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DAQP-0001-11

January 3, 2011

Callie Videtich
Director Air Program
EPA Region 8
1595 Wyncoop St
Denver, CO 80202-1129

Dear Ms. Videtich,

In 2008, Governor Huntsman submitted a revision to Utah's Regional Haze SIP to address, in part, the requirements in 40 CFR 51.309(d)(4)(vii) *Provisions for stationary source emissions of NOx and PM.* This revision contained an analysis of best available retrofit technology (BART) for NOx and PM. During subsequent conversations with your staff, questions were raised regarding the 5-factor analysis that is outlined in 40 CFR Part 51, Appendix Y, and the enforceability of the current emission limits for the Hunter and Huntington plants in Utah. The attached document is a more complete explanation of how these two issues were addressed in the 2008 SIP.

Thank you for your continued support as we work towards final approval of Utah's Regional Haze SIP.

Sincerely,

M. Cheryl Heying
Director

Attachment

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# Supplement to the Technical Support Documentation for Utah's 2008 Regional Haze SIP

On September 3, 2008, the Utah Air Quality Board adopted a revision to Utah's Regional Haze State Implementation Plan (SIP). This revision addressed Best Available Retrofit Technology (BART) requirements for $NO_x$ and particulate matter (PM), as required by 40 CFR 51.309(d)(4)(vii). The SIP generally relies on EPA's presumptive BART emission rate for $NO_x$ as the appropriate benchmark and, because EPA has not established a presumptive rate for PM, the SIP relies on technical work completed by the WRAP for PM. The purpose of this supplement is to more fully explain the analysis that was completed by UDAQ for the 2008 SIP.

While the SIP relies on presumptive emission rates for $NO_x$ as the appropriate benchmark, the SIP also includes a BART analysis for $NO_x$, as required by 40 CFR Part 51, Appendix Y that is summarized in Section D.6.d of the SIP. EPA completed extensive technical work to develop presumptive limits for $NO_x$, now codified in Appendix Y.[1] In addition, the Western Regional Air Partnership (WRAP) evaluated the impact of PM, as well as other pollutants. Utah's BART analysis relies on both of these works.

The BART analysis performed by UDAQ was influenced by several important factors.

1. In the 1990s PacifiCorp installed first generation low $NO_x$ burners on the four electric generating units (EGUs) that are subject to BART. As can be seen on the table below, Utah's ability to achieve significant $NO_x$ reductions that may have been available at older uncontrolled plants was limited because of these previously installed low $NO_x$ burners. Moreover, it is less cost effective to install controls on a lower-emitting plant than on an uncontrolled plant.

| | Pre-control emission rate (lb/MMBtu) | $NO_x$ Controls Installed prior to 2004 | 2004 NOx emission rate with first generation low $NO_x$ burners (lb/MMBtu) |
|---|---|---|---|
| Hunter Unit 1 | 0.50 | LNC1 (Installed: 06/01/1999 – Still in service) | 0.35 |
| Hunter Unit 2 | 0.55 | LNC1 (Installed: 10/01/1997 -- Still in service) | 0.35 |
| Huntington Unit 1 | 0.52 | LNC1 (Installed: 06/01/1997 – Still in service) | 0.34 |
| Huntington Unit 2 | 0.43 | LNC1 (Installed: 06/01/1998 -- Still in service) | 0.36 |

[1] 40 CFR Part 51, Appx Y, Table 1, Presumptive $NO_x$ Emission Limits for BART-Eligible Coal-Fired Units, note 20, says:

> These [presumptive $NO_x$] limits reflect the design and technological assumptions discussed in the technical support document for $NO_x$ limits for these guidelines. See Technical Support Document for BART $NO_x$ Limits for Electric Generating Units and Technical Support Document for BART $NO_x$ Limits for Electric Generating Units Excel Spreadsheet, Memorandum to Docket OAR 2002–0076, April 15, 2005.

The information in the above table is drawn from the "Technical Support Document for BART $NO_x$ Limits for Electric Generating Units Excel Spreadsheet" (see footnote 1 above) and included in the TSD for Utah's RH SIP.

2. In 2005 PacifiCorp began major pollution control projects, including the installation of next generation low $NO_x$ burners, at the four EGUs that are subject to BART. The projects were described in the commitments made by MidAmerican Energy Holdings Company to the Utah Public Service Commission when purchasing PacifiCorp in 2005. The projects were based on the regulatory framework established in Utah's 2003 regional haze SIP and the 2005 Clean Air Mercury Rule as well as EPA's BART guidelines that were finalized in 2005.

The pollution control projects were designed to achieve overall emission reductions not only of $NO_x$ but also of $SO_2$, PM, and mercury. The emission rates that were ultimately included in the permits for these pollution control projects for $NO_x$ and PM are shown in Table 5 of Utah's RH SIP and summarized below.

| | Utah Permitted Rate (pollution control project) in lb/MMBtu | | Presumptive $NO_x$ limit established in Appendix Y (lb/MMBtu) |
|---|---|---|---|
| | $NO_x$ | PM | |
| Hunter Unit 1 | 0.26 | 0.015 | 0.28 |
| Hunter Unit 2 | 0.26 | 0.015 | 0.28 |
| Huntington Unit 1 | 0.26 | 0.015 (74 lb/hr) | 0.28 |
| Huntington Unit 2 | 0.26 | 0.015 (70 lb/hr) | 0.28 |

As can be seen from the table above, the pollution control projects at the Hunter and Huntington Plants, including installation of low $NO_x$ burners, achieve the presumptive BART limits for $NO_x$, as currently codified in 40 CFR 51, Appendix Y Section IV.E.5 that states:

> For coal-fired EGUs greater than 200 MW located at greater than 750 MW power plants and operating without post-combustion controls (i.e., SCR or SNCR), **we have provided presumptive $NO_x$ limits**, differentiated by boiler design and type of coal burned. You may determine that an alternative level is appropriate based on a careful consideration of the statutory factors. *Emphasis added.*

Utah's RH SIP relies on the presumptive BART limit for $NO_x$ as the appropriate benchmark, and Utah did not choose to follow the voluntary path to establish an alternative level. This decision was based on a careful review of the supporting documentation that EPA developed to support the presumptive $NO_x$ limits in Appendix Y.

4. The Grand Canyon Visibility Transport Commission determined that sulfates were the primary stationary source pollutant of concern in the sixteen Class I areas on the Colorado Plateau. Utah's RH SIP, based on the Commission's

recommendations, established a regulatory framework that required stationary sources to focus their resources on reductions in $SO_2$. The 2003 SIP included a regional $SO_2$ milestone with a backstop trading program that locked in substantial $SO_2$ emission reductions, and also included allocation provisions to encourage early reductions.

The milestones in the 2003 SIP required substantial $SO_2$ reductions in the region. If the milestones were not met, sources in the region would face significant financial penalties and the implementation of a mandatory trading program. The milestones provided flexibility for companies such as PacifiCorp to schedule projects across their fleet of plants in the most cost-effective manner, as long as the regional emission reduction goals were achieved. The milestones could not be met unless major sources achieved the assumed emission reductions in the SIP. After the 2003 had been finalized, there was a huge growth in applications for new power plants in response to the California energy crisis of 2000 and 2001, putting further pressure on existing sources to reduce emissions to meet the milestones. The 2003 SIP also contained a commitment to address BART for $NO_x$ and PM by 2008 with installation of controls within 5 years, as required by the regional haze rule.

PacifiCorp's pollution control projects were developed within this regulatory framework, and achieved the substantial reductions of $SO_2$ that were needed to ensure that the $SO_2$ milestones would be met. PacifiCorp's projects planned across their large fleet of plants, were done in an ordered manner and achieved cost savings by timing the upgrades to coincide with other planned maintenance at the plants, achieving significant early reductions in the process.

The overall level of control in Utah's RH SIP was weighted to achieve $SO_2$ reductions because $SO_2$ reductions would lead to the greatest improvement in regional haze. PacifiCorp's pollution control project reflected this weighting by achieving substantial reductions of $SO_2$ with an emission rate of 0.12 lbs/MMBtu, which is an emission rate lower than the presumptive rate of 0.15 lbs/MMBtu established in 40 CFR Part 51, Appendix Y, Section IV.E.4. This high level of control, needed to meet the $SO_2$ milestones, meets Utah's unique and dual needs of reducing $SO_2$ emissions and achieving $NO_x$ emissions below EPA's presumptive emissions rate.

The Commission's recommendations to reduce $NO_x$ emissions were focused on mobile sources that are the most significant source of $NO_x$ in the region. The WRAP provided further analysis of the need for additional measures to address $NO_x$ emissions from stationary sources in a document titled *Stationary Source $NO_x$ and PM Emissions in the WRAP Region: An Initial Assessment of Emissions, Controls, and Air Quality Impacts* dated October 1, 2003. This report concludes that stationary source $NO_x$ emissions probably cause 2% - 5% of the visibility impairment on the Colorado Plateau. The BART analysis for $NO_x$ was developed

within the context of the substantial $SO_2$ reductions that had been achieved in the 2003 SIP.

5. In 2005, EPA finalized the Clean Air Mercury Rule (CAMR) that established a national trading program for mercury. This trading program, designed to reduce mercury emissions from EGUs nationwide, allowed sources that could make cost-effective reductions to reduce mercury emissions and then sell the excess allowances to other plants that could not achieve the reductions in a cost-effective manner. The CAMR trading program was adopted into Utah's SIP in 2007. While the CAMR rule has since been vacated, emissions of mercury are an important concern. This is particularly the case in Utah where elevated mercury levels have been measured in fish and have also been measured in waterfowl at the Great Salt Lake, an internationally important migratory bird resource. The State of Utah has identified reduction of mercury emissions as a priority for the State. When looked at in a multi-pollutant context, there is a strong rationale to focus resources where benefits beyond visibility can be achieved. Baghouses to reduce PM in conjunction with wet scrubbers to reduce $SO_2$ can significantly decrease mercury emissions. PacifiCorp's pollution control project was consistent with this multi-pollutant approach to achieve broad benefits in the most cost-effective way.

6. The overall pollution control projects at the Hunter and Huntington plants achieved early reductions that are already benefiting the Class I areas in Utah and in neighboring states.

Because of these overarching factors, UDAQ determined that it would be appropriate to compress the 5-factor BART analysis by focusing on the $NO_x$ and PM emission controls that had already been achieved at the Hunter and Huntington plants.

## *BART Analysis for $NO_x$*

**Step 1. The available retrofit control options and Step 2. Eliminate technically infeasible options.**

As the EPA had already provided a substantial analysis of potential $NO_x$ controls at EGUs throughout the nation, UDAQ relied heavily on that analysis to address the first two steps in the BART analysis for $NO_x$.

EPA's analysis identified three levels of feasible control that are described in Table 1 of the Methodology for Developing BART $NO_x$ Presumptive Limits and reproduced below as well as included in the TSD for Utah's SIP.

**Table 1. Coal-fired Control Cases**

| Control Case | Control Action Taken | Major Assumptions/Notes |
|---|---|---|
| 1a | Installation of current $NO_x$ combustion controls for units with no prior controls, or which had controls installed before 1997. For units with controls installed in or after 1997, install incremental controls if a complete set of combustion controls was not installed (LNBO or LNC3). For Cyclone units, apply Coal Reburn if no prior controls installed. For Cell Burners, install Current Combustion Controls if the unit had no controls or controls were installed before 1997. For Stokers install overfire air (OFA). Do not include existing SCR or SNCR units in the Control Case $NO_x$ Rate. | If the 2004 $NO_x$ rate was less than the floor rate or the new controlled rate, no controls added. Used average heat input from 2002 – 2004 to calculate an Average $NO_x$ Rate. Assume 10,000 BTU/ kWh heat rate for coal-fired boilers. The heat rate is a measure of how much fuel energy needed to get electric energy out. Therefore, 1,000,000 Btu/yr divided by 10,000 Btu/kWh = 100 kWh-yr. Multiply Avg Heat Input (mmBtu) by 100 to get kWhyr. |
| 1d | Install SCR, unless unit already has SCR installed or the 2004 $NO_x$ rate is already at or below the SCR floor rate. | |
| 1e | Install rotating opposed fire air (ROFA), unless unit already has SCR or the 2004 $NO_x$ Rate is already at or below the ROFA floor rate. Also, for Cyclone units, install SCR. Do not include units with existing SCR/SNCR in the Control Case $NO_x$ Rate. | |

**Step 3. Evaluate Control Effectiveness of Control Technologies**
UDAQ used EPA's analysis to determine the effectiveness of each option.

| | Case 1a (increase to LNC3) | | Case 1d (SCR) | | Case 1e (ROFA) | |
|---|---|---|---|---|---|---|
| | $NO_x$ emission rate | tons reduced | $NO_x$ emission rate | tons reduced | $NO_x$ emission rate | tons reduced |
| Hunter 1 | 0.28 | 1,233 | 0.06 | 5,108 | 0.19 | 2,642 |
| Hunter 2 | 0.28 | 1,131 | 0.06 | 4,685 | 0.19 | 2,423 |
| Huntington 1 | 0.27 | 1,084 | 0.06 | 4,462 | 0.19 | 2,231 |
| Huntington 2 | 0.29 | 1,082 | 0.06 | 4,507 | 0.20 | 2,404 |

**Step 4. Evaluate Impacts**
UDAQ used EPA's analysis to determine the cost of compliance for each option. A few key items from EPA's analysis are provided in the following table.

| | Case 1a (increase to LNC3) | | | Case 1d (SCR) | | | Case 1e (ROFA) | | |
|---|---|---|---|---|---|---|---|---|---|
| | total annual cost | tons reduced | cost/ton | total annual cost | tons reduced | cost/ton | total annual cost | tons reduced | cost/ton |
| Hunter 1 | $367,235 | 1,233 | $298 | $6,772,337 | 5,108 | $1,326 | $1,889,141 | 2,642 | $715 |
| Hunter 2 | $360,235 | 1,131 | $319 | $6,608,657 | 4,685 | $1,411 | $1,889,141 | 2,423 | $780 |
| Huntington 1 | $359,195 | 1,084 | $331 | $6,584,352 | 4,462 | $1,476 | $1,889,141 | 2,231 | $847 |
| Huntington 2 | $354,802 | 1,082 | $328 | $6,481,622 | 4,507 | $1,438 | $1,889,141 | 2,404 | $786 |

Case 1a, increase to LNC3, assumes an upgrade to current low $NO_x$ burner technology. This case is the closest to Pacificorp's pollution control project. Case 1d is the installation of post combustion controls (selective catalytic reduction). Case 1e is the installation of an emerging technology called rotating opposed fire air (ROFA).

PacifiCorp's calculations of the costs associated with SCR are much higher that what is shown in this table. PacifiCorp estimates that the costs would be $4,500 - $5,500 per ton removed.

The cost/ton in Cases 1d and 1e are significantly higher than the $567/ton that is shown as the average cost-effectiveness of $NO_x$ controls for BART-eligible coal fired units in Table 3 of EPA's July 6, 2005 final BART rule (70 Fed. Reg. 39135). Appendix Y on its face shows that an alternative analysis is required only when a source cannot meet the presumptive $NO_x$ limits. 40 CFR Part 51, Appendix Y, Section IV.E.5 states,

> **Most EGUs can meet these presumptive $NO_x$ limits** through the use of current combustion control technology, i.e. the careful control of combustion air and **low-$NO_x$ burners**. For **units that cannot meet these [presumptive] limits using such technologies**, you should consider whether advanced combustion control technologies such a rotating opposed fire air should be used to meet these limits. (*Emphasis* added)

The preamble discussion of the presumptive limits supports this reading of Appendix Y. It clearly states that the presumptive limits are reasonable, but the preamble also recognizes that in some limited cases, where a source could not meet that limit, the state could demonstrate an alternative level of control.

"States, as a general matter, must require owners and operators of greater than 750 MW power plants to meet these BART emission limits. We are establishing these requirements based on the consideration of certain factors discussed below. Although **we believe that these requirements are extremely likely to be appropriate for all greater than 750 MW power plants subject to BART**, a State may establish different requirements if the State can demonstrate that an alternative determination is justified based on a consideration of the five statutory factors....A State is free to reach a different conclusion **if the State believes that an alternative determination is justified** based on a consideration of the five statutory factors. Nevertheless, our analysis indicates that these controls are likely to be among the **most cost-effective controls available for any source subject to BART, and that they are likely to result in a significant degree of visibility improvement.**"

. . . .

"EPA's analysis indicates that the large majority of the units can meet these presumptive limits at relatively low costs. Because of differences in individual boilers, however, there may be situations where the use of such controls would not be technically feasible and/or cost-effective. For example, certain boilers may lack adequate space between the burners and before the furnace exit to allow for the installation of over-fire air controls. Our presumption accordingly may not be appropriate for all sources. As noted, the $NO_x$ limits set forth here today are presumptions only; in making a BART determination, States have the ability to consider the specific characteristics of the source at issue and to find that the presumptive limits would not be appropriate."

. . . .

"We assumed that coal-fired EGUs would have space available to install separated overfire air. Based on the large number of units of various boiler designs that have installed separated over-fire air, we believe this assumption to be reasonable. It is possible, however that some EGUs may not have adequate space available. In such cases, other $NO_x$ combustion control technologies could be considered such as Rotating Opposed Fire Air ("ROFA").

. . . .

"Although states may in specific cases find that the use of SCR is appropriate, **we have not determined that SCR is generally cost effective** for BART across unit types."

70 Fed. Reg. 39,131, and 39,134-36. (Emphasis added)

What comes through from the BART regulations in Appendix Y and the discussion in the preamble to the BART rule is that the presumptive $NO_x$ level is adequate and expected for most sources, and only if a source is not able to meet the presumptive BART limits is an alternate analysis required.

## BART Analysis for PM

EPA did not establish a presumptive BART limit for PM. The pollution control projects at the Hunter and Huntington plants upgraded the PM controls from electrostatic precipitators to baghouses, which is the current standard control technology for EGUs. 40 CFR Part 51 Appendix Y Section IV.D, Step 1: Item 9 states:

> If you find that a BART source has controls already in place which are the most stringent controls available (note that this means that all possible improvements to any control devices have been made), then it is not necessary to comprehensively complete each following step of the BART analysis in this section. As long these most stringent controls available are made federally enforceable for the purpose of implementing BART for that source, you may skip the remaining analyses in this section, including the visibility analysis in step 5. Likewise, if a source commits to a BART determination that consists of the most stringent controls available, then there is no need to complete the remaining analyses in this section

The visibility impact from stationary source PM emissions is not as significant as the impact from $SO_2$ and $NO_x$. However, when viewed in a broader, multi-pollutant approach, the combination of $SO_2$ controls and PM controls are very effective at reducing mercury emissions.

The SIP determined that the emission rate under the pollution control project met or was better than BART.

## Enforceability

Utah's State Implementation Plan concluded that the level of control already in place at the Hunter and Huntington Plants satisfied the BART requirement. Therefore the SIP does not establish a BART emission limit. To put it in a different way, the SIP concluded that BART was not an additional control and this determination does not require an emission limit. This determination is reasonable because Utah's broad SIP and permit program ensure that the underlying permits and regulations that are already applicable to the Hunter and Huntington plants are enforceable by both the State and EPA.

Utah's State Implementation Plan and the permits that are issued under that plan are enforceable under State law and become federally enforceable when EPA approves the plan and incorporates it into 40 CFR Part 52, Subpart TT. The following general description of this process is drawn from the Environmental Protection Agency, Region 8's web page (http://www.epa.gov/region8/air/sipreq.html).

> Several sections of the Clean Air Act (Act or CAA) describe the states' planning obligations to achieve healthy air quality. Section 110 of the Act requires states to submit state implementation plans (SIPs) to EPA which provide for implementation, maintenance, and enforcement of the primary and secondary National Ambient Air Quality Standards (NAAQS) established by EPA under Title I of the Act. Section 172, and other provisions in Title I, Part D, of the Act identify additional SIP requirements for areas that do not meet the NAAQS and that have been designated as nonattainment under section 107 of the Act. Section 175A of the Act describes the maintenance plan requirements for states wishing to redesignate an area from nonattainment to attainment.

> Additionally, SIPs contain state air regulations that, for example, allow states to permit the construction and operation of stationary sources, establish specific requirements for categories of stationary sources, and identify open burning requirements.
>
> Each SIP revision submitted by the state must undergo reasonable notice and public hearing at the state level, and SIPs submitted to EPA to attain or maintain the NAAQS must include enforceable emission limitations and other control measures, schedules and timetables for compliance.
>
> EPA evaluates submitted SIPs to determine if they meet the Act's requirements. If a SIP meets the Act's requirements, EPA will approve the SIP. EPA's notice of approval is published in the Federal Register and the approval is then codified in the Code of Federal Regulations (CFR) at 40 CFR Part 52. Once EPA approves a SIP, it is enforceable by EPA and citizens in federal district court.

Approval orders and Title V operating permits issued by the Executive Secretary of the Utah Air Quality Board are also federally enforceable. Approval orders become federally enforceable through R307-401 *Permits: New and Modified Sources*, and R307-405 *Permits: Major Sources in Attainment or Unclassified Areas (PSD),* when those rules are are approved by EPA as part of Utah's SIP and codified in 40 CFR. § 52.2320 and 40 CFR 40 CFR § 52.2346. Under Title V of the Clean Air Act, EPA has broad general authority to enforce state-issued Title V permits. EPA approved Utah's Operating Permit Program and codified that approval in 40 CFR Part 70, Appendix A on July 10, 1995.

Approval Orders issued by the Executive Secretary under authority of R307-401 and R307-405 to the Hunter and Huntington plants, including provisions to make the pollution control projects enforceable, contain enforceable emission limits for $NO_x$ and PM, as well as monitoring, recordkeeping, and reporting requirements to ensure that the emission limits are continuously met. EPA has discretion to federally enforce the provisions of these approval orders under authority of the federally approved Utah SIP. There is no doubt that such approval orders are federally enforceable, as evidenced by lawsuits brought previously by EPA against other sources in Utah.

The applicable requirements in the approval orders for the Hunter and Huntington plants have been incorporated into the operating permits for these plants under authority of R307-415. The operating permit program was designed to ensure that applicable requirements are clear and are enforceable. A source that violates one or more enforceable permit conditions is subject to an enforcement action including, but not limited to, penalties and corrective action. Enforcement actions may be initiated by the local permitting authority (UDAQ), EPA or, in many cases, through citizen suits.

Utah's new source review program for major and minor sources is part of the federally approved SIP. If PacifiCorp seeks to relax or modify the limitations in the approval orders for the Hunter or Huntington plants at some point in the future, the company would be required to obtain a new approval order and apply BACT under either Utah's major source (R307-405) or minor source (R307-401) rules. A modification may potentially trigger other requirements, such as PSD review, NSPS standards, GHG review, or analysis of impact on new NAAQS. As has been evident throughout the federal Clean Air Act programs that EPA has delegated to Utah, there are substantial federally enforceable requirements in the broad air program in Utah to ensure that the

emission reductions achieved through the pollution control projects are maintained (through state or federal enforcement if necessary) into the future.

## Conclusion

After reviewing the detailed analysis prepared by EPA in support of Appendix Y, and reviewing whether that rate was achievable at the Hunter and Huntington plants, UDAQ agreed with EPA's presumptive BART emission rate for $NO_x$ as applied to those Utah plants. As the Hunter and Huntington Plants already meet the presumptive $NO_x$ emission rate in Appendix Y, no additional $NO_x$ controls were needed to meet the BART requirement.

EPA has not established a presumptive BART emission rate for PM. However, the baghouses that are already required at the two plants meet or are better than BART and, therefore, no additional PM controls were needed to meet the BART requirement.