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Mr. Michael Owens
USEPA Region 8 (8P-AR)
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Re: Ruggedized Rotor Spreadsheet for the Bonanza Plant

Dear Mr. Owens:
This letter is in response to our phone conservation a few weeks ago in regards to the spreadsheet Deseret has submitted to you for the assessment of the ruggedized rotor project completed at the Bonanza Power Plant in 2000. You requested information on the methodology of some of the calculations and discussed with me possible methods of calculating post-rotor adjustments to the baseline numbers based on the WEPCO rule as defined in the latest New Source Review (NSR) rules.

I have delayed responding to you so that I could include in the attached spreadsheet plant data through August of 2005 which represents the end of the NSR mandatory 5-year post-change assessment period for the ruggedized rotor project.

I have reviewed the latest NSR rule and the associated documents to determine the correct way to adjust the post-rotor data to the baseline conditions. As you discussed with me, there are no clear guidelines established in the rule to make these adjustments and so I have reviewed the user's comments and the EPA responses to get a sense of the rule and of the proper adjustment method.

First, several people commented on the idea that the rules penalize those facilities that have been environmentally conscious, and that the rules, in fact, seem to encourage facilities to run at or near their maximum emission limits in order to establish the highest possible baseline numbers for future changes that may occur at the facility. EPA, in their responses, gave no clear answer to these comments.

Deseret has always been environmentally conscious and has always run the plant pollution control equipment to achieve the lowest emissions possible. The Bonanza Power Plant has always been one of the lowest SO2 emitting coal fired power plants in the nation and has typically run in the top five on a pounds per million BTU (#/mmBtu) basis. Bonanza's particulate emissions have also been among the best. Due to this fact, the baseline numbers for the Bonanza Plant are low compared to what they would be at similar facilities nationwide.

The NSR (WEPCO) rules seem clear on the calculation of baseline values (40 CFR 52.21(b)(48)(i). The baseline values are the actual emissions for each pollutant based on the most accurate data available. Where available, Bonanza's baseline numbers were calculated using plant CEMS data, stack test data, on-site coal analysis or other site specific data. Also, the two in five look-back rule that applies to WEPCO facilities was used.

The problem arises with the adjustments to the post-change pollutant data that are allowed by the rule. The downward post-change adjustments are allowed for two different reasons: Emissions that are directly related "demand growth" and on the basis of "emissions that could have been accommodated" by the unit during the baseline period found in the rule at 40 CFR 52.21(b)(41)(ii)(c). Deseret feels that these are two separate adjustments that should be made to the data.

The associated spreadsheet has been modified from the original spreadsheet. Relevant operational plant data has been added to make the calculations easier to understand and some of the data has been simplified.

The next few paragraphs respond to the demand growth question. There are two power plant terms that apply to this discussion of power plant production, demand growth and megawatts produced. Those terms are "capacity factor" and "equivalent availability". Capacity factor is expressed in percent, and represents the total amount of megawatts that were produced in a month compared the total amount of megawatts that could have been produced. An example is that in a thirty day month, a 450 Mw unit could have produced 324,000 megawatt hours of electricity. If it produced 300,000 megawatt hours, then the capacity factor would have been 92.6%. Capacity factors can be calculated using either the net or gross megawatt rating of a plant.

The term equivalent availability represents the percentage of time that the unit was available to produce 100% of the unit's capacity. Therefore, a unit could have had a capacity factor of 92.6%, but an equivalent availability factor of 100%. Bonanza's monthly capacity factors averaged 86.3% (382 Mw gross) for the 5-year look-back period and the monthly average equivalent availability for the same period was 97.2% (431 Mw gross). These numbers were calculated excluding maintenance outage months which are not representative of unit performance. Therefore, the difference between the equivalent availability and the capacity factor is the percentage of the megawatt hours that the unit was not used due to lack of transmission, demand or other outside influences.

Deseret believes that the overall increase in the megawatts produced at Bonanza for the post-rotor period can be directly attributed to the increased demand for power. Net capacity factor equals demand, and so by comparing the baseline and post-rotor net capacity factors, demand and demand growth can be calculated. The baseline net capacity factor (86.3% of 420 MW) calculates to an average 5-year baseline demand of 362 Mw/hour, while the post-rotor 5-year net capacity factor (94.6% of 458 Mw) calculates to an average 5-year demand of 433 Mw/hour. Therefore, based on these calculations, the demand on the unit increased by an average of 71 megawatts after the rotor change.

100% net capacity for the baseline period was 420 Mw and 458 Mw for the post-rotor period.

Deseret has always been among the industry leaders in on-line availability and has always had the ability to run near or at the 100% capacity factor during the baseline period. Excluding maintenance outage months, monthly baseline availabilities averaged 97.2% while post-rotor availabilities averaged 96.1%. Also, 12-month rolling availabilities during the 5-year look-back period reached a high of 99%. During the 5-year look-back period, there were 28 months where unit availabilities were 100%. These facts should answer the demand growth question.

The following paragraphs relate to the emissions that could have been accommodated during the baseline period. In the WEPCO Rule, baseline values are calculated using the highest annual average calculated from the highest 24-month emissions for the 5-year look-back period. The post-change emissions, however, are calculated using a straight 12 month total beginning on the month the unit was back in normal service. This difference in averaging periods is important when discussing emissions that could have been accommodated during the baseline period. Since Bonanza's most stringent SO2 and NOx emission limits are on an annual or rolling annual average basis, Deseret believes that 12-month rolling baseline averages are appropriate to use to adjust the post-rotor data for emissions that could have been accommodated.

In accounting for emissions due to increased demand, Deseret feels that an availability of 98.8% (the maximum 12-month 5-year look-back availability) (June 1998) should be used to adjust the post-rotor data back to baseline conditions for availability because it is evident that the plant had the ability to run at that level on an annual basis during the baseline period.

Perhaps the most difficult question in this discussion is the proper SO2, NOx and particulate emission levels to use for the post-rotor to baseline adjustment for emissions that could have been accommodated. This is where the environmentally conscious facilities are penalized for running below their allowable emission limits. Deseret's allowable SO2 emissions during the five baseline years based on actual operation levels were 8,027 tons while actual emissions were 5645 tons (71% of allowable). Allowable NOx emissions during the baseline period were 41,374 tons while the actual emissions were 30,517 tons (74% of the allowable). Allowable PM-10 baseline emissions were 2,367 tons while actual emissions were 559 tons (24% of allowable). These allowable emissions are based on annual allowable permitted emission limits of .097 for SO2, .50 for NOx, .0283 for PM-10 and a Part 75 actual total heat input during the baseline of 165,497,039 mmBtu's.

In looking at the baseline data and trying to adjust the post-rotor data back to baseline values based on actual tons emitted, Deseret feels that while the two in five WEPCO rule must be used to calculate actual baseline emissions, it is not always representative of worst case actual emissions in terms of #/mmBtu during the five year look-back. The baseline two in five emissions may simply represent the 24-month period of highest

production during the five year look-back period without taking into account the variability in coal quality, unit operation or control equipment operation that actually occurred during the five years and was built into the permit limits. Therefore, Deseret feels that the post-rotor data should be adjusted based on the maximum actual 12-month pounds per million BTU (#/mmBtu) rolling average emissions experienced during the five year look-back period compared to the average #/mmBtu of the baseline value.

There were also other SO2 emissions that could have been accommodated during the baseline period. All permit applications submitted for the Bonanza Unit indicated that coal sulfur content at the Deserado Mine would be as high as 1.00%. We believe that there should be some adjustment made based on the emissions that could have been accommodated had the plant been burning the higher sulfur coal during the baseline period. Although Deseret has no long term experience burning the higher sulfur coal, the plant has been burning the higher sulfur coal during the past several months, and since the latter part of June has been burning coal with an average sulfur content of 0.7%. SO2 emissions during this time have averaged 0.096 #/mmBtu. Deseret, believes that had the plant been burning the higher sulfur coal during the baseline period, SO2 emissions would have been in the range of the actual 12-month rolling SO2 average permitted limit of .097 #/mmBtu. Deseret believes that the post-rotor adjustment for SO2 emissions should be based on an emission limit of 0.096 #/mmBtu as this is the number that could have been accommodated by the unit if the current seam of coal would have been burned during the baseline period.

The highest NOx emissions during the baseline period were .54 #/mmBtu on a monthly basis, .46 #/mmBtu on a 12-month rolling average basis and .44 #/mmBtu on a 24-month rolling annual average. As was mentioned above, Deseret feels that the 0.46 #/mmBtu rolling annual average (April 1997) is more representative of the actual unit performance during all conditions and the difference between that emission level and the baseline emission level of 0.40 #/mmBtu represents NOx emissions that could have been accommodated during the look-back period on an annual basis and is the number that the post-rotor NOx data should be adjusted with.

Since particulate emissions are measured on a once a year stack test, they are harder to quantify. The highest monthly baseline emissions were 32.11 tons, the highest 12-month rolling emissions were 142.5 tons and the maximum 24-month rolling average was 116.3 tons. Deseret feels that the 12-month rolling average is most representative of baseline emissions that were actually emitted and should be the number that is used to adjust the post-rotor data.

Post rotor emissions for all other pollutants were adjusted downward based on the same availability calculation factor as were made for SO2, NOx and PM-10.

The following will describe the calculations made to the post-rotor data. The availability factor adjustment was made by subtracting the 24-month capacity factor relating to the 24-month baseline value (in tons) for each pollutant, from the highest baseline 12-month availability factor (98.9%), and then dividing that number by the same 24-month capacity

factor to get a percent of emissions that could have been accommodated had the unit been allowed to run at that availability factor. That number was then multiplied by the annual 24-month baseline value in tons to get the adjustment factor for availability. That number would then be subtracted from the post-rotor 12-month emissions in tons to get a baseline adjusted 12-month post-rotor value in tons. This would then be compared to the baseline value to determine if a significant increase had occurred. An example would be for SO2. For SO2, May of 1999 represented the highest annual 24-month emissions at 1406.4 tons. The 24-month capacity factor for that same period was 92%. June 1998 represented the highest 12-month availability factor at 98.9%. 92 was subtracted from 98.9 and that answer was divided by 92 to get a percent adjustment difference. The percent difference was then multiplied by the 24-month baseline emissions to get an SO2 tons adjustment. ((98.9-92)/92)*1406.4= 105.5 tons that would be subtracted from the SO2 post-rotor annual data. This represents the capacity factor adjustment.

Post-rotor SO2, NOx and PM-10 emissions were also adjusted downward for changes in actual unit operating conditions that weren't reflected in the baseline values. An example is NOx. For NOx, the difference in emission factors in terms of #/mmBtu needed to be accounted for. The maximum NOx baseline value occurred in May of 1998 and was 7005.5 Tons. The 24-month #/mmBtu value associated with that baseline value was 0.40. However, the highest baseline period 12-month #/mmBtu was 0.46. The adjustment equation was ((.46-.40)/.40)*7005.5= 1050.8 tons that then would be subtracted from the Post-rotor 12 month emissions. The same calculation was applied to the PM-10 Emissions.

The SO2 was handled just a little different. The SO2 adjustment for coal quality was the most difficult adjustment to figure due to little actual experience burning higher sulfur coal during the baseline period. We have had to rely on current operating data and try to apply it to the baseline. While the Bonanza Plant is burning more coal now than during the baseline period, the plant also has more limestone grinding capacity now than then. The calculation was the same, except that instead of using the 12-month highest baseline period value for SO2, the current actual #/mmBtu (.096) based on burning the higher sulfur coal was used.

Hopefully, this will clarify the calculations and give you the basis that Deseret thinks should be used to determine NSR applicability. A copy of this letter and the associated spreadsheet will be sent to you by E-mail. If you have any questions, please call me at the plant.

Sincerely,

Howard Vickers

Howard Vickers
Environmental Supervisor

CC: David Crabtree