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BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power for Authority to Increase its Retail Electric Utility Service Rates in Utah and for Approval of its Proposed Electric Service Schedules and Electric Service Regulations	**Docket No. 10-035-124**

PREFILED SURREBUTTAL TESTIMONY OF HOWARD GEBHART

[REVENUE REQUIREMENT]

The UAE Intervention Group (UAE) hereby submits the Prefiled Surrebuttal Testimony of Howard Gebhart on revenue requirement issues.

DATED this 19th day of July, 2011.

/s/_____
Gary A. Dodge,
Attorney for UAE

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served by email this 19th day of July, 2011, on the following:

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BEFORE

THE PUBLIC SERVICE COMMISSION OF UTAH

Surrebuttal Testimony of Howard Gebhart

on behalf of

UAE

Docket No. 10-035-124

[Revenue Requirement]

July 19, 2011

SURREBUTTAL TESTIMONY OF HOWARD GEBHART

Introduction and Purpose

Q. Please state your name and business affiliation.

R. I am Howard Gebhart and I am employed at Air Resource Specialists, Inc. (ARS), located at 1901 Sharp Point Drive, Suite E, Fort Collins, CO 80525. ARS is an environmental engineering and consulting firm. At ARS, I am the Manager for the Environmental Compliance Section. My staff and I assist regulated industries as well as government and commercial clients with environmental permitting and compliance issues, primarily with respect to the Clean Air Act and Clean Water Act.

Q. Did you also provide Direct and Rebuttal Testimony in this Docket?

R. Yes.

Q. What is the purpose of your surrebuttal testimony?

R. My surrebuttal testimony responds to rebuttal testimony filed by Chad Teply, Cathy Woollums, Howard Ellis and Richard Sprott on behalf of Rocky Mountain Power (RMP), as well as rebuttal testimony filed by Matthew Croft on behalf of the Utah Division of Public Utilities (DPU).

Summary

Q. Please summarize your surrebuttal testimony:

R. A summary of my surrebuttal testimony is as follows:

1. RMP's rebuttal witnesses confuse and distort Regional Haze requirements as they apply to the challenged emission control projects. The four projects challenged in my direct testimony were clearly not cost-effective, did not produce any meaningful reduction in SO_2 emissions, and would never have been required under the Regional Haze regulations or other provisions of the Clean Air Act. My challenges are limited to those projects where the cost for pollution control significantly outweighs the environmental benefits achieved.
2. Mr. Sprott is dead wrong in suggesting that the Section 309 Regional Haze regulations require "better than BART" controls at each individual electric generating unit (EGU) that is "subject-to-BART". To the contrary, the primary and intended benefit of the Section 309 regulatory option was to permit utilities and regulators to target the most cost-effective environmental controls in order to achieve better "overall progress" towards meeting regional milestones than would be achieved through a unit-by-unit analysis.
3. The Section 309 states (which include Utah and Wyoming) have easily met the regional SO_2 emissions milestones contained in the Regional Haze SIP, with significant leeway, in part because of the scrubber project at the previously-unscrubbed Huntington 2 – an emissions control project that I have not challenged. The additional SO_2 removal accomplished by the very expensive projects at Hunter 1, Hunter 2 and Huntington 1 added

nothing of significance to regional haze reductions or compliance with Clean Air Act requirements. Those projects were optional and voluntary, not mandatory, when RMP committed to them.

4. RMP's witnesses repeatedly make the accurate but misleading claim that the applicable Utah and Wyoming State Implementation Plans (SIPs) and air permits require RMP to install the challenged pollution control upgrades. That argument ignores the fact that the current requirements were incorporated into the SIPs and air permits after and because of RMP's voluntary commitment in or before 2005 to install the upgrade projects in dispute. That claim begs the question whether the challenged upgrades would have been required had RMP looked out for the interests of its ratepayers by demonstrating to the respective air pollution control agencies that the challenged pollution control upgrades were not cost-effective, did not produce significant regional haze reductions, and were not necessary to achieve greater overall progress than BART towards meeting regional haze SO_2 emissions milestones.

5. Cost-effectiveness is *always* relevant in Regional Haze evaluations and requirements, regardless of whether the Section 308 or Section 309 approach is used. Simply stated, Regional Haze regulations do not require investments in pollution control upgrades unless the controls are cost-effective.

6. RMP's witnesses quibble with my $2,000 per ton cost-effectiveness threshold for SO_2, but they generally offer no meaningful alternatives and no support for their claims. In contrast, I provided evidence of numerous SO_2 cost analyses at other BART-eligible facilities in support of my proposed cost threshold. The $2,000 per ton figure is not absolute or cast in stone. However, all available evidence confirms that BART control projects at the majority of similar EGUs achieved emission reductions during the relevant time period at costs far below $2,000 per ton of SO_2 removed. These costs are a reasonable upper limit for cost-effective BART SO_2 controls, absent unique circumstances that would make a higher cost reasonable. Abstract arguments that costs have increased since 2009 or that some witnesses or regulators feel that higher costs may be reasonable are not applicable or relevant. Any cost-effectiveness evaluation done at any meaningful time in the process would have used the same data that I used and would have concluded that costs in excess of about $2,000 per ton were not reasonable under BART.

7. RMP has never prepared a meaningful cost-effectiveness analysis of the scrubber projects at Hunter 1, Hunter 2 or Huntington 1. No such analysis was prepared in or before 2005 to support the Company's decision to proceed with the challenged Utah scrubber projects; nor has any such analysis been submitted by RMP's rebuttal witnesses in this docket. Mr. Sprott and Dr. Ellis purport to quarrel with certain aspects of my analyses,

but neither makes any effort to prepare his own quantitative analysis. RMP has attempted after-the-fact evaluations in response to DPU data requests and in Mr. Teply's rebuttal testimony, but these explanations do not use accepted or appropriate methodologies, they grossly distort claimed SO_2 emissions control benefits, and they do not provide meaningful results. When Mr. Teply's data are evaluated properly, his data actually confirms that the challenged projects were not cost-effective.

8. I would expect a utility concerned about ratepayer impacts to have performed, well in advance of a commitment to any of the challenged pollution control upgrades, a meaningful cost-benefit analysis and a robust evaluation of all other potential options. No such analyses have ever been produced by the Company with respect to the challenged Utah projects. While such an analysis was prepared by PacifiCorp's consultants in connection with the Dave Johnston 3 upgrades, PacifiCorp ignored the results of that analysis (including the recommendations of its own consultant performing the BART review) and chose an option that was not cost-effective on an incremental costs basis. RMP cannot properly rely upon after-the-fact rationalizations to defend its decision to move forward with uneconomical pollution controls at the four disputed EGUs.

9. RMP's witnesses purport to offer after-the-fact rationalizations for the company-wide decision made by PacifiCorp by 2005 to install or upgrade scrubbers and other pollution controls at all of its BART-eligible EGUs.

These arguments are unpersuasive. It is my understanding that the prudence of a utility's decision is evaluated based on facts that are known or should have been known at the time the decision was made, and not based on looking backwards or considering new data, as suggested by RMP's witnesses. In any event, none of the after-the-fact rationalizations support an argument that pollution control projects not meeting a reasonable cost-effectiveness test would have been required under any reasonable Clean Air Act regulatory program.

10. Despite claims by RMP witnesses, projections of increased coal sulfur at the Hunter plant do not support the challenged scrubber projects at these plants. First, the specific likelihood, magnitude or extent of potential increases in sulfur were not known in or before 2005 when the Company decided to proceed with the challenged pollution control projects. Second, I have seen no demonstration that the projected increase in sulfur would necessarily require the challenged scrubber projects in any event. Third, my rebuttal testimony demonstrates the weak correlation between coal sulfur and SO_2 emissions at Hunter 2, and shows that the Company's own data demonstrates better emissions control performance of the old scrubber units during periods of higher sulfur coal. Finally, I have not seen any convincing demonstration from the Company that coal blending or other options would not have addressed the implications of higher sulfur coal at lower costs than the challenged scrubber upgrades.

11. The challenged Utah scrubber projects were not required to satisfy the requirement for progress toward visibility improvement at Utah's Class I areas. Very significant SO_2 reductions (nearly 12,000 tons per year according to the Utah Regional Haze SIP) have been accomplished through controlling the previously unscrubbed Huntington 2 plant. I have not challenged the Huntington 2 pollution control costs in the Docket. In contrast, the additional SO_2 emission reductions projected for the three challenged projects at Hunter 1, Hunter 2, and Huntington 1 total only about 1,000 tons per year according to the Utah Regional Haze SIP. These additional emission reductions were not necessary in achieving required visibility improvements.

Compliance with Regional Haze Regulations

Q. There are repeated claims throughout the RMP rebuttal testimony to the effect that State Implementation Plans (SIPs) and applicable air permits require RMP to install the challenged scrubber upgrades. Is that correct?

R. Yes, those claims are accurate, but they are not relevant to the issue at hand, and in my view are intended to mislead the Commission. They ignore the fact that the current requirements were incorporated into the SIPs and air permits after and because of RMP's voluntary commitment in or before 2005 to install the challenged pollution control projects. Those claims beg the question

whether the challenged upgrades were in fact required by the Regional Haze Regulations and if they would have been required by air regulatory authorities had RMP properly done its job of looking out for the interests of its ratepayers by evaluating project costs and the related environmental benefits. If the proper analysis had been done at the time, RMP could have demonstrated then, as I have now, that the challenged pollution control projects were not cost-effective, did not produce significant reductions in emissions and/or improvements is regional haze, and were not necessary or essential to achieve the required regulatory standard, which is greater overall progress than BART towards meeting regional haze milestones.

Q. What is your general response to the testimony of RMP rebuttal witnesses Sprott regarding the application of Regional Haze regulations and requirements to the four pollution control projects that you have challenged as not cost-effective?

R: Mr. Sprott's discussion is confusing and misleading at best. He makes the remarkable assertion that RMP was essentially required by Utah's Section 309 approach to install the challenged scrubber upgrades at the three Utah EGUs (Hunter 1, Hunter 2, and Huntington 1) regardless of cost or other factors. That suggestion is ludicrous and just flat wrong. Simply stated, there is no credible argument that non-cost-effective pollution control upgrades were mandated by the Section 309 Regional Haze regulations or other Clean Air Act requirements.

Mr. Sprott's testimony discusses at length the process followed by the State of Utah (and to some extent Wyoming) in developing a Regional Haze State Implementation Plan (SIP) under Section 309 of the Clean Air Act. However, it fails to recognize the primary reason that some states selected the Section 309 alternative. Section 309 differs from Section 308 in that it provides states with an alternative means of implementing emissions reductions to achieve the national goal of reducing or eliminating man-made impairment to visibility in a manner designed to create overall emissions reductions in a more cost-effective manner than would otherwise be achieved using the source-by-source BART approach under Section 308. Within Section 309, states are given significant flexibility, provided that the state must demonstrate that its alternative Section 309 plan will achieve greater overall emissions reductions and/or improvements in visibility at affected Class I areas than would have otherwise been achieved following the source-by-source BART approach under Section 308. Mr. Croft's rebuttal testimony also recognizes this basic premise of the Section 309 regulations.

Mr. Sprott is correct that a source-by-source BART determination is not required for BART-eligible sources located in Section 309 states. However, he ignores the critical distinction between Section 308 and 309. Mr. Sprott's testimony would lead one to believe that, under Section 309, emissions reductions and controls that are "better-than-BART" must be installed on each and every BART-eligible source. Indeed, he states that "PacifiCorp had a

clear legal obligation to reduce SO_2 emissions" in order to meet the emission milestones from the Section 309 SIP (Page 7, Line 141), and suggests that this is true individually for each of the challenged EGUs. That is simply not the case, and Mr. Sprott provides no support for his misleading suggestion.

What Section 309 does require is that the regional emissions control plan as a whole must achieve "greater overall progress" in reducing SO_2 emissions than would a source-by-source BART approach. That differs significantly from suggesting that each and every source must individually achieve emission reductions or must add controls that are "better than BART", as suggested by Mr. Sprott. Using the flexibility allowed by Section 309, individual states can adopt controls that exceed the minimum BART standards at some sources, while leaving other BART-eligible sources controlled at levels less than BART. It is this flexibility that can make Section 309 an attractive alternative, particularly in a State like Utah where all of the BART-eligible EGUs were owned by the same company.

The overall emission reduction level that would have been achieved by source-by-source BART reviews under Section 308 must be achieved under Section 309, and must be incorporated into the SO_2 emission milestones described in the SIP. In fact, the SO_2 emission milestones described in the SIP are intended to represent the regional emissions levels that would have otherwise been achieved by installing BART on all of the BART-eligible sources. However, it is wholly unnecessary for emissions control technology

to be required on each and every BART-eligible source to meet the milestone targets in the SIP. States and BART-eligible sources covered under the regional plan are free to choose the most cost-effective manner to add the needed controls in order to meet the overall regional emission milestone targets. Again, Mr. Croft agrees with this assessment in his rebuttal testimony.

To suggest, as Mr. Sprott does, that Section 309 somehow requires emission reductions across the board on each and every BART-eligible source would make Section 309 meaningless, as the requirement for source-by-source BART controls is imposed through Section 308. Section 309 was designed specifically to provide States with flexibility in addressing emissions reductions to improve visibility; duplicating the basic Section 308 requirements in Section 309 as suggested by Mr. Sprott would be meaningless and contrary to the statutory goal.

In summary, Mr. Sprott's rebuttal testimony is wrong in suggesting that emission reductions were needed and/or required under Section 309 at each and every PacifiCorp BART-eligible unit. Mr. Sprott's interpretation of Section 309 renders its legal requirements as essentially equal to Section 308 (source-by-source BART). This interpretation undermines the basic premise of Section 309, which is the ability to craft emission controls that <u>as a whole</u> are "better than BART", but come at a lower overall cost than the source-by-source BART approach in Section 308. Section 309 was actually designed to <u>prevent</u> what happened here -- the addition of very costly environmental

controls on individual emission sources that generate little or no environmental improvement, rather than achieving overall emissions reductions in the most cost-effective manner.

Q. Can the SIP's regional milestones be met without the challenged scrubber upgrades?

R. Yes, clearly. The 2008 SO_2 Emissions Milestone Report (which evaluates compliance with the 2008 SIP Milestones, and was released in March 2010), shows that the regional SO_2 emissions for the four states participating in Section 309 at the time (Arizona, New Mexico, Utah, and Wyoming) was 265,662 tons year, compared to the regional SO_2 emissions milestone of 378,398 tons per year. In other words, the regional SO_2 emission reductions already achieved through 2008 provided surplus emissions reductions of 112,736 tons per year compared to the required milestones, a 30% cushion. On this basis, Utah and the other participating states have clearly demonstrated that their Section 309 plan is achieving results that are "better than BART".

Q. But don't those numbers include reductions from the challenged scrubber projects?

R. No. As of 2008, none of the SO_2 emissions controls at the plants in dispute (Huntington #1, Hunter #1, Hunter #2 and Dave Johnston #3) were yet in service. Yet, even without those scrubber upgrades, the regional surplus in SO_2 emissions reductions already exceeded 100,000 tons per year. Any

suggestion by Mr. Sprott or other RMP witnesses that these added emissions controls were essential and necessary to meeting the emissions milestones in the SIPs is simply not supported by the available data. In fact, the 2008 actual SO_2 emissions are already almost as low as the required milestone for 2014. Moreover, even the final 2018 milestone (234,624 tons per year) will require only moderate additional (post-2008) emission reductions of about 31,000 tons per year on a regional basis, representing an emissions decrease of only 12 percent over the remaining 10 years in the SIP (or about 1% per year). These milestones should be easy to achieve and there is no credible argument that the modest emissions reductions from the challenged projects (only about 1,000 tons per year at the three Utah EGUs combined) are critical or necessary to meet the milestones.

This is further confirmed by further analysis of the 2008 milestone report. Actual 2008 emissions reflected in that report represents the <u>average</u> SO_2 emissions over the period 2006 – 2008, and many of the PacifiCorp emission control improvements described in the Company's planning documents were not yet in place by this time. For example, the Huntington #2 scrubber project, which provided SO_2 reductions of 11,960 tons per year according to the Utah SIP, was not in place until about mid-2007. As such, these emissions reductions are not yet fully recognized in the 2008 milestone report. When this is factored into the analysis, the SO_2 emission reductions required by "new" (post-2008) emissions control projects is significantly less.

In summary, Mr. Sprott's rebuttal testimony fails to recognize that the SO_2 emission reductions achieved at Huntington #1, Hunter #1, and Hunter #2 are inconsequential and have not been demonstrated to be necessary or essential to meet the current or future regional emissions SO_2 milestones contained in the Utah Regional Haze SIP.

Q. Do you agree with the suggestions of RMP witnesses Sprott and Ellis that added controls at Huntington #1, Hunter #1, and Hunter #2 may be necessary to provide sufficient progress toward visibility improvement specifically at Utah's Class I areas?

R. No. While it is true that regional emission reductions need to be somewhat geographically distributed in order to provide reasonable progress in reducing haze at individual Class I areas under Section 309 Regional Haze SIPs, Mr. Sprott and Dr. Ellis ignore that very substantial SO_2 reductions have already been achieved at Huntington #2, which was previously uncontrolled. The costs associated with emission controls at Huntington #2 are not being disputed by me in this Docket. According to the Utah Regional Haze SIP, the Huntington #2 emission controls reduce SO_2 emissions from the baseline by 11,960 tons per year, which represents about 90% of the total emission reductions from all of PacifiCorp's BART-eligible EGUs in Utah.

In contrast, the three challenged Utah scrubber projects produce slightly more than 1,000 tons per year of SO_2 emission reductions combined. The Utah scrubber projects challenged in this docket contribute only a small

fraction of the total reductions from PacifiCorp's Utah EGU sources. The combined reductions of the three challenged projects are inconsequential in comparison to the reductions already achieved at Huntington #2. Furthermore, the Huntington #2 reductions occur in the same relative location as the other Utah scrubber projects and would therefore have similar effects on a per ton basis in meeting the SIP emissions milestones and reducing regional haze in Utah's Class I areas. The Huntington #2 reductions are more than sufficient to meet any requirement to demonstrate reasonable further progress toward improving visibility at Utah's nearby Class I areas (Arches, Canyonlands, and Capitol Reef National Parks).

Moreover, a portion of the Huntington #2 emission reductions are also "surplus" in that the current SO_2 emissions limit for that unit is 0.12 lb/MMBtu, which is lower than the "presumptive BART" limit of 0.15 lb/MMBtu described by Mr. Sprott. These surplus reductions create additional "room," confirming that the other Utah EGU's could have been left at or near their existing SO_2 emissions levels without jeopardizing the requirement that the overall SIP must create better overall progress than BART and meet the reasonable further progress requirements for Utah's Class I areas. Similarly, "better-than-BART" controls installed on several other EGUs in the planning region provided even more flexibility in meeting the Section 309 regulatory requirements, and created an opportunity for additional

flexibility at other EGUs where additional pollution controls were not cost-effective.

Q. Ms. Woollums claims that your conclusions rest on the "faulty assumption" that RMP "could have relied exclusively on the SO_2 backstop trading program to achieve compliance with the Regional Haze Rule" (lines 342-344). Is she correct?

R. No, she is incorrect. I made no such assumption. Indeed, I did not challenge the vast majority of Wyoming plant SO_2 upgrade projects even though the WDEQ itself said that PacifiCorp would not be required to install any particular SO_2 control equipment as BART in light of the backstop trading program.

My analysis does not rely at all on the backstop SO_2 trading program. Rather, I conclude that the SO_2 controls installed at the four EGUs in dispute were not cost-effective and were not necessary to meet the regional haze milestones. If there had been a showing that the inconsequential reductions in SO_2 emissions from these four contested projects were necessary to meet the regional emissions milestones, I would not have challenged the associated costs. However, as clearly demonstrated above in my discussion of the 2008 Emissions Milestone Report, the projects in question are not essential in meeting the SIP emissions milestones. Also, if the milestones are achieved, and I have every reason to expect that they will be achieved going forward

even without the benefits achieved by the challenged emission control projects, the backstop SO_2 trading program will not be triggered.

Q. Ms. Woollums and Mr. Croft both refer to an assumption that a 90% SO_2 removal level may be required by the EPA or UDEQ. Can you comment?

R. There is no credible evidence that any regulatory agency ever required a 90% SO_2 removal level at any of the EGUs in dispute; all available evidence demonstrates to the contrary. Indeed, the air quality permits issued to PacifiCorp for its Utah facilities (Hunter 1, Hunter 2, and Huntington 1) still mandate only an 80% SO_2 control efficiency.

When RMP was asked for support for the 90% level, it pointed to the EPA's Proposed Guidelines for BART Determinations published in the Federal Register on July 20, 2001, which was attached to Mr. Croft's rebuttal testimony as DPU Exhibit 7.9R-RR. Those guidelines make no suggestion whatsoever that a 90% removal requirement should be imposed on currently controlled units, or that cost-effectiveness is not relevant in selecting the appropriate control level under BART. The proposed guidelines referenced an October 2000 report to the effect that scrubbers installed in the 1990s typically removed more than 90% (pg. 38110), they mention 1980 BART guidelines that included an analysis of 90% controls (pg. 38110), and they discussed and proposed a presumption that 90-95% SO_2 control could be achieved cost-effectively for <u>previously uncontrolled units</u> (at 38130). No

presumption was suggested for units that were already 80-85% controlled, as were the Hunter 1 and 2 and Huntington 1 units.

In reality, the proposed guidelines were explicit in confirming that cost-effectiveness remains a critical component of a BART analysis and should not be ignored, as reflected in the following quotations from those 2001 guidelines:

- "[T]he state's determination of BART for regional haze involves some State discretion in considering a number of factors …, including the costs of compliance." (pg. 38111);
- "States are required by Section 169A(g) of the [Clean Air Act] to consider: - The costs of compliance, …. (pg. 38115);
- "[If states adopt] alternative measures, such as an emissions trading program, …, [they must] provide a demonstration that any such alternative will achieve greater 'reasonable progress' [based on considerations including] the costs of compliance …." (pg. 38115);
- "[The engineering analysis step] requires … analysis of the cost of compliance…. (pg. 38116).
- "Step 4: For a Bart Engineering Analysis, What Impacts Must I Calculate and Report" …. After you identify and rank the available and technically feasible control options, you must then conduct three types of impacts analyses when you make a BART determination: Impact analysis part 1: Costs of compliance …." (pg. 38125).

- "c. *What do we mean by cost effectiveness*? …. [providing discussion of cost-effectiveness calculations] (pg. 38126-38127).

These guidelines were unambiguous in their requirement that cost-effectiveness must be taken into account in selecting BART. There is simply no credible argument that the EPA ever considered imposing a 90% SO_2 control requirement regardless of cost.

Similarly, there is no credible evidence that the UDEQ ever considered imposing a 90% requirement regardless of cost on its BART-eligible Utah plants. The WRAP Annex clearly demonstrates that its participants, which included the UDEQ, contemplated that uncontrolled units such as Huntington 2 would add at least 85% efficient controls, but that units already controlled to about 80%, as were Huntington 1 and Hunter 1 and 2, would not be further controlled. In addition, as noted above, the air permits for the Hunter 1 and 2 and Huntington 1 units still, to this day, require only 80% SO_2 removal. While the lb/MMBtu SO_2 emissions requirements were made much more stringent at PacifiCorp's request, the percentage removal requirements were not changed from the 80% value mandated by earlier permits. Finally, based on my inspection of the UDEQ file on the Hunter 2 air permitting process, I did not discover a single document that supports any claim that UDEQ ever proposed that PacifiCorp's Utah EGUs should be required to remove at a 90% SO_2 removal rate. I cannot speak to whether various parties may have engaged in speculation about such a requirement, but I can say confidently

that no such requirement was ever adopted or proposed for adoption for the challenged Utah EGUs.

Cost-Effectiveness Calculations

Q. How do you respond to the various challenges by RMP rebuttal witnesses to your SO_2 cost-effectiveness calculations?

R. My first general response is that, despite various unfounded criticisms of my calculations, the RMP witnesses have not offered any cost-effectiveness analyses of their own (other than a misleading attempt by Mr. Teply to calculate cost-effectiveness, which I discuss below). Even more incriminating is that RMP has never produced any kind of meaningful evaluation of available options to the selected pollution control projects or the cost-effectiveness of the challenged Utah scrubber projects prior to the time that PacifiCorp committed to proceed with them. I cannot see how a utility that purports to be looking out for the best interests of its ratepayers can avoid preparing rigorous analyses of cost-effectiveness of the proposed projects and all reasonable alternatives. Yet, that is how this utility elected to proceed.

An analysis of costs and options was prepared by PacifiCorp's consultants with respect to Dave Johnston 3. Unfortunately, those results were then ignored and the Company elected to proceed with an option that was not recommended by its own consultant on the basis that the controls were not cost-effective on an incremental-cost basis.

I note that, in his rebuttal testimony, Mr. Croft remains somewhat confused as to the WDEQ's cost-effectiveness conclusions regarding Dave Johnston 3. As I explained in my rebuttal testimony, the control costs evaluated by WDEQ were clearly for the full-scale baghouse option that was eventually selected by the Company. WDEQ's BART analysis mis-labeled controls, but it clearly concluded that the incremental cost-effectiveness of that option was not reasonable, even while it "accepted" the option as (more than) satisfying BART. Later, the Wyoming SIP accepted the overall cost effectiveness of that option as reasonable, but I have challenged only the incremental costs of this option over another available and cost-effective option. On an incremental cost basis, the WDEQ unambiguously found PacifiCorp's selected control option not to be cost-effective.

Mr. Sprott and Dr. Ellis quibble with various aspects of my analyses, but neither of them makes any effort to prepare a competing quantitative analysis. It is not particularly helpful to take unsupported pot-shots at an analysis without offering a competing analysis.

Q. In his rebuttal testimony, Mr. Sprott claims that the cost data you used in calculating cost-effectiveness are invalid. How do you respond?

R. First, I note that Mr. Sprott makes this claim without stating what he thinks are the accurate cost values for the emission control projects in dispute. Second, the capital cost data used in my direct testimony come directly from the cost data provided by PacifiCorp in response to various data requests in

this Docket. I then annualized the capital costs using the same assumptions used elsewhere by PacifiCorp in its five-factor BART analyses for Wyoming. I also added realistic incremental operating costs to the totals. So, in fact, my costs were derived directly from PacifiCorp's own data. Mr. Sprott's unsupported suggestion that the costs described in my direct testimony include errors is ludicrous and not based on any scientific evaluation or checking of the relevant supporting data, which was fully documented in my direct testimony.

Also, if one actually compares the cost data developed in my direct testimony with the cost information provided by Mr. Teply in his rebuttal testimony (which I discuss below), one will find that my cost values are actually slightly less than the costs developed in the Teply rebuttal testimony. For example, Teply Table 1 (page 38) lists annualized cost for emissions control at Hunter #1 and Hunter #2 at $9.885 million and $8.982 million respectively. The annualized costs in my direct testimony for Hunter #1 and Hunter #2 are less, about $8.2 million and $7.4 million respectively. This comparison also occurs in Mr. Croft's rebuttal testimony. So, in comparison, my costs are actually underestimated by approximately $1.5 million per year at each of these units. Mr. Sprott should verify his facts before making claims about the accuracy of another witness's data and calculations.

Q. Mr. Sprott makes similar claims about the accuracy of the pollution control benefits for the challenged Utah scrubber projects. What is your response?

R. As seems to be his style, without offering any quantitative data or analysis of his own, Mr. Sprott makes the unsupported claim that the emission reductions assumed in my direct testimony are "drastically low" (Lines 432-433) and that the true reductions should be "several fold greater" (Line 442). Mr. Sprott again ignores the underlying data in making these erroneous claims.

The proper and accepted method for calculating the level of emissions control is to calculate the difference in pre-control emissions with the post-control emissions. This basis for calculating the emission control reductions is also acknowledged by Mr. Croft's rebuttal testimony. As explained in my rebuttal testimony, the standard regulatory practice is to use past actual emissions for the pre-control level and future allowable emissions for the post-control emissions. Mr. Sprott's claim that "actual tons reduced" must be used (Lines 441-442) is contrary to standard regulatory practice and, in fact, is not possible, given that the "actual" emissions levels for future years are unknown. Any attempt to define future year "actual" emissions would be entirely speculative. For this reason, standard regulatory practice defines future year emissions based on the allowable permit levels, because the source is legally allowed to operate up to that emissions level at any point in the

future. Standard regulatory practice does not allow sources to take credit for emission reductions that are not legally enforceable.

Mr. Croft cites some examples where the baseline emission calculations used the allowable permit emissions, and he describes such an approach as "conservative". I generally agree with Mr. Croft's assessment. However, when the baseline emissions are based on the allowable permit values, this approach will overestimate the actual emission reductions and the resulting cost-effectiveness value will be underestimated. It is from this perspective that the approach described by Mr. Croft is "conservative". The regulatory agency is generally concerned in selecting BART that the costs being evaluated are not overstated so as to erroneously exclude a BART option based on costs. The situation in this Docket is actually the reverse of the standard situation that the BART guidelines try to address.

The use of a standardized regulatory practice in calculating emission reductions from a pollution control project is essential for any type of meaningful comparisons between costs and associated cost-effectiveness of different controls and different projects. If everyone used a unique approach in calculating costs and the associated pollution control benefits, there would be no basis for comparing costs or determining reasonable levels for cost-effectiveness between different EGUs and/or control options. My calculations follow the standard regulatory approach and provide a meaningful comparison

of the true costs and benefits of the emission control options selected by PacifiCorp.

Q. You mentioned RMP's after-the-fact attempts at calculating cost-effectiveness. What do you make of those analyses?

R. RMP's first such attempt was done in response to DPU data requests and I responded to those analyses in my rebuttal testimony. I showed that the analyses did not use accepted or appropriate methodologies and that they overstated claimed SO_2 savings. More important, however, I showed that, even using the distorted numbers from those analyses, the SO_2 reductions are still not cost effective at any of the challenged pollution control projects.

Apparently troubled by the cost-effectiveness numbers reflected in RMP's own data response, Mr. Teply's rebuttal testimony purports to include a brand new approach to cost-effectiveness. I will say that, unlike Mr. Sprott or Dr. Ellis, Mr. Tetley at least made an attempt at a quantitative assessment of the potential costs and benefits of the Hunter scrubber projects. However, his analysis is even more distorted than the DPU data response analyses, provides little meaningful or useful information, and does not represent a regulatory acceptable method of addressing project costs under BART.

Based on his Table 1 (page 38), Mr. Teply's rebuttal testimony claims that the scrubber projects at Hunter #1 and Hunter #2 provide a net benefit of over 9,000 tons per year in SO_2 reduction at each plant. This claim is internally inconsistent because it comes from an emissions baseline of only

about 3,000 tons per year. One cannot start with 3,000 tons of emissions and produce 9,000 tons of emission reductions no matter how hard you try; yet that is what Mr. Teply's table purports to show. For his values to be accurate, one would have to accept that the degree of controls added exceeds the original emissions level. In other words, Teply attempts to claims credit for controlling emission levels that were never released at either of the plants in question.

For this reason and others, Mr. Teply's calculations do not conform to any standard regulatory analysis. They are meaningless in terms of assessing the cost-effectiveness of the challenged scrubber projects or comparing cost-effectiveness calculations from other projects.

One significant error in Teply's table is the assumption of 0.16 lb/MMBtu in calculating baseline emissions at Hunter Unit #1 and Unit #2. Based on PacifiCorp's own data provided in response to data request DPU 36.10, the historical "actual emissions" at Hunter Unit #2 ranged between about 0.11 and 0.17 lb/MMBtu over the period of record (13 years). In fact, in 9 of the 13 years for emissions data provided by PacifiCorp, the actual Hunter #2 SO_2 emissions were less than 0.16 lb/MMBtu. Therefore, the value used by Teply in his table is at or near the top of the range in terms of baseline SO_2 emissions. On average, PacifiCorp's own data demonstrate that the baseline emissions at Hunter Unit #2 were much lower than the value used by Teply in his rebuttal testimony. The result is that the historical SO_2 removal

rates stated by Teply are also at the lower end of the historical range, which results in exaggerating the benefits of any added pollution controls. Mr. Teply's assumptions regarding baseline emissions completely distort his calculated cost-effectiveness for emission controls.

A more significant error in Teply's data is in his estimate of the pollution control benefits of the Hunter #1 and Hunter #2 scrubber upgrades. As described previously, he claims an emissions reduction credit of about 9,000 tons per year, about threefold more than his reported baseline emissions of about 3,000 tons per year. The practical implication of Teply's claim is that the pollution control projects at Hunter Unit #1 and #2 will result in the power plant becoming an SO_2 "sink" that will suck ambient SO_2 out of the atmosphere! Teply's claim for the environmental value of the Hunter pollution control project is totally unreasonable, unrealistic, and provides no meaningful basis for estimating or comparing the cost effectiveness of the Hunter pollution control projects.

Among other concerns, it appears that Teply is attempting to claim credit for presumed emissions control benefits of projected increases in coal sulfur at the Hunter plant. In a similar vein, Mr. Croft seems to accept the possibility that increased coal sulfur might be "another factor" that could be considered in a cost-effectiveness evaluation, assuming it was known by PacifiCorp at the time it made its decision to proceed with the Hunter projects.

There are several problems with any attempt to quantify or claim unknown and unknowable emissions reductions from projected increases in coal sulfur content at the Hunter plants. First, no credible evidence has been offered that PacifiCorp knew of the likelihood or extent of projected increases in sulfur content at the Hunter plant before 2006, or that it considered or evaluated those factors in deciding to install the scrubber upgrades at Hunter. PacifiCorp proposed the Hunter scrubber projects as early as 2003, when it requested an air permit for a proposed Hunter 4 unit. Hunter 4 was never constructed. Although the permitting efforts for Hunter 4 were never completed, the scrubber control projects at issue in this Docket originated with the Hunter 4 permit application. PacifiCorp re-committed to these Hunter scrubber projects in 2005 in connection with the proposed acquisition by its current owner. It is beyond reasonable dispute that PacifiCorp had committed to the Hunter scrubber projects long before the nature or extent of any projected increases in coal sulfur for the Hunter plant were known or evaluated. PacifiCorp has produced no analysis documenting the likelihood, extent or potential impacts of higher sulfur coal at any time before it committed to these projects. Therefore, even accepting Mr. Croft's suggestion that this factor could be an "additional factor" in assessing costs, it was not timely considered or evaluated by PacifiCorp before it had committed to the Hunter pollution control projects.

Second, as demonstrated by the data in my rebuttal testimony, coal sulfur content by itself is poorly correlated with actual SO_2 emissions, and actual plant data show that scrubber performance at Hunter Unit #2 improves as coal sulfur increases. So, a basic premise of the calculations and assumptions made by Mr. Teply and several other RMP rebuttal witnesses (i.e., that SO_2 emissions increase proportionally to coal sulfur content) is itself unproven and not documented by PacifiCorp's own plant data. Simply stated, PacifiCorp has not demonstrated that the projected increases in sulfur at coal to be burned at the Hunter plant could not have been handled adequately by the existing scrubber and/or through alternative means. No such analyses have been offered.

Notwithstanding all of the above, the biggest problem with Mr. Teply's Table 1 calculations is that the effect of the higher coal sulfur is included on only one side of the comparison. The baseline emissions are based on a coal sulfur of 0.5% while the future year emissions are based on a coal sulfur content assumed to be 0.767%. This skews the calculation and suggests larger emission control benefits than would be achieved in reality, if one were to correctly perform the calculations even accounting for higher sulfur coal. In effect, Teply's Table 1 compares apples to oranges in terms of tons of SO_2 removed. It does not provide any meaningful or accurate assessment of the cost effectiveness of the Hunter scrubber upgrade projects.

Q. Can any meaningful data be gleaned from Mr. Teply's Table 1?

R. Yes, it is possible to perform a proper calculation of cost-effectiveness that conforms to standard regulatory practice based on data in Teply's Table 1. Table 1 claims environmental benefits based on the difference between future emissions and the past baseline emissions. This claimed value is 751 tons per year for each unit. Using Teply's annualized cost data ($9,885,000 for Hunter Unit #1 and $9,982,000 for Hunter Unit #2), the calculated cost effectiveness is about $13,292 per ton at Hunter Unit #1 and $11,960 per ton at Hunter Unit #2. These values are in the same general range of cost effectiveness as calculated in my direct testimony and are well above the cost effectiveness values promoted by any other witness. Mr. Teply's own data thus confirms my analysis.

Q. How do you respond to Mr. Croft's question about whether it is appropriate to rely upon SO_2 removal data from the Utah SIP?

R. Mr. Croft's rebuttal testimony states that a UDEQ employee told him that the Utah SIP SO_2 reduction values were "never intended for the purpose of a cost effective analysis" (lines 121-123). Whether or not this statement is true, I do not believe it is troubling. In performing a BART analysis, one needs to project SO_2 removal under each of the options under consideration. Neither the UDEQ nor PacifiCorp ever performed a BART analysis for the Utah units, so no such data was prepared specifically for a BART cost-effectiveness test. The reported SIP emissions control numbers are simply the difference between the "baseline" emissions described in the SIP and the future plant

emissions based on the allowable permit level. As such, the SIP calculations conform with the standard regulatory practice, making the numbers generated comparable to BART data for other plants. Whether or not the participants in developing the SIP "intended" that the SO_2 reduction numbers be used for other purposes, those participants had every incentive and obligation to reach their best estimates based upon all available information. In fact, statements that these particular control benefits calculations were not developed for the purpose of conducting a cost-effectiveness analysis actually gives me higher confidence that these values are accurate and not biased by the desire to engineer a particular cost effectiveness outcome. It is thus the best and most accurate information available that I or the Commission can look to in describing the pollution control benefits of the Utah scrubber projects and, as such, it provides the best estimates for making cost-effectiveness calculations.

Cost-Effectiveness Threshold

Q. How do you respond to claims made by RMP rebuttal witnesses Sprott, Ellis, Teply and Woollums that your $2,000 per ton cost-effectiveness "threshold" is too low?

R. In my direct testimony, I offered my expert opinion that $2,000 per ton of SO_2 removed is a reasonable threshold for defining the upper limit for "cost-effective" SO_2 emissions controls under BART. I based my opinion on my professional experience and also on my evaluation of numerous SO_2 BART

674 determinations performed by air regulators in several states on their BART-
675 eligible sources. My opinion has been challenged by RMP's rebuttal
676 witnesses, although none of them offers any meaningful support for a higher
677 number.

678 Ms. Woollums suggests that a value of $5,000 per ton SO_2 removed is a
679 reasonable value for defining "cost-effective" SO_2 controls. However, Ms.
680 Woollums offers no calculations, technical analysis or regulatory evaluation in
681 support of her claim. She offers only unsupported claims of "recent
682 discussions" with unnamed air regulators that $5,000 is a reasonable "rule of
683 thumb." As a professional scientist, I have a very hard time relying upon
684 unsupported hearsay for setting a reasonable cost-effectiveness threshold,
685 particularly given that extensive data from actual BART evaluations at similar
686 EGUs consistently confirm that $2,000 per ton is a reasonable upper limit,
687 absent compelling evidence of other factors that warrant a higher cost value.
688 Ms. Woollums references her "review" of BART determinations around the
689 country, but fails to cite even one of them that reached a conclusion that more
690 than $2,000 per ton for SO_2 removal is a reasonable general standard under
691 BART.

692 Mr. Teply suggests that costs of up to $7,500 per ton SO_2 removed may
693 represent a reasonable "cost-effectiveness" level. The only thing offered in
694 support of this claim is a recent BART decision for the Four Corners
695 Generating Station in New Mexico. However, that decision involved nitrogen

oxide (NOx) emissions, not SO_2. The Four Corners BART analysis is wholly irrelevant to SO_2 and cannot be used to defend higher costs for controlling SO_2 emissions at PacifiCorp's EGUs. Mr. Croft also reaches the same conclusion in his rebuttal testimony.

Mr. Sprott and Dr. Ellis both criticize my $2,000 figure, but neither offers a competing figure or any basis for calculating a different number. As stated elsewhere, my number is based upon an analysis of numerous actual BART determinations for EGUs operating under comparable circumstances. If either Mr. Sprott or Dr. Ellis had any basis for supporting a higher number, I would have expected them to produce and support competing calculations. Having failed to do so, their criticisms ring hollow.

In considering the challenges of the RMP rebuttal witnesses to my $2,000 per ton threshold, it should also be remembered that the margin by which PacifiCorp's costs exceed this threshold is very large. As documented in my direct testimony, the true costs for PacifiCorp's controls at the Utah EGUs (Huntington #1, Hunter #1, and Hunter #2), are between $11,929 per ton and $30,943 per ton. These costs are well above even the inflated cost-effectiveness thresholds of $5,000 or $7,500 per ton offered by PacifiCorp's witnesses. The arguments presented against my $2,000 per ton threshold are smokescreens designed to divert attention away from the facts of this case, i.e., that the actual cost of the disputed pollution control projects cannot be justified under any reasonable BART threshold.

Q. Dr. Ellis and Mr. Sprott point out that the cost-effectiveness values referenced in the EPA's Appendix Y of $400 - $2,000 per ton are based on previously uncontrolled EGUs. Mr. Croft made a similar observation. Does that affect the validity of your threshold or calculations?

R. No. My calculations are not based on cost data from uncontrolled plants. I cited the information from Appendix Y regarding previously uncontrolled EGUs because it is consistent with actual BART decisions on previously controlled EGUs reached by a variety of air regulators. However, it was clearly not the primary basis for my conclusion. As explained in my direct testimony, I reviewed all of the data contained in the Western Regional Air Partnership (WRAP) BART Clearinghouse, which were compiled by WRAP up until late 2009. Further updates to the Clearinghouse were not made by WRAP after December 2009 as many of the WRAP states had already completed their BART decision-making by that time. Further updates of BART costs were simply no longer valuable to WRAP, so the efforts were discontinued.

Within the WRAP Clearinghouse, I compiled the relevant cost data for the subset of coal-fired EGUs where a scrubber upgrade was being considered as BART. This is the most relevant data for comparisons to the challenged Utah EGUs (Huntington #1, Hunter #1, and Hunter #2), as those plants were also upgrading their scrubbers under the BART technology proposed by PacifiCorp. Excluded from my comparison table were costs complied by

WRAP where the EGU previously operated without SO_2 controls or the EGU was fired on fuels other than coal. The relevant cost-effectiveness data for scrubber upgrades from the WRAP BART Clearinghouse are summarized below:

BART Cost Information – SO_2 Scrubber Upgrades
(from December 10, 2009 WRAP BART Clearinghouse, www.wrapair.org)

EGU & Location	***Estimated SO_2 BART Costs ($ per ton)***
Jim Bridger (WY)	$620 to $729 per ton
Coal Creek (ND)	$555 per ton
King (MN)	$49 per ton
Laramie River (WY)	$1,564 to $1,571 per ton
MR Young (ND)	$247 to $565 per ton
Naughton Unit #3 (WY)	$290 per ton
Sherburne County (MN)	$236 to $238 per ton
Wyodak (WY)	$1,428

Based on the above table, costs determined to represent BART for scrubber upgrades at other coal-fired EGUs ranged from a low of $49/ton at the King Plant in Minnesota to a high of $1,571/ton at Wyoming's Laramie River Station. The WRAP data cover units at eight different coal-fired facilities and even a larger number of individual EGUs. As such, these data represent a robust cross-section of coal-fired EGUs where scrubber upgrades were being installed to provide incremental control of SO_2 emissions.

Mr. Sprott's rebuttal testimony accepts that the WRAP Clearinghouse cost data were accurate as of 2009 (Lines 445-446), but then implies that the Clearinghouse data may not be current today, and should thus not be relied upon. PacifiCorp filed its applications for revised air permits to install the challenged scrubbers at the Huntington and Hunter units in 2003 - 2006, and the permits that authorized these projects were issued in 2008. This is the relevant time period to be considered in performing cost-effectiveness calculations, as it is the time period when PacifiCorp made the financial and other commitments to proceed with the disputed emissions control upgrades, and when it should have performed cost-effectiveness calculations. The data in the BART Clearinghouse are generally concurrent with the time period during which PacifiCorp make the commitments to move forward with its emissions control projects and, as such, form a valid basis for relative comparison of PacifiCorp costs to BART costs at other similar EGUs.

The costs incurred to install SO_2 emission controls at other BART-eligible EGUs provide reasonable benchmarks for judging whether proposed control strategies at other similar facilities are cost-effective under BART, particularly where the costs reported at other similar facilities fall within a fairly narrow range. Costs significantly outside the range of costs incurred at other BART-eligible facilities are simply not cost-effective. Since BART costs at other similar BART-eligible EGUs are all under $2,000 per ton SO_2 removed, the threshold I selected for this evaluation represents a

reasonable cost-effectiveness threshold to judge PacifiCorp's control projects. Because the comparable costs for the challenged emissions controls are significantly above $2,000 per ton (and even above all other potential cost thresholds referenced by PacifiCorp's own witnesses), they are not reasonable from a cost perspective. As such, these pollution control project are not required to meet any Clean Air Act requirement.

In reaching my expert conclusions, I also researched other information to help confirm that a $2,000 per ton threshold for cost-effectiveness is reasonable. As part of the WRAP process that Mr. Sprott speaks of in his rebuttal testimony, expected cost information for potential future SO_2 controls were also compiled. These costs are identified in the preamble to EPA's 2001 proposed regional haze rules (Federal Register, Volume 66, July 20, 2001, Page 38130-31). In the Annex to the Report of the Grand Canyon Visibility Transport Commission, Section 6A, WRAP describes "low cost" controls with an average cost-effectiveness below $500 per ton, "moderate" costs are described as having an average cost-effectiveness in the range of $500 to $3,000 per ton, and "high" costs are described as controls having an average cost effectiveness of over $3,000 per ton. Again, these costs were compiled as part of the very process described by Mr. Sprott's testimony and provide independent cost information consistent with my premise that $2,000 per ton is a reasonable threshold for identifying whether or not SO_2 BART controls

are cost-effective. Even accepting the "high" cost assumption of $3,000 per ton, none of the challenged scrubber projects is even close to cost-effective.

Q. Do you have any other comments on the challenges to your $2,000 per ton threshold?

R. Yes. RMP's rebuttal witnesses attempt to characterize my cost-effectiveness threshold of $2,000 as a "bright line." That is a misrepresentation of my testimony. An appropriate BART evaluation looks at the "five factors" described in my direct testimony. One of these factors is cost or cost-effectiveness. Although cost is an important factor, I have never claimed that the cost of emissions control trumps all other factors in selecting BART. Clearly, the regulatory requirement for BART considers all five factors described in 40 CFR 51 Appendix Y. However, to impose costs significantly above a reasonable threshold, other factors allowed under BART need to support that result. PacifiCorp or its witnesses in this case have not made any showing that any of the other regulatory factors were drivers in the emission control projects or would have supported a higher cost.

The RMP witnesses, particularly Mr. Sprott, attempt to downplay the role that costs should play in the BART process. This leads to the ludicrous suggestion by Mr. Sprott that PacifiCorp would have been forced to install controls at each of its Utah EGUs that exceed the "presumptive BART" limit of 0.15 lb/MMBtu regardless of cost. This is a gross misrepresentation of the applicable legal requirements. Cost is and always has been a very important

factor in the selection of BART technologies, whether under a Section 308 or Section 309 SIP. Indeed, I suspect most of PacifiCorp's utility counterparts would be astonished to hear a utility claim otherwise. Emission control projects that are not cost-effective cannot be defended as BART under any regulatory scenario, Section 308 or Section 309. All available evidence and data in this Docket demonstrate that the emission control projects disputed in my testimony do not meet any reasonable definition for cost-effective controls, and in fact exceed this threshold by a very large margin.

The central role played by cost considerations is emphasized in a quote offered by Ms. Woollums in the context of her discussion of the uncertainty that has prevailed in the air regulatory environment. The March 16, 2011 quote from Ms. Jackson of the EPA includes the following sentence: "And to ensure cost-effectiveness, we have proposed flexibility in meeting the standards." (Lines 448-449; emphasis added). Cost-effectiveness and flexibility are critical components of any meaningful air regulatory analysis. Unfortunately, PacifiCorp failed to consider those critical components in making its "one size fits all" decision to install similar scrubber upgrades at all of its BART-eligible EGUs without even considering the costs, environmental impacts, or the financial impacts on its ratepayers. It is for that reason that RMP should be required to shoulder a significant part of the financial burden of its decisions with respect to the non-cost-effective projects.

Q. Mr. Croft's rebuttal testimony abandons his previous assumption that SO_2 removal costs as high as $7500 per ton may be reasonable. Do you wish to comment?

R. Yes. As I pointed out in my rebuttal testimony, Mr. Croft previously relied upon a clearly misleading claim in an RMP data request to that effect. By the time he filed his rebuttal testimony, Mr. Croft agreed with my assessment and had abandoned the notion that the referenced NOx BART case at the Four Corners Plant provided any support for cost-effectiveness for SO_2 removal. Mr. Croft then searches for other meaningful data that can be used to target a reasonable upper-end of cost effectiveness for SO_2 equipment. The appropriate place to find such data is in SO_2 cost-effectiveness calculations done by air regulators around the country on similar plants that were already largely controlled. That data, reproduced above, clearly demonstrates that the level at which air regulators have found SO_2 controls to be cost-effective BART at previously controlled plants is in the range of $49 - $1,571 per ton. Anything significantly above the upper end of this range should be rejected, based on all available data, as being not cost-effective.

Mr. Croft points out that the Wyoming DEQ found costs of around $9,500 per ton to not be cost effective in the case of the Basin Electric Laramie River Station. Mr. Croft correctly notes that this conclusion by itself does not establish $9,500 per ton as a proper cost-effective threshold. Despite Mr. Croft's best efforts to research this question, my professional opinion as a

practicing air quality professional is that one should place more reliance on costs determined to be cost effective as opposed to trying to establish the appropriate cost threshold based on options that were determined not to be cost-effective. My direct testimony relies on data where emission control upgrades were determined to be cost effective.

Q. Various RMP rebuttal witnesses seem to imply that the challenged scrubber upgrades may be necessary to meet Mercury or other HAPs MACT requirements. Can you respond?

R. Yes. It is clearly implied in RMP's rebuttal testimony that scrubber upgrades will "support" mercury removal and satisfaction of proposed HAPs MACT requirements. Baghouses and chemical additions in connection with particulate removal can significantly enhance removal of mercury and perhaps other hazardous air pollutants, but it is my understanding that scrubbers do not contribute significantly to control of mercury emissions. Scrubbers are aimed primarily at SO_2 removal. I think the vague references to HAPs removal in the context of scrubber upgrades is misleading at best. The HAPs emission control benefits of the Utah scrubber upgrades in particular are non-existent or minimal at best.

Conclusion

Q. What is your ultimate conclusion in this case?

R. The pollution control projects at issue here, specifically the scrubber upgrades and Hunter Units 1 & 2, and Huntington Unit 1, and the baghouse addition for Dave Johnston Unit 3, are not cost-effective and were not required by BART or any other Clean Air Act regulatory requirements. I have challenged only four specific pollution control projects that do not meet any reasonable cost-effectiveness test, although other projects could reasonably be challenged as inadequately supported or marginally beneficial. I have conservatively challenged only those projects that were clearly not cost-effective, and to which PacifiCorp should never have committed on a voluntary basis. Instead, PacifiCorp should have fought for the interests of its ratepayers by performing and defending reasonable cost-effectiveness calculations, similar to what I have done. I have no doubt but that such an approach would have resulted in decisions that the four challenged projects were not required. The significant sums committed to these marginal projects could have been much more meaningfully deployed for other generation, transmission or pollution control projects that were legitimately needed.

With respect to Dave Johnston Unit #3, the Wyoming DEQ reached a similar conclusion as to the incremental cost-effectiveness of the pollution control option selected by PacifiCorp. Although the Wyoming DEQ accepted the voluntary PacifiCorp commitment as (more than) meeting BART, the

WDEQ BART records clearly reflect that the agency determined that the selected option did not meet reasonable incremental cost-effectiveness criteria under BART, and would not have otherwise been required by any regulatory standard of the Clean Air Act.

At the three Utah facilities, no such analyses were ever performed, either by the Company in developing its emissions control plan or by the Utah DEQ. While regional haze regulations do not require a formal five-factor BART analysis in Section 309 states, a meaningful advance assessment of the underlying options and costs is indispensible to any prudent utility decision to spend hundreds of millions of dollars that ratepayers will be expected to pay. There is no other means of assuring that the selected emission controls will achieve a reasonable cost-benefit standard. No such analysis was ever even attempted by PacifiCorp until I challenged the costs in this Docket. My calculations, based on the standard and accepted regulatory approach for a five-factor BART analysis, demonstrate that the projected environmental benefits of the disputed Utah scrubber controls are small and that they do not pass any reasonable cost-effectiveness standard. Furthermore, there are no non-regional haze emission control benefits from the projects in question that would warrant a higher cost-effectiveness standard. The Utah scrubber projects were simply not necessary under regulatory standards, BART or otherwise.

926 The small environmental benefits achieved by the disputed Utah projects
927 are also unnecessary given the large margin of safety under the regional SO_2
928 emissions milestones reflected in the Utah SIP. Also, these controls were not
929 needed for Utah to demonstrate reasonable further progress in meeting
930 visibility goals at its Class I areas, primarily because those benefits are
931 dwarfed by benefits achieved through controlling SO_2 emissions at
932 Huntington Unit 2.

933 Recent projections of increased coal sulfur content are, at best, attempts
934 at "after-the-fact" justifications. There is no evidence that the likelihood,
935 magnitude or extent of such sulfur increases were known or considered when
936 PacifiCorp committed to its emissions reduction plan. Moreover, there has
937 been no showing that projected increases in sulfur content could not have been
938 adequately dealt with by the old scrubbers or other alternatives.

939 While existing Regional Haze SIPs and air permits now require
940 installation of the disputed pollution control upgrades, those requirements
941 were imposed only after and because of PacifiCorp's voluntary commitment
942 to proceed with the projects. The bottom line is that the Company failed to
943 discharge its responsibility to ratepayers to carefully evaluate the proposed
944 projects in advance, and to undertake only those projects required by existing
945 or reasonably foreseeable regulations, and only then at the lowest reasonable
946 cost. As in the Deseret Arbitration, the inescapable conclusion is that
947 PacifiCorp voluntarily embarked on an unneeded and expensive emissions

control program where, as to the four challenged projects, costs far exceeded benefits. As suggested by the arbitrator, PacifiCorp may have had internal corporate or other reasons for spending money on uneconomical projects. In that case, however, its shareholders, and not its ratepayers, should be expected to shoulder all or a significant portion of the unnecessary expenses of the four challenged projects.

Q. Does this conclude your surrebuttal testimony?

R. Yes.