

BLACK HILLS POWER, INC.
SD PUC DOCKET: EL11-001

SDPUC Request No. 1-9:

1-9) Per SDCL 49-34A-100, please provide a copy of all studies, analyses, or other documentation, prepared by Black Hills or PacifiCorp, or at their request, that demonstrates that the environmental improvements on the Wyodak Power Plant are prudent investments.

Response to SDPUC Request No. 1-9

As shown in Attachments 1-9.a (cost of environmental improvements) and 1-9.b (cost of building new gas generation), the cost to make these environmental improvements on the Wyodak Plant are significantly below building a new gas generating power plant. This analysis is based on the improvements having an economical useful life of an additional 20 years, which is consistent with the last depreciation study. On a cost per MWh, the environmental improvements have an incremental cost that is very small and very cost effective.

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SDPUC Request No. 1-10:

1-10) Please provide a copy of all studies that analyze the risk of installing environmental improvements on the Wyodak Power Plant with CO₂ cost projections.

Response to SDPUC Request No. 1-10

A preliminary Environmental Policy Impact Assessment was recently initiated for customer communication purposes. Attachment 1-10 depicts the results of this preliminary assessment. The results of this assessment identified certain Environmental Policies having a direct and measurable impact on the following Black Hills Power coal generation plants:

<u>Plant</u>	<u>Year Installed</u>
Neil Simpson II	1995
Wyodak	1978
Osage	1950
Ben French	1960
Neil Simpson I	1969

A measurable impact classification is based on an anticipated material capital and O&M costs to bring the plant into compliance with the environmental rules. The next phase of this assessment and the Integrated Resource Planning process will begin to identify specific actions, and related costs, to be taken with these coal generation plants. The scope of this preliminary Environmental Policy Impact Assessment for customer communications purposes did not include CO₂ costs.

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SDPUC Request No. 1-11:

1-11) Per SDCL 49-34A-100, the commission considers “whether the costs and expenses included for recovery will achieve the environmental improvements at the lowest reasonable cost to ratepayers,”. On Exhibit D of the filing, on page 36 of AP-6043 BART Application Analysis, the Wyoming Department of Environmental Quality Air Quality Division concludes, “While the Division considers the cost of compliance for a full-scale fabric filter on Unit 1 not reasonable, PacifiCorp is committed to installing this control device and has permitted the installation of a full-scale fabric filter on Unit 1 in a recently issued New Source Review construction permit. A full-scale fabric filter is the most stringent PM/PM₁₀ control technology and therefore the Division will accept it as BART.”

- a) Please explain the decision to install the full-scale fabric filter whose cost of compliance was determined to be “not reasonable” by the Wyoming Department of Environmental Quality.
- b) Please provide the New Source Review construction permit referenced above.
- c) Please provide a copy of all studies, analyses or other documentation that supports the full-scale fabric filter as the control that will achieve the environmental improvements at the lowest reasonable cost to ratepayers.

Response to SDPUC Request No. 1-11

a and c) The document attached as Exhibit D to the Company’s filing was the Wyoming DEQ’s response to the installation of a full-scale fabric filter from March of 2008. Upon consideration of the cost of compliance, the energy and non-air quality environmental impacts of compliance, any pollution equipment in use or in existence at the source, the remaining useful life of the source and finally, the degree of improvement in visibility, the Wyoming DEQ stated the following on January 7, 2011:

*For control of PM/PM₁₀ emissions from Unit 1, the State of Wyoming requires that PacifiCorp install and operate a new, full-scale fabric filter to meet a corresponding BART emission limit on a continuous basis. **When considering all the factors above and beyond the benefits associated with regional haze** which include the existing precipitator’s current condition and performance and end of life issues, the ability of the current electrostatic precipitator to meet an ESP BART rate of 0.10 lb/MMBtu on a continuous basis, and the enhanced mercury removal co-benefits the baghouse provides, **the Wyoming Air Quality Division has determined that the costs associated with the installation of a new full-scale fabric filter are reasonable.** A full-scale fabric filter is*

the most stringent PM/PM10 control technology and therefore the Division accepts it as BART. The Division considers the installation and operation of the BART-determined PM/PM10 controls of a new full-scale fabric filter at Wyodak, as recently permitted under Air Quality Permit MD-7487, to meet the requirements of BART.

This verbiage can be found on page 108 of the WY AQD SIP attached as Attachment 1-11a hereto (available in its entirety at [http://deq.state.wy.us/aqd/308%20SIP/309\(g\)%20SIP%201-7-11%20Clean%20Final.pdf](http://deq.state.wy.us/aqd/308%20SIP/309(g)%20SIP%201-7-11%20Clean%20Final.pdf))

See also the SO2 Reduction Study attached hereto as Attachment 1-11c.

b) See Attachment 1-11b

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SDPUC Request No. 1-12:

1-12) Please refer to Exhibit D of the filing, page 12 of AP-6043 Bart Application Analysis. Under the “PM₁₀: Eliminate Technically Infeasible Options” section, the Division states “Installing a new full-scale fabric filter is cost-prohibitive in comparison to installing a polishing fabric filter on the existing ESP, which can achieve the same PM/PM₁₀ emission rate.”

- a) Please explain why a more expensive control device was installed when a less expensive option can achieve the same PM/PM₁₀ emission rate.
- b) Please provide the economic and environmental cost comparisons for installing a polishing fabric filter on the existing ESP and installing a new full-scale fabric filter. Please provide a similar comparison as Exhibit D of the filing, page 14 of AP-6043 Bart Application Analysis, Table 7 and Table 8.
- c) Please provide any laws or actions that will require a full-scale fabric filter to be installed.

Response to SDPUC Request No. 1-12

a) As stated in the 2011 Wyoming DEQ excerpt above, when all factors are considered, the decision to install a stand alone baghouse was reasonable. In order to increase the SO₂ removal efficiency of the unit above 90 percent as required to comply with environmental requirements, a bag house must be utilized in conjunction with the existing dry spray dryer absorbers (“SDAs”). Without a bag house, the best SO₂ removal efficiency an SDA on the unit can achieve with Wyodak coal is between 70 and 80 percent. Removing the existing ESP and adding the bag house is necessary to achieve the permitted SO₂ removal requirements.

b) The Wyodak SO₂ reduction study attached in response to 1-11c above, did not include a polishing fabric filter option. Sargent & Lundy determined in the preliminary stages of the subject study that though the ESP/polishing fabric filter option was a potential particulate control option, it was not a viable solution to achieve the higher level of SO₂ control required (0.15 pounds per million Btu study basis). The installation of a full size fabric filter was driven by SO₂ removal requirements and was not dictated by PM/PM₁₀ emission rates. It was determined that the required SO₂ removal rate could not be obtained from the addition of a polishing fabric filter, if the ESP were to remain in service. The primary concern was the effect of removal of scrubber byproducts in the ESP not allowing adequate accumulation on the fabric filter bags for effective SO₂ removal. If sufficient byproduct is allowed to bypass the ESP to the fabric filter for enhanced SO₂ removal then it would overwhelm the higher air to cloth ratio

polishing fabric filter. Sargent & Lundy is also not aware of any dry scrubber fabric filter combination using a polishing fabric filter behind an ESP because of these issues. The internals of the ESP would have also required replacement due to end-of-life issues and future corrosion concerns associated with the lower required flue gas temperature to achieve the greater SO₂ removal reducing the benefit from continued use of the ESP. A cost comparison was not completed, as the option was not identified as a viable solution for the desired result of the project.

c) In addition to the BART requirements under the regional haze rule, increasingly more stringent National Ambient Air Quality Standards have been and are being adopted for criteria pollutants, including SO₂, NO₂, ozone, and PM. Implementation of the pollution control projects described herein assists in meeting these more stringent standards, avoiding the negative consequences of an area being declared to be a nonattainment area. Further, while the Clean Air Mercury Rule, which would have required a reduction of mercury emissions of approximately 70 percent by 2018 was overturned by the United States Court of Appeals for the District of Columbia Circuit in February 2008, the U.S. EPA plans to propose a new rule that will require coal-fired generating facilities to reduce mercury, and potentially other emissions of hazardous air pollutants, through a Maximum Achievable Control Technology standard. Under a consent decree, the U.S. EPA must issue a proposed rule to regulate mercury emissions by March 2011 and a final rule no later than November 2011; compliance with the mercury standards would be required by November 2014. The bag house and scrubber projects described herein will assist in meeting the forthcoming Maximum Achievable Control Technology requirements.

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SDPUC Request No. 1-13:

1-13) Please refer to Exhibit D of the filing, page 13 of AP-6043 Bart Application Analysis. Under the “PM₁₀: Evaluate Effectiveness of Remaining Control Technologies” section, the Division states “PacifiCorp did not further evaluate the installation on a new full-scale fabric filter on Unit 1 since there is a substantial capital cost associated with the control and no anticipated benefit compared to COHPAC”.

- a) Please explain why the full-scale fabric filter was not evaluated but, nonetheless, was ultimately selected as the control device to install.
- b) Was the installation of the full-scale fabric filter done to avoid formal new source review litigation or mandated compliance? If so, which group, organization(s) or agency(s) requested or required the installation of the emissions control equipments?

Response to SDPUC Request No. 1-13

a) As discussed above, the evaluation performed on the full scale fabric filter was focused on increasing SO₂ removal, with increased particulate (PM) emission control as secondary benefit. The subject Exhibit D was a particulate control evaluation only. The statement that “PacifiCorp did not further evaluate the installation on a new full-scale fabric filter on Unit 1...with...no anticipated benefit compared to COHPAC” is accurate only to the extent that it pertains to particulate control benefits.

b) The installation of the fabric filter was not done to avoid new source review, but rather in response to SO₂ removal requirements. Additional drivers for the project included ESP end-of-life issues and future ESP corrosion concerns.