most years of unit operation. As such, a second  
2           criterion limiting the hypothetically negotiable compliance delay  
3           window to 5-years beyond the current compliance deadline is  
4           applied.<sup>88</sup>

5           The Company would not consider running such a sensitivity unless they  
6           understood that there was the potential to negotiate these deadlines. This proposed  
7           scenario could result in a situation similar to the Naughton 3 decision discussed  
8           above where the Company determined that a fuel conversion was more  
9           economical than meeting the requirements proposed in Wyoming Regional Haze  
10          plan.

11       **Q    Does Wyoming’s proposed Regional Haze plan compel the Company to**  
12       **install SCR?**

13       **A.**   No. The Wyoming Regional Haze plan submitted to EPA for approval  
14       does not, by itself, create an enforceable obligation. It is a plan for meeting  
15       federal requirement, and it must be approved by EPA. The Jim Bridger  
16       deadlines contained in the proposed Wyoming SIP are part of Wyoming’s  
17       attempt to address the reasonable progress requirement toward the 2064  
18       visibility goal under the federal rule.<sup>89</sup> The provisions applicable to the  
19       installation of SCR at Jim Bridger Units 3 and 4 are not federally  
20       enforceable unless the plan is approved by EPA, and they are enforceable  
21       at the state level only through permit conditions or an order from the  
22       Environmental Quality Council. In this case, the specific provisions in  
23       Wyoming’s proposed long-term strategy plan that address Jim Bridger  
24       originated from section 5(b) of the BART Settlement Agreement and the  
25       subsequent Environmental Quality Council order. However, as noted  
26       above, the applicable order from the BART Settlement Agreement and the

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<sup>88</sup> *Id.* Page 8.

<sup>89</sup> Wyoming State Implementation Plan, Regional Haze Section 309(g), Excerpt (Attached as Exhibit 37).

1 Environmental Quality Council order can and should be modified given  
2 the changed circumstances of EPA's delay in issuing its final rule.

3 **Q Do you have any other concerns regarding the Company's filing that you did**  
4 **not previously raise?**

5 **A** Yes. Mr. Teply describes that the Company is currently awaiting the finalization  
6 of its permit for the SCRs with Wyoming Air Quality Division. He states that "the  
7 Company is currently in the process of responding to agency questions regarding  
8 application of Best Available Control Technology ("BACT") for particulate  
9 matter emissions 2.5 micros and smaller ("PM<sub>2.5</sub>") control.<sup>90</sup>

10 **Q Please explain.**

11 **A** When the Company submits an application to an air management agency, in this  
12 case the Wyoming Air Quality Division, the agency evaluates the permit  
13 application for several important factors. One factor is whether the new  
14 construction will cause an increase in pollutants other than the one it is designed  
15 to reduce. In this case, the SCR is designed to reduce NOx, but Mr. Teply  
16 indicates that the Division has a concern that it might have an adverse impact on  
17 PM<sub>2.5</sub>.<sup>91</sup>

18 **Q What are the implications of such a finding?**

19 **A** At best for the Company, they will be able to show that PM<sub>2.5</sub> emissions will not  
20 increase beyond a significant threshold, and thus have little or no immediate  
21 requirement. At worst, the Company might be required to remediate condensable  
22 PM<sub>2.5</sub> through additional controls in order to be able to obtain a permit for the  
23 SCR. Those controls could change the Company's compliance costs.

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<sup>90</sup> Rebuttal Testimony of Chad Teply, page 16, lines 17-21.

<sup>91</sup> Response to Sierra Club Data Request 5.11(d) (Attached as Exhibit 38).

1 **Q Does the Company have a final finding on PM2.5?**

2 **A** Not yet. The Company does not expect to submit modeling to the Division with  
3 regards to PM<sub>2.5</sub> until the date of this testimony (February 28, 2013).<sup>92</sup>

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

5 **A** It does.

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<sup>92</sup> Response to Sierra Club Data Request 5.11(d) (Attached as Exhibit 38).