State of Utah

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DAQ-021-15

M E M O R A N D U M

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Colleen Delaney, Environmental Scientist

DATE: May 21, 2015

SUBJECT: FINAL ADOPTION: Amend Utah State Implementation Plan Section XX.D.6. Regional Haze. Long-Term Strategy for Stationary Sources. Best Available Retrofit Technology (BART) Assessment for NOx and PM; Add New Utah State Implementation Plan Subsections IX.H.21 and 22. General Requirements: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, Regional Haze Requirements; and Source Specific Emission Limitations: Regional Haze Requirements, Best Available Retrofit Technology.

On March 4, 2015, the Board proposed a revision to Utah's Regional Haze State Implementation Plan (SIP) to address the Environmental Protection Agency's partial disapproval of the Best Available Retrofit Technology (BART) provisions for nitrogen oxides (NOx) and particulate matter (PM).

1. Particulate Matter. The proposed BART determination for PM was based on a 5-factor analysis of available control technologies for PM. The Division of Air Quality (DAQ) analysis concluded that the most stringent PM controls were already required; therefore, the emission limits established in 2008 met the BART requirement for PM.

2. Nitrogen Oxides. The proposal outlined an alternative to BART for NOx that maintained the requirements established in 2008 for PacifiCorp Hunter 1 and 2 and PacifiCorp Huntington 1 and 2 (installation of low-NOx burners with overfire air with an emission limit that is more stringent than EPA's presumptive BART limits); makes enforceable the expected closure of PacifiCorp Carbon 1 and 2; and takes credit for the installation of low-NOx burners at PacifiCorp Hunter 3 in 2008.

3. Enforceable requirements for PM and NOx were included in new SIP Subsections IX.H.21 and 22.

A public comment period was held from April 1 through May 1, 2015, and a number of public comments were received. A hearing was not requested. A summary of comments received and DAQ's response to those comments is attached to this memo. The proposed SIP and the staff review that includes the 5-factor analysis for PM and the demonstration that the alternative measures provides greater reasonable progress than BART for NOx were both modified in response to comments and the revised documents are also attached to this memo.

Staff Recommendation: Staff recommends that the Board adopt the revision to SIP Section XX, Part D.6 and new SIP Sections IX, Part H.21 and H.22 as amended.

Response to Comments

General Comments

1. [National Park Service (hereinafter NPS] On an annual basis millions of people come from around the world to visit Utah's national parks and to experience the iconic, scenic views that are among the most spectacular in the country. These views are degraded on many days by industrial haze that impairs visibility. The NPS Organic Act of 1916 and the Wilderness Act of 1964 address the importance of protecting these areas. The goal of the PSD provisions in the Clean Air Act is to preserve, protect and enhance the air quality in national parks. Together these laws required that NPS, EPA, and the State work together to reduce regional haze.

Response: The current proposal before the Board is the last piece of a comprehensive strategy developed to address regional haze. Utah has been working for decades to address this important issue because it is important to the State and to the citizens of Utah. Utah's Visibility Protection Program (SIP Section XVII and R307-406) and Utah's Prevention of Significant Deterioration Program (SIP Section VII and R307-405) were adopted in the early 1980s to address the visibility goals established in the 1977 Clean Air Act. In the mid-1980s Utah's Governor appointed the Task Force on Visibility Protection to determine the appropriate level of protection for Utah's Class I areas and to determine the sources of impairment of visibility in those areas. After more than a year of investigation, the Task Force recommended that all Utah Class I areas need protection, and that the biggest cause of visibility impairment is not individual industrial source, but rather regional haze from a multitude of sources that is transported over long distances. In 1991, EPA established the Grand Canyon Visibility Transport Commission (GCVTC) as required by the 1990 Clean Air Act. Utah's Governor was vice-chair of the Commission and Utah was an active participant in the process. In 1996 the Commission finalized a comprehensive series of recommendations that addressed the multiple emission sources and pollutants that contribute to regional haze on the Colorado Plateau. These recommendations were the basis of Utah's SIP. Utah was an active participant in the Western Regional Air Partnership (WRAP) that was the follow-up organization to the GCVTC. Utah's Governor Co-chaired the WRAP and Utah representatives were co-chairs or members of many of the WRAP's Forums. The WRAP established an extensive stakeholder-based process to further develop the GCVTC's Recommendations and to improve the technical understanding of the causes of regional haze in the western states and the development of effective strategies to improve visibility in Class I areas throughout the West. Throughout this process Utah has worked with the National Park Service, EPA, and other western states as recommended by the commenter.

Utah's SIP was focused on reducing emissions of SO_2 from stationary sources because SO_2 is the most significant anthropogenic pollutant contributing to haze on the Colorado Plateau. The SIP was adopted 5 years earlier than was required for the rest of the country due to the significant work that had been completed to address visibility on the Colorado Plateau.

DAQ is in the process of finalizing the first 5-year progress report to evaluate progress under the RH SIP. Utah's Class I areas are showing improvement in visibility on the most impaired days and no degradation on the least impaired days between baseline and current monitoring data. The first 5-year progress period covers the 2005-2009 timeframe, as it represents the most recent successive 5-year averaging period. The most recent 5-year average indicates that visibility at Utah's Class I areas is improving on both the 20% worst and 20% best days, and has already achieved better visibility improvement than the preliminary reasonable progress (PRP) projections for 2018.

Table 3.28. Utah Class I Area IMPROVE Sites Visibility conditions – 20% Most and Least Impaired Days Including 2010 to 2012 data

Class I Area	Baseline (2000-2004) (dv)	First Progress Period (2005-2009) (dv)	(2009-2013) (dv)	2018 Preliminary Reasonable Progress Case (PRP18a) (dv)
20% Worst Days				
Arches NP (CANY1)	11.2	11.0	10.8	10.9
Bryce Canyon NP (BRCA1)	11.6	11.9	10.6	11.2
Canyonlands NP (CANY1)	11.2	11.0	10.8	10.9
Capitol Reef NP (CAPI1)	10.9	11.3	10.2	10.5
Zion NP (ZICA1)	12.5	12.3	10.8	N/A[1]
20% Best Days				
Arches NP (CANY1)	3.7	2.8	3.1	3.5
Bryce Canyon NP (BRCA1)	2.8	2.1	1.8	2.6
Canyonlands NP (CANY1)	3.7	2.8	3.1	3.5
Capitol Reef NP (CAPI1)	4.1	2.7	2.6	3.9
Zion NP (ZICA1)	5.0	4.3	4.2	N/A (see footnote 15)

The current control strategies in the state's Regional Haze SIP have improved visibility at Federal Class I areas in the state and have also benefitted Class I areas outside of Utah that might be impacted by emissions from Utah during the first planning period. The emission reduction strategies in Utah's RH SIP have been implemented and have been effective.

- The State of Utah has developed *The Utah Smoke Management Plan (SMP)* which provides operating procedures for federal and state agencies that use prescribed fire, wildfire, and wildland fire on federal, state and private wildlands in Utah.
- Mobile NO_x emissions in the four main urban counties (Weber, Davis, Salt Lake, and Utah) were projected to decrease 42,000 tons/yr or 61% between 2002 and 2018. Even greater emission reductions will be achieved by 2018 than had been anticipated in Utah's RH SIP due to federal Tier 3 fuel and vehicle standards that were adopted in 2014.

[1] There is no PRP18a established for the new ZICA1 monitor. The PRP18a was originally established for the original ZIONI IMPROVE monitor, which was discontinued on July 29, 2004.

- The alternative to BART measures included in the proposed revision to Utah' SIP will have decreased SO_2 emissions by 27,947 tons and NO_X emissions by 15,258 tons from the 2002 inventory by 2015.
- The GCVTC set a goal of achieving 10 percent of generation from renewable resources in 2005 and 20 percent in 2015. Significant progress has been achieved towards meeting this regional goal. Thirteen percent of electricity generation in Utah was from renewable resources in 2012 and significant new resources are currently under construction.

Utah's Regional Haze SIP reflects the state's commitment to improve visibility and is focused on strategies that will provide the greatest benefit for Utah's Class I areas.

2. [NPS] The importance of scenic values was integral to the creation of the national parks in Utah. Clear clean air is essential to this purpose. Visibility at the parks is impaired (range varies across the 5 Class I areas from 70% of the days at Bryce Canyon National Park to 83% of the days at Arches National Park) We ask that DAQ carefully consider the implications for millions of park visitors as the agency considers whether to proceed with implementation of its SIP amendments.

Response: See response to comment 1. As described in the proposed alternative to BART, DAQ has confidence that the SO_2 emission reductions from stationary sources that were the focus of Utah's SIP will be effective to further improve visibility in Utah's Class I areas throughout the year, including the high visitation period of March - November. The significant NOx emission reductions that have already occurred have not resulted in reductions in ammonium nitrate during the low visitation period of December – February and further research is needed to better understand why visibility has not improved. During the rest of the year ammonium nitrate levels are generally low and are not a significant contributor to visibility impairment. The alternative measure proposed in Utah's SIP includes further reductions in SO_2 leading to a more certain improvement in visibility than would occur due to the installation of further NOx controls on the four electric generating units (EGUs) and these benefits would occur year round.

3. [Wasatch Clean Air Coalition] A particularly valuable part of the regional haze SIP process has been development of relationships with tribes, regulators in other states and federal agencies as well as many other stakeholders. These relationships are a valuable asset that will serve as we address other regional problems.

Response: DAQ agrees with the commenter. The stakeholder-based, consensus process of the GCVTC and the WRAP led to a workable and comprehensive strategy to address regional haze on the Colorado Plateau.

4. [HEAL Utah, National Parks Conservation Association, and Sierra Club (hereinafter Conservation Organizations)] Utah's latest RH SIP proposes a Best Available Retrofit Technology ("BART") alternative that would exempt Utah's only BART-eligible sources, Hunter Units 1 and 2 and Huntington Units 1 and 2, from any emission reductions whatsoever. Should this proposal move forward, it will result in the outright deprivation of Clean Air Act-mandated cleaner, clearer air at the region's treasured Class I national parks and wilderness areas.

Response: The commenter's contention that Hunter Units 1 and 2 and Huntington Units 1 and 2 were exempted from any emissions reductions whatsoever is incorrect. The emission reduction requirements for these EGUs were established in 2008 and have been fully implemented providing visibility benefits for the last nine years. Under the alternative to BART program for SO_2, PacifiCorp installed an SO_2 scrubber on Huntington Unit 2 and upgraded the scrubbers on the other 3 EGUs. As a result, SO_2 emissions from the four EGUs decreased by 18,707 tons/yr between 2002 and 2014[2]. The alternative measures for NOx outlined in the proposed rule require the installation of low-NOx burners with overfire air at all 4 EGUs and emissions of NOx decreased by 11,988 tons/yr between 2002 and 2014[2]. The BART determination for PM in the proposed rule requires the replacement of electrostatic precipitators with baghouses leading to significant reductions in PM and mercury emissions. The total combined capital cost for these controls was over $588,000,000 with an annualized operating cost of $71,000,000/yr.

5. [Conservation Organizations] The Conservation Organizations object to the State's failure to respond to our previous comments prior to re-proposing its latest RH SIP. The Conservation Organizations also object to the State's failure to formally retract its previous RH SIP proposal before re-proposing its latest proposal.

Response: The Regional Haze SIP was re-proposed to allow for public comment on the extensive revisions that had been made to the October 2014 proposal in response to public comments, including those from the commenter. Improvements were made to the modeling analysis, also in response to comments, and these changes are reflected in the revised modeling protocol. DAQ did not summarize and respond formally to the comments because so many of the comments that were directly related to the 5-factor analysis were no longer relevant. In addition, many of the comments received were addressed and resolved by the revised analysis. With modern word processing programs it is a simple matter for commenters to copy and resubmit any relevant comments that had not been addressed.

Under the provisions of R15-4, Administrative Rulemaking Procedures, the October proposal automatically expired on March 2, 2015, 120 days after the proposal was published on November 1, 2014. Therefore there was no need to retract the previous proposal. The Board proposed the new revision on March 4, 2105.

6. [Conservation Organizations] The Conservation Organizations request that all correspondence with EPA and/or PacifiCorp regarding Utah's withdrawal of its prior proposal and submission of its latest reproposal be made publicly available and be posted to its website for public review and comment.

Response: R15-4, Administrative Rulemaking Procedures, does not require that all correspondence related to a rulemaking be posted to an agencies web site. DAQ has followed the required rulemaking procedures: the proposed rule was published in the State Bulletin with a rule analysis form as required, and a 30-day public comment period was provided. The Staff Review and the proposed SIP are thoroughly documented to describe the legal requirements, technical analysis, and justification for the proposal. Other documents are available through a request under Utah's Government Records Access

[2] 2003 for Huntington Unit 2 because 2002 was not representative of normal plant operations.

and Management Act (GRAMA). Information about GRAMA requests and the procedures for making a request are posted on DEQ's web page at http://www.deq.utah.gov/ProgramsServices/services/grama/GRAMA.htm.

7. [Numerous individuals] I understand that Utah's Regional Haze plan will not require any pollution cuts from two big Rocky Mountain Power coal plants in central Utah. I would like to urge state officials to reconsider that -- and specifically to require significant reductions in smog-producing nitrogen oxides consistent with industry-standard pollution control upgrades, as has been done for coal plants in Colorado, Arizona, and New Mexico. In Utah, this would reduce an additional 14,000 tons of nitrogen oxide emissions per year from our air. Please require the best possible reductions in air pollution from Rocky Mountain Power's coal plants. I believe that investing in cleaner energy generation is vital for our families' health and to protect our parks' iconic views and the tourism and recreation dollars they help generate.

Response: The commenters did not provide any data or documentation to support this comment. As explained in the response to comment 4, the alternative measures for NOx outlined in the proposed rule require the installation of low-NOx burners with overfire air at all 4 EGUs. These controls have already been installed on all four EGUs and have been providing visibility benefits for the past nine years. Emissions of NOx from the four EGUs decreased by 11,988 tons/yr between 2002 and 2014. As explained in the response to comment 1, visibility impairment at Utah's Class I areas is the result of multiple sources and pollutants, including natural sources such as wildfire and windblown dust. Utah's SIP is a comprehensive strategy that reflects this complexity. Utah's SIP has focused on reducing SO_2, the most significant anthropogenic pollutant at Utah's Class I areas. As described in the proposed alternative to BART, DAQ has confidence that the SO_2 emission reductions will be effective to further improve visibility in Utah's Class I areas. DAQ has less confidence that NOx reductions will provide a real benefit. The significant NOx reductions that have already occurred have not resulted in reductions in wintertime ammonium nitrate. During the rest of the year ammonium nitrate levels are generally low and are not a significant contributor to visibility impairment. Further research is needed to better understand the visibility benefits of NOx reductions and DAQ anticipates that regional modeling for the next RH SIP that is due in 2018 will improve our understanding of this important issue.

8. [Numerous individuals] The commenters did not provide any data or documentation to support this comment. Clean air is necessary for the well-being of Utah's national parks and their nine million annual visitors from around the world. The Hunter and Huntington coal plants have heavily polluted the air in the Four Corners region for decades. Because of the pollution from these coal plants, a visitor to Canyonlands National Park sees only a third of the scenic vista they would see if the air was cleaned up. This same pollution that affects visibility is also harmful to our lungs, especially those of children. Please take this opportunity to cut nitrogen oxide pollution by over 14,000 tons per year at Hunter and Huntington coal plants and invest in the future of our national parks, our economy and our health.

Response: The Four Corners Region, where Utah's Class I areas are located, is currently designated attainment for all national ambient air quality standards. Utah's PSD program, promulgated in SIP

Section VII and R307-405 and NSR permitting program, promulgated in SIP Section II and R307-401, ensure that new stationary sources do not cause or contribute to a violation of the NAAQS. When new NAAQS are promulgated, Utah reviews and updates its SIP as necessary to address the impact of emissions in Utah on nonattainment areas in downwind states. Emissions from the four EGUs that are subject to BART have not been determined to cause or contribute to nonattainment for any criteria pollutant through these regulatory processes.

As explained in the response to comment 1, visibility impairment at Utah's Class I areas is the result of multiple sources and pollutants, including natural sources such as wildfire and windblown dust. Utah's SIP is a comprehensive strategy that reflects this complexity. Utah's SIP has focused on reducing SO_2, the most significant anthropogenic pollutant at Utah's Class I areas. As described in the proposed alternative to BART, DAQ has confidence that the SO_2 emission reductions will be effective to further improve visibility in Utah's Class I areas. DAQ has less confidence that NOx reductions will provide a real benefit. The significant NOx reductions that have already occurred have not resulted in reductions in wintertime ammonium nitrate. During the rest of the year ammonium nitrate levels are generally low and are not a significant contributor to visibility impairment. Further research is needed to better understand the visibility benefits of NOx reductions and DAQ anticipates that regional modeling for the next RH SIP that is due in 2018 will improve our understanding of this important issue.

9. [Individual] Utah is the last state in the union to comply with the haze regulations of the Clean Air Act.

Response: Utah's Regional Haze SIP was submitted in 2003, five years earlier than required, and has been providing visibility benefits for the last 12 years. Significant emission reductions were required in 2008 to address BART for NOx and PM. These reductions have been fully implemented and have provided visibility benefits for the last nine years.

10. [Individual] What is the cost of non-action on the part of DEQ and RMP? What are the long-term costs of the negative impacts of haze and pollution on Utah's tourism industries and the respiratory health of Utah's citizens?

Response: The alternative to BART measures included in the proposed revision to the RH SIP will have decreased SO_2 emissions by 27,947 tons and NO_X emissions by 15,258 tons from the 2002 inventory by 2015. EPA has fully approved the reasonable progress demonstration in Utah's RH SIP (77 FR 74355, December 14, 2012). The most stringent PM controls have been installed on the 4 subject to BART EGUs and the alternative measures for both SO2 and NOx provide greater reasonable progress than BART. The SIP does not represent non-action as claimed by the commenter. As described in the response to comment 1, Utah has been working for decades to address visibility impairment at Utah's Class I areas, but it is a complex problem resulting from multiple emission sources and pollutants, including natural emissions from wildfires and windblown dust. Utah's SIP is focused on reductions in SO_2, the most significant anthropogenic pollutant and those reductions have led to improvements in visibility. These improvements have had a positive impact on the experience of visitors to the Class I areas. As

addressed in the response to comment 8, the emissions from the four EGUs that are subject to BART have not been demonstrated to cause or contribute to nonattainment for any criteria pollutant.

11. [UAMPS] UAMPS supports the SIP Revision as the SIP Revision is consistent with the Regional Haze regulations and best meets the main objective of the Regional Haze Program to return visibility conditions in Class I areas to natural conditions by 2064. UAMPS adopts PacifiCorp's comments supporting the SIP Revision.

Response: Comment noted.

PM BART Determination

12. [PacifiCorp and UAMPS (hereinafter PacifiCorp)] In its Guidelines for BART Determinations Under the Regional Haze Rule found at 40 CFR §51, Appendix Y ("BART Guidelines"), EPA states in part at Section IV.D.9: "If you find that a BART source has controls already in place which are the most stringent controls available…, then it is not necessary to comprehensively complete each step of the BART analysis in this section. As long as 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…." The SIP Revision reiterates and concludes, based on Utah's review and approval of PacifiCorp's PM BART analyses, that the "baghouse technology required…is still the most stringent technology available and 0.015 lb PM/MMBtu represents the most stringent emission limit." (Staff Review, p. 5). In addition, by including the emission limits in amended Section IX.H.21 and 22, the SIP Revision makes the PM BART limits federally enforceable. As a result, Utah properly skipped the remaining BART analyses steps consistent with the BART Guidelines and properly determined PM BART for the Units.

Response: Comment noted.

13. [PacifiCorp] Utah's conclusion is further supported by SIP approvals offered by EPA in surrounding states, which PacifiCorp requests that Utah specifically rely on in making its final decision to approve the proposed PM BART determinations for the Units.

    a. In Colorado, with regard to similar electric generating units (EGU), EPA explained that "[f]abric filter baghouses are the most stringent control technology for controlling PM emissions." 77 Fed. Reg. 18,052, 18,066 (Mar. 26, 2012). EPA further explained, "consistent with the BART Guidelines, the State did not provide a full five-factor analysis because the State determined BART to be the most stringent control technology and limit" and "assumes the BART limit can be met with the operation of the existing fabric filter baghouses." *Id.* Significantly, EPA concluded that it "agree[d] with the State's conclusions and we are proposing to approve its PM BART determinations." *Id.*

    b. In Wyoming, EPA approved the State's conclusions that "fabric filters represent the most stringent PM control technology" and that "[c]onsistent with the BART Guidelines, the State did

not provide a five-factor analysis because the State determined BART to be the most stringent control technology and limit." 77 Fed. Reg. 33,022, 33,035. (*citing* 70 Fed. Reg. at 39,165 (Appx. Y)). EPA also has approved or proposed to approve in numerous other actions, including Wyoming, the same 0.015 lb/MMBtu PM BART emissions limit adopted in the prior Utah RH SIP and in this SIP Revision. *See, e.g.*, 79 Fed. Reg. 5,032, 5,220. *See also* EPA's approval of PM BART in Arizona (77 Fed. Reg. at 72,523 (December 5, 2012)) and for the Four Corners Power Plant (77 Fed. Reg. 51, 620, 51, 636 (August 24, 2012)).

c. In other actions, EPA has approved PM BART limits that are twice as high as those included for the Units in the SIP Revision. For example, EPA approved a RH SIP with a PM BART emissions limit of 0.03 lb/MMBtu for nine EGUs in Colorado. *See, e.g.*, 77 Fed. Reg. 18,051,18,066 (Mar. 26, 2012); 77 Fed. Reg. at 76,872 . EPA approved PM BART emissions limits of 0.03 and 0.04 lb/MMBtu for certain EGUs in Wyoming, where the most stringent limit was 0.015 lb/MMBtu. 79 Fed. Reg. at 5,220. EPA also approved PM limits of 0.07 lb/MMBtu for four EGUs in North Dakota. 76 Fed. Reg. at 58,585; 77 Fed. Reg. at 20,930. In addition, EPA also adopted a PM limit of 0.26 lb/MMBtu for Corette in its FIP for Montana. 77 Fed. Reg. at 57,911.

Response: The information has been added as footnotes in Section III of the Staff Review as part of the record supporting the conclusion that the emission limit for PM represents the most stringent technology available.

Alternative To BART Analysis vs Case-by-Case Review

14. [NPS] DAQ has determined that Hunter Units 1 and 2 and Huntington Units 1 and 2 are subject to BART. Yet in the proposal DAQ has proposed to claim emission reductions due to the planned closure of the Carbon plant as an acceptable alternative to BART installation and emission reductions from the Hunter and Huntington Plants. The State of Utah appears unprepared to fulfill its legal requirements under the Clean Air Act to protect and enhance the views that attract millions of visitors to the parks each year.

Response: The regional haze rule provides two pathways to address the regional haze BART requirements. The first, outlined in 40 CFR 51.308(e)(1), is a case-by-case review that must meet the criteria established in 40 CFR Part 51, Appendix Y. The second, outlined in 40 CFR 51.308(e)(2), provides the criteria for an alternative program. Either pathway is equally acceptable under the rule. The proposed RH SIP addresses BART for NOx using the second pathway, an alternative program, and the Staff Review demonstrates that the alternative program meets the requirements of 40 CFR 51.308(e)(2). The commenter does not explain how the proposal that establishes alternative measures that provide greater reasonable progress than BART, as fully allowed by the RH rule, does not fulfil the requirements under the Clean Air Act.

15. [PacifiCorp] The National Park Service mischaracterized the nature of the Alternative Measure. As clearly explained in the SIP Revision, the Alternative Measure does not rely solely on emission reductions from the Carbon power plant. Instead, it consists of: (i) substantial emission reductions associated with the closure of the Carbon plant (non-BART eligible); (ii) early NOx emission

reductions due to upgraded LNB/OFA at Hunter Unit 1 and Unit 2 (BART eligible); (iii) early NOx emission reductions due to upgraded LNB/OFA at Huntington Unit 1 and Unit 2 (BART eligible); and (iv) substantial NOx emission reductions due to upgraded LNB/OFA at Hunter Unit 3 (non-BART eligible). It is unfair and improper to characterize the entirety of the Alternative Measure as merely reductions associated with the Carbon power plant closure. Moreover, given the extensive explanation in the letter of the importance of improved visibility at Utah's national parks, the National Park Service should be pleased with – not critical of – the Alternative Measure because it provides even greater reasonable progress than would be achieved by assuming the most stringent NOx controls (SCR) and limits. In other words, Utah is proposing the very "strong action" that the National Park Service is asking Utah to do. What Utah cannot do, of course, is require both the Alternative Measure and also the most stringent NOx controls and limits as BART on the Units.

Response: Comment noted.

16. [PacifiCorp] 40 C.F.R. 51.308(e)(2) allows a state to implement an "other alternative measure" ("Alternative Measure") in lieu of BART so long as the Alternative Measure meets certain regulatory requirements and can be demonstrated to "achieve greater reasonable progress than would be achieved through the installation and operation of BART." Greater reasonable progress can be demonstrated using one of two methods: (i) "greater emission reductions" than under BART (40 C.F.R. §51.308(e)(3)); or (ii) "based on the clear weight of evidence" (40 C.F.R. §51.308(e)(2)(E)). As the U.S. Circuit Court of Appeals for the 10th Circuit recently observed, the state is free to choose one method or the other. *WildEarth Guardians v. E.P.A.*, 770 F.3d 919, 935-37 (10th Cir. 2014). The court characterized the former approach as a "quantitative" and the later as "qualitative," and specifically sanctioned the use of qualitative factors under the clear weight of evidence.

Response: A reference to the *WildEarth Guardians v. E.P.A.* decision has been added as a footnote in Section IV of the Staff Review to provide further support to the ability of the state to choose to use an alternative measure. As the use of multiple metrics is an important aspect of the weight of evidence, the citation has also been added to Section VIII.5 of the Staff Review. There it serves as additional support that the alternative approach provides greater reasonable progress than the most stringent available NOx controls.

17. [PacifiCorp] Some parties have expressed the view, because PacifiCorp considered certain planning scenarios in PacifiCorp's 2015 Integrated Resource Plan ("PacifiCorp IRP") that include the installation of SCR at one or more of the Units, that Utah also should require SCR at the Units under the Utah SIP Revision. By its nature, however, the PacifiCorp IRP is a general planning document that is intended to assess a variety of potential future generation resource portfolio scenarios across PacifiCorp's generating system. It does not represent a commitment to install SCR at the Units, nor does it indicate that SCR represents BART at the Units. In addition, although the PacifiCorp IRP includes remaining life and cost assumptions for the Units in regard to SCR installation across the planning scenarios assessed, those assumptions do not directly relate to the SIP Revision.

Response: Comment noted.

Alternative to BART Analysis Sources Covered

18. [PacifiCorp] ***§51.308(e)(2)(i)(A)*** – Utah properly listed all of the BART-eligible sources. *See* SIP Section XX.D.6.b(1), Table 3, page 21; and Staff Review, Section V, page 7. ***§51.308(e)(2)(i)(B)*** – Utah properly listed all of the BART-eligible sources which are covered by the Alternative Measure. *See* SIP Section XX.D.6.c; and Staff Review, Section V, page 7.

Response: Comment noted.

19. [NPS] The BART alternative does not comply with the intent of the 1999 regional haze rule. States have demonstrated an alternative either through other sources/pollutants within the fence line of the source or through a trading program. The UT DAQ BART Alternative is unique in that it is not a pre-existing state program (like CO, MA, MD and NC) and goes beyond the fence line of the BART-eligible Hunter and Huntington facilities to include a facility (Carbon Power Plant) not subject to BART and a pollutant (SO_2) already covered under a separate BART trading program. For these reasons, it is our understanding that the UT DAQ approach is more similar to the trading programs previously cited than the BART Alternatives listed above. To conform to the intent of the 1999 Regional Haze Rule, it seems the UT trading program should include all significant sources within a source category (EGUs) in a trading region (UT). We compared 2014 emissions (Q in tons-per-year) from CAMD to distances (d in km) from the 100 ton-per-year sources (the Q/d greater than 10 approach recommended by the BART Guidelines) and found two additional EGUs that should have been included in UT DAQ's BART Alternative—Intermountain Power Unit 1 & Unit 2 (IPP). This satisfies the 2006 recommendation that we "…include all [significant] sources within a source category in a trading region…"

Response: The regional haze rule, 40 CFR 51.308(e)(2)(B) establishes the criteria for determining which sources to include in an alternative program. The rule states, "The State is not required to include every BART source category or every BART-eligible source within a BART source category in an alternative program, but each BART-eligible source in the State must be subject to the requirements of the alternative program, have a federally enforceable emission limitation determined by the State and approved by EPA as meeting BART in accordance with section 302(c) or paragraphs (e)(1) or (e)(4) of this section." During the development of the rule EPA had considered the need to include all sources within a category in order to prevent emission shifting, but ultimately rejected that approach. The preamble to the 2006 regional haze rule revision states,

> "having carefully considered the comments and the relationship between the requirement for category-wide participation of BART-eligible sources and the requirements for the State to address emission shifting, we are adopting final provisions that maximize the flexibility of the States while ensuring that the BART-eligible sources are addressed in some fashion by States…States are not required to include each BART-eligible source in a source category in an alternative program; however, any BART-eligible sources not included in an alternative program would remain subject to the general requirements governing BART sources." (71 FR 60619)

Intermountain Power Units 1 & 2 is therefore not required to be included in the alternative program. The units at Intermountain Power are not BART-eligible and are therefore not required to meet BART provisions independently. The plant is included in the SO_2 milestone and backstop trading program and the overall reasonable progress analysis in Utah's SIP.

20. [Conservation Organizations] For any alternative measure, "[t]he State is not required to include every BART source category or every BART-eligible source within a BART source category in an alternative program, but *each BART-eligible source in the State must be subject to the requirements of the alternative program, [or] have a federally enforceable emission limitation determined by the State and approved by EPA as meeting BART*." This requirement ensures that the sources with the greatest share of the contribution to the regional haze problem do not escape statutorily mandated emission reductions. In fact, the alternative excludes all BART sources in the state, exempting Hunter Units 1 and 2 and Huntington Units 1 and 2 from emission reductions under both the alternative program and BART-derived emission limits.

Response: The comment is factually incorrect, and provides no basis for the claim it makes. Utah has identified only four BART-eligible sources in the state: PacifiCorp Hunter Units 1 and 2 and PacifiCorp Huntington Units 1 and 2. All four of these EGUs are included in the alternative program. As described in the response to comment 4, the alternative program required the installation of low-NOx burners on all four BART-eligible EGUs that resulted in substantial emission reductions of NOx in addition to emission reductions measures at three EGUs that are not BART-eligible. The required emission controls were installed early and have been improving visibility at Utah's Class I areas since 2006.

21. [Conservation Organizations] Importantly, EPA's BART alternative regulations are intended to allow future emission reductions to serve as a substitute for BART. For example, the regulations require a state to demonstrate that its program "will achieve greater reasonable progress…" indicating that BART alternative emission reductions must occur in the future. Moreover, the regulations also require "an analysis of the projected emission reductions achievable through the trading program or other alternative measure, again requiring that emission reductions occur in the future. Utah's proposed alternative does not satisfy these requirements. In fact, the alternative relies exclusively on past emission reductions.

Response: 40 CFR 51.308(e)(2)(iv) establishes the criteria for when emission reductions due to other requirements may be included as part of an alternative measure. This section requires "a demonstration that the emission reductions resulting from the alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP," which is defined as 2002 for regional haze purposes. The commenter is taking language out of context in the rule while ignoring the very clear language that references the baseline date of the SIP for determining which reductions may be considered. The commenter is also not considering the long process that has occurred in the development of Utah's SIP. The SIP was originally adopted in 2003 requiring significant emission reductions of SO_2 from stationary sources and was amended in 2008 to require significant emission reductions of NOx and PM under the BART requirements. These emission reductions have been fully implemented and have been providing visibility benefits since 2003. Any

revision to the BART determination, such as the alternative measures addressed in the proposal, must fully include the emission reductions that have already been required as BART.

22. [Conservation Organizations] While the April 2015 retirement of the Carbon Plant and 2008 NOx emission reductions from Hunter Unit 3 no doubt improved visibility at these parks to some degree, they will remain unlawfully impaired by NOx emissions from the BART-subject units under Utah's alternative. Without adequate BART controls for emissions of NOx, Utah fails to make reasonable progress toward the national visibility goal of *eliminating* human-caused visibility impairment in these lands.

Response: Visibility at the Class I areas is not unlawfully impaired - on December 14, 2012, EPA determined that Utah's SIP had met the reasonable progress requirements of the regional haze rule. EPA determined that "States adopting the requirements of 40 CFR 51.309 are deemed to have met the requirements for reasonable progress for the Class I areas on the Colorado Plateau. 40 CFR 51.309(a)…All of the Class I areas in Utah are on the Colorado Plateau. Therefore, the State met all reasonable progress requirements for the Class I areas in Utah." (77 FR 74367) As explained in earlier responses (14, 16, 19, and 21), the alternative process is fully allowed under the regional haze rule and is therefore not "unlawful" as claimed by the commenter.

23. [Conservation Organizations] Utah's alternative program does not meet the precedent established by the CAIR program in the eastern US. CAIR required future emission reductions. Further, in finding that CAIR satisfied the "greater reasonable progress" requirement for alternative programs, EPA noted specifically that BART, if implemented, would not be additive and achieve emission reduction over and above those achieved by CAIR, because CAIR and BART covered the same sources of haze emissions. Such source specific control requirements would simply result in a redistribution of emission reductions, as other EGUs could buy the excess allowances generated by the installation of controls at BART units. The net result would be the same level of emission reductions, but at a higher total cost, because the ability of the market to find the most cost effective emission reductions would be constrained. In contrast, because Utah's alternative program does not require emission reductions from BART sources, emission reductions under BART would be additive to the emission reductions already achieved through the Carbon closure and Hunter 3 emissions reductions. This fundamental difference alone nulls the Utah alternative. EPA's replacement rule for CAIR, CSAPR, has similar requirements. The 309 SO_2 Trading program was also designed to require emission reductions from all EGUs.

Response: First, the commenter's contention that Utah's alternative program does not require emission reductions from BART sources is incorrect. Utah's 2008 SIP required installation of low-NOx burners with overfire air on all four EGUs that are subject to BART. As described in the response to comment 4, NOx emissions from the four EGU's decreased 11,988 tons/year between 2002[3] and 2014 due to these controls. The NOx emission limits in the 2008 SIP also met the presumptive BART emission rates established in 40 CFR Part 51, Appendix Y. These NOx emission reductions have been fully implemented

[3] 2003 for Huntington Unit 2 because 2002 did not represent normal operations.

and have been providing visibility benefits since 2006. Second, 40 CFR 51.301(e)(2)(iv) allows inclusion of emission reductions due to control requirements adopted since 2002. The rule does not require "future" emission reductions, instead it requires "reductions that are surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP." Third, the comment misunderstands what EPA was saying in this discussion of additive benefits. Because some sources are subject to both CAIR and BART, you would not get double the emission reductions by requiring case-by-case BART in addition to CAIR. Instead, that approach would achieve the same reductions but would force those reductions to occur at specific plants, thereby losing the ability of the trading program to find the most cost-effective emissions reductions. The result would be the same level of emission reductions at a higher cost. While the proposed alternative measures in Utah's SIP is not a trading program there is a similar logic. The alternative does not mandate that the emission reductions occur at the higher cost source and instead takes advantage of the emission reductions required by the MATS rule to achieve even greater reductions at a lower cost.

24. [Conservation Organizations] EPA has approved several "BART alternatives" for certain power plant units in the western United States. However, unlike Utah's proposal, these BART alternatives required future emission reductions at the same power plant as an alternative to BART, rather than exclusively past emission reductions at other non-BART sources. Thus, Utah's proposed BART alternative deviates not only from EPA's regulations but also from EPA practice and precedent. Specifically, unlike Utah's proposal, each of the power plants with EPA approved BART alternative emission reductions have units that are subject to BART. Utah relies solely on past, unrelated emission reductions that occurred separate from and before the adoption of its regional haze SIP.

Response: Utah's RH SIP was adopted in 2003 and the base year of the SIP is 2002. The commenter's contention that the emission reductions in the alternative program occurred before the adoption of the SIP is incorrect. As described in the response to comment 21, 40 CFR 51.308(e)(2)(iv) fully allows credit for emission reductions due to measures adopted after the 2002 baseline date of the SIP. The regional haze rule does not limit inclusion in an alternative program to sources with units that are subject to BART. The fact that alternative programs cited by the commenter occurred at the same power plant or include only BART source is irrelevant and does not change the requirements of the rule.

25. [Conservation Organizations] Under EPA regulations, plans must show that any BART-alternative emission reductions are "resulting from" and "achievable through" the "trading program or alternative measure." Utah's BART alternative fails to meet these requirements. Utah points to no evidence in the administrative record indicating that 2008 NOx emission reductions at Hunter 3 were "resulting from" or "achievable under" Utah's BART alternative. Nor could they be. Utah did not even propose its BART alternative program until 2015—seven years after the Hunter 3 emission reductions. Likewise, the emission reductions at Carbon 1 and 2 were achieved on April 15, 2015—prior to the promulgation of Utah's BART alternative. The reductions were the result of the MATS rule. Thus, it is impossible that these emission reductions "resulted from" or were "achieved under" a program that had yet to be promulgated.

Response: The commenter is taking the terms "resulting from" and "achievable through" out of context. The rule does not require that the alternative program establish new requirements. EPA specifically envisioned allowing states the flexibility to rely on emission reductions from other CAA requirements as part of an alternative program. The preamble to the proposed rule states, "In some cases, emission reductions required to fulfill CAA requirements other than BART (or to fulfill requirements of a State law or regulation not required by the CAA) may also apply to some or all BART eligible sources. In such a situation a State may wish to determine whether the reductions thus obtained would result in greater reasonable progress than BART." (70 FR 44161) 40 CFR 51.308(e)(2)(iv) specifically allows the inclusion of measures adopted after the baseline date of the SIP (2002) to be included in the alternative program. In Utah's case, the alternative program is relying on the emission reductions "resulting from" and "achievable through" the closure of the Carbon Plant and the installation of low-NOx burners on Hunter Unit 3, as well as the installation of low-NOx burners with overfire air on the 4 BART-eligible EGUs and these reductions are made enforceable through emission limits in Section IX.H.22 and 23 of Utah's SIP.

Alternative To BART – Most Stringent NOx Controls Comparison

26. [PacifiCorp] Utah properly analyzed the Alternative Measure by comparing it against the most stringent, potential BART controls and limits (by assuming the installation of selective catalytic reduction ("SCR") at a 0.05 lb/MMBtu limit to control NO_x at the Units). *See* Staff Report, Section VI, page 8. This allowed Utah properly to determine that the Alternative Measure provides greater reasonable progress against the most stringent, potential BART controls and limits. It is worth noting that several environmental groups agreed, in comments to the September 2014 proposed amendment by Utah to its regional haze SIP, that SCR with a NO_x emission rate of 0.05 lb/MMBtu is appropriate as BART. *See* December 22, 2015 letter to Utah by HEAL Utah, National Parks Conservation Association, and Sierra Club at Section V.D. (pages 27 – 30). EPA has used a 0.05 lb/MMBtu NO_x emissions rate for SCR for other regional haze SIP analyses, recently in New Mexico and Arizona. *See e.g.*, 79 Fed. Reg. 60,978, 60, 984 (New Mexico, Oct. 9 2014)("In promulgating the FIP, we evaluated the performance of both new and retrofit SCRs and determined that 0.05 lb/MMBtu on a 30-boiler-operating-day average was the appropriate emission limit for SCR at the San Juan Generating Station units. See 76 FR 491 and 76 FR 52388. New Mexico appropriately used this same rate in their cost and visibility analyses for the four-SCR scenario as part of its BART evaluation."); 79 Fed. Reg. 52,420, 52,431 (Arizona, Sept. 3, 2014)("We agree that our use of a 0.05 lb/MMBtu annual average design value for SCR is consistent with other BART determinations for coal-fired power plants."). EPA has agreed that even higher NO_x emission rates can qualify as the most stringent emission rate for modeling visibility impacts. For example, EPA accepted state-mandated SCR emission rates of 0.07 and 0.08 in Colorado, as well as its SCR related analyses based on 0.07. 77 Fed. Reg. 76,871 (Colorado, Dec. 21, 2012). EPA also used 0.083 to 0.098 for the Reid Gardner Station in Nevada. 77 Fed. Reg. 50,936, 50,942 (Nevada, Aug. 23, 2012).

Response: DAQ agrees with the commenter that 0.05 lb/MMBtu is the appropriate emission rate for evaluating the emission reductions due to the most stringent potential NOx control for BART. The citations provided by the commenter have been added as a footnote in section VI of the report to provide further support for the emission rate used in the analysis.

27. [PacifiCorp] Assuming, as Utah concluded in its prior RH SIP, that NOx BART for each Unit is Low NOx Burner/Over-fire Air (LNB/OFA) with an emission limit of 0.26 lb/MMBtu, the Alternative Measure also results in greater reasonable progress than that assumption. This is because achieving greater reasonable progress as against the most stringent NOx technology and limits, by definition, demonstrates even greater reasonable progress as compared against less stringent technology and limits. The same is true by comparing the Alternative Measure against presumptive NOx limits in Appendix Y, and PacifiCorp's BART analyses referenced in Footnote 1 and included in SIP record.

Response: As noted in the Staff review, DAQ's use of SCR as a benchmark is not a determination that this technology is BART, it is merely a conservative approach to evaluate the effectiveness of the alternative program. When evaluating an alternative to BART under the RHR it is not necessary to make a final determination of BART. Instead the most stringent technology available is used as a benchmark.

28. [PacifiCorp] Utah properly conducted an analysis of the projected emission reductions achievable through the Alternative Program. *See* Staff Report, Section VII, page 9.

Response: Comment noted.

29. [NPS] UT DAQ's approach to comparing its BART Alternative to its "Most Stringent NO_X" scenario is not consistent with our understanding of the intent of the applicable regulations. Instead of creating a scenario that reflects application of the most stringent NO_X controls to all EGUs (Hunter Units 1 – 3, Huntington Units 1 & 2, and Carbon Units 1 & 2) "covered" in the trading population, only the BART-eligible EGUs are assumed to get the most stringent NO_X controls—Selective Catalytic Reduction (SCR)—even though other non-BART EGUs are included ("covered") in UT DAQ's Most Stringent NO_X trading population. This appears to be inconsistent with the intent of the 2006 rule requirement that the BART Alternative "trading program or other alternative measure achieves greater reasonable progress than would be achieved through the installation and operation of BART at the *covered sources."* If the application of the UT BART Alternative is expanded beyond just BART sources, it seems appropriate to use UT DAQ's "Most Stringent" nomenclature and apply that approach to all "covered sources."

Response: The commenter has neglected to include the full text in the regional haze rule when referring to the term "covered sources." The full text says "each source within the State subject to BART and covered by the program." The most stringent NOx scenario assumes the installation of SCR on each source within the State subject to BART and covered by the program: Hunter Units 1 and 2, and Huntington Units 1 and 2.

30. [NPS] UT DAQ's conclusion that "…the alternative method may be deemed to achieve greater reasonable progress than BART" is based upon a significant deviation from accepted procedures. UT

DAQ used CAMD emissions from 2001 – 2003 to establish baseline emission rates for the Hunter and Huntington EGUs, but used 2012 – 2013 for the Carbon EGUs. According to UT DAQ, "This approach provides a more accurate representation of the effectiveness of this "control" option, as well as being in line with federal and state permitting guidelines under Title I (NSR)." In this case, the combined 2012 – 2013 average SO_2 and NO_X emissions used by UT DAQ were 25% higher than the appropriate 2001 – 2003 emissions.

Response: DAQ used current emissions from the Carbon Plant because these emissions are more representative of the reductions that will be achieved due to the closure of the plant. The difference in emissions referenced by the commenter is primarily due to increased SO_2 emissions from the plant during this time period. The Carbon Plant was built in the 1950s and was grandfathered under Utah's permitting rules. The plant was equipped with ESPs to control particulate, but had no controls for SO_2. The increasing SO_2 emissions are therefore the direct result of increased sulfur content in the coal that is combusted in the plant. Use of 2001-2003 emissions would underestimate today's benefit. In either case the emission year used would not have affected the overall conclusion because emissions under the alternative would still be lower than the most stringent NOx scenario even if 2001—2003 average emissions were used for the Carbon Plant.[4]

The modeled emission rate for the Carbon Plant is not based on annual emissions. Instead, it is based on the highest daily emissions in the time period. Because there are day to day fluctuations in the sulfur content of the coal the effect of increasing sulfur is not a factor because the highest days are comparable. The SO_2 emissions on the highest day in 2001-2003 were 19.024 tons (highest day for each unit averaged) while the emissions on the highest day in 2012-13 were 18.957 tons. If the approach suggested by the commenter were used, the model would have shown slightly greater visibility benefits due to the closure of the Carbon Plant.

31. [NPS] It is generally assumed that a modern SCR can achieve at least 90% NO_x reduction, and at least seven recent retrofits are meeting 0.04 lb/mmBtu (or lower) on an annual average basis. Considering that PacifiCorp's BART EGUs are already achieving less than 0.30 lb/mmBtu on an annual average, it is realistic to assume that addition of SCR could reduce those emissions to not more than 0.04 lb/mmBtu (annual average).

Response: DAQ disagrees with this comment. While the commenter is correct that a modern SCR can achieve a 90% reduction in NOx emissions, there are two errors in the commenter's presented logic. The first error is in the use of historical actual emission data to simply set an emission limit. This is not the proper approach toward setting a best available retrofit technology (BART) emission limit.

BART, as defined by §169A [42 USC 7491]:

> *in determining best available retrofit technology the State (or the Administrator in determining emission limitations which reflect such technology) shall take into*

[4] Combined SO_2 and NOx average emissions in 2001-3 were 9,102 tons and in 2012-13 were 11,352 tons. The 2,250 ton difference between these time periods is less than the 2,283 ton difference between the alternative and the most stringent NOx scenario (PM reductions not included).

consideration the costs of compliance, the energy and non-air quality environmental impacts of compliance, any existing pollution control technology in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology;

Therefore, simply setting a limit based upon an arbitrary fraction of past performance ignores the very process defined within the CAA.

The second error in the comment is in the selection of averaging periods. The commenter has specifically chosen to present the emission limit on an "annual average basis." However, the values used within DAQ's analysis were presented using a 30-day rolling average basis. This is a much shorter time frame, and simply lowering the limit without taking this averaging period into account can greatly affect the stringency of the limit. Typically in the permitting realm, the longer the averaging period, the lower the limit can be set. This is because the longer data collection period tends to lessen the impact of outliers on the overall average.

EPA itself has used a 0.05 lb/MMBtu NOx emissions rate for SCR for other regional haze SIP analyses, recently in New Mexico and Arizona. See e.g., 79 Fed. Reg. 60,978, 60, 984 (New Mexico, Oct. 9 2014)("In promulgating the FIP, we evaluated the performance of both new and retrofit SCRs and determined that 0.05 lb/MMBtu on a 30-boiler-operating-day average was the appropriate emission limit for SCR at the San Juan Generating Station units. See 76 FR 491 and 76 FR 52388. New Mexico appropriately used this same rate in their cost and visibility analyses for the four-SCR scenario as part of its BART evaluation."); 79 Fed. Reg. 52,420, 52,431 (Arizona, Sept. 3, 2014)("We agree that our use of a 0.05 lb/MMBtu annual average design value for SCR is consistent with other BART determinations for coal-fired power plants.") EPA has agreed that even higher NOx emission rates can qualify as the most stringent emission rate for modeling visibility impacts. For example, EPA accepted state-mandated SCR emission rates of 0.07 and 0.08 in Colorado, as well as its SCR related analyses based on 0.07. 77 Fed. Reg. 76,871 (Colorado, Dec. 21, 2012). EPA also used 0.083 to 0.098 for the Reid Gardner Station in Nevada. 77 Fed. Reg. 50,936, 50,942 (Nevada, Aug. 23, 2012).

32. [NPS] NPS provided modeling based on their determination of the correct comparison. The modeling for the most stringent NOx scenario included the IPP units 1 and 2, used a lower emission rate for SCR and applied that rate to all of the EGUs (Hunter, Huntington, Carbon, IPP). Using these assumptions and adding up the additional improvement that would occur at all 9 Class I areas resulted in 7.1 dV greater improvement that what was modeled by DAQ under the alternative.

Response: The results of the NPS modeling are not relevant because that modeling was performed using incorrect emission rates. The following errors with the NPS modeling are noted: 1, IPP was included in the analysis even though this plant is not part of the alternative program (see response to comment 19). 2. The SCR emission rate was incorrectly used for all EGUs, rather than those subject to BART (see response to comment 29). 3. Finally, where an SCR emission rate was applied, an incorrect emission value was chosen (see response to comment 31). The modeling result were not relevant to the proposal and were therefore not considered.

33. [Conservation Organizations] Utah's projected emission reduction analysis wrongly assumes that Carbon Units 1 and 2 could, in perpetuity, continue to emit NOx, SO2, and PM at the same rate the plant emitted these pollutants in 2012-2013. More specifically, Utah's so-called "Most Stringent NOx" scenario—purportedly reflecting the emissions from Hunter, Huntington and Carbon if BART were implemented—has Carbon Units 1 and 2 emitting NOx (3,348 tpy total), SO2 (8,005 tpy total), and PM (573 tpy total) at 2012-2013 emission rates through at least 2064. This emission scenario is arbitrary and both factually and legally incorrect.

Response: The comment is factually incorrect and is not supported by the requirements of the regional haze rule. The proposal does not contain a projection of emissions for any of the EGUs to 2064 as implied by the commenter. The emission rates evaluated are based on current actual emissions and therefore reflect conditions as they exist today, not at some future date. The regional haze rule does not require an emission projection to 2064 for this analysis, and EPA has not required such a projection for other alternative programs, including CAIR/CSAPR. Baseline emissions for the Hunter and Huntington plants are based on 2001-2003 actual emissions, consistent with the modeling requirements of 40 CFR Part 51 Appendix Y. As discussed in the response to comment 30, current emissions for the Carbon plant were used in the baseline to better represent the emission reductions that would occur due to the closure of the plant. The most recent available actual emissions (2012-13 at the time the analysis was completed) were used for emissions under the alternative. The creditable emission reductions since the 2002 baseline inventory were included in the alternative analysis, consistent with 40 CFR 51.308(e)(2)(iv).

34. [Conservation Organizations] The Carbon Plant was permanently closed on April 15, 2015 and is in the process of being dismantled (April 15, 2015 Newspaper Article). Thus, Utah's assumption that these units could continue to emit pollutants at 2012-2013 emission rates is arbitrary, factually inaccurate, and defies reality.

Response: The regional haze rule allows emission reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP (2002). The reductions due to the closure of the Carbon Plant are due to a measure adopted under the CAA since 2002 and are clearly creditable under those criteria. The Staff Review notes that the Carbon Plant was closed due to the high expense of complying with the MATS rule. A challenge to this rule is currently under consideration by the Supreme Court. If the Supreme Court overturned or stayed the MATS rule, PacifiCorp could reopen the Carbon Plant under its existing operating permit and continue operating indefinitely. For this reason enforceable measures were included in the SIP to lock in the substantial emission reductions that were relied upon in the alternative program.

35. [Conservation Organizations] Utah arbitrarily assumed that if BART, and not the alternative program, were required at Hunter and Huntington, PacifiCorp would somehow remove the most recently installed LNB from Hunter Unit 3 and emit NOx rates higher than its currently permitted limit. As a result, Utah significantly overstated the overall haze-causing emissions that would occur under the BART benchmark scenario.

Response: Utah never assumed that the emission controls installed on Hunter Unit 3 would be removed as implied by the commenter. The emission limits for Hunter Unit 3 are enforceable under the approval order and operating permit for the unit. The regional haze rule allows credit for emission reductions resulting from measures adopted after the baseline date of the SIP (2002). The installation of low-NOx burners at this unit in 2008 is clearly creditable. Allowing credit for emission reductions due to other measures does not mean that those measures would disappear as implied by the commenter.

36. The Conservation Organizations again employed the services of professional air quality dispersion modeler Dr. Andrew Gray to assess whether the corrected BART scenario would achieve greater reasonable progress than would Utah's BART alternative. Dr. Gray's latest visibility modeling largely used the same emission inputs as Utah. The only major difference between Dr. Gray's modeling and Utah's was the SO2 emission inputs for Carbon Units 1 and 2. Instead of adopting Utah's assumption of uncontrolled SO2 emissions from these units into the future in the Most Stringent NOx scenario, Dr. Gray used SO2 emissions that reflected compliance with MATS (Gray modeling scenario MATS#1 and MATS#2) The only difference between the two scenario's run by Dr. Gray is that the MATS#1 scenario does not allow for a NOx emission reduction credit at Hunter 3 resulting from installation of LNB in 2008. Dr. Gray's modeling results clearly show that Utah's BART alternative will not achieve greater reasonable progress than would operation of SCR. Additionally, visibility actually declines under Utah's BART alternative and thus is in violation of 40 C.F.R. § 51.308(e)(3)(i).

Response: The modeling analysis provided by the commenter did not use the correct emission rate for Carbon Units 1 and 2 to compare the alternative measures to the most stringent NOx controls available. 40 CFR 51.308(e)(2)(i)(C) requires an "analysis of the best system of continuous emission control technology available and associated emission reductions achievable for each source within the State subject to BART and covered by the alternative program." DAQ's analysis complied with this requirement by modeling the emission reductions that would be achieved due to the most stringent NOx controls available, SCR, on the four EGUs that are subject to BART. The commenter included additional emission reductions at Carbon 1 and 2 due to the MATS rule that go beyond BART and therefore significantly overestimated the emission reductions achievable for each source within the State subject to BART. The modeling results were therefore not relevant to the proposal and were not considered.

Alternative to BART Weight of Evidence Standard

37. [Wasatch Clean Air Coalition] We strongly support the current proposed amendment, with the better than BART analysis for NOx that acknowledges the early investment & installation of pollution control at the Hunter Units 1 & 2 and Huntington Units 1 & 2. Utah & the entire region have benefited from the early emission reductions of mercury, PM, SO2 and NOx. These early reductions allowed the discovery that the visibility model over-predicts visibility improvements from NOx reductions. This finding is very important to future regional haze planning.

Response: DAQ agrees that the early reductions have highlighted uncertainties regarding the effect of NOx emission reductions on ammonium nitrate levels during the winter. To improve our understanding

of the role of ammonia in formation of ammonium nitrate, DAQ has funded ammonia monitoring at Canyonlands beginning in May, 2014, and we anticipate that this data will be useful in future visibility analyses. The western states are already beginning planning for the next regional haze SIP that is due in 2018, and this issue will be one of many addressed through that process as the states evaluate progress that occurred during the first planning period and develop strategies to achieve progress during the 2018-2028 planning period.

38. [PacifiCorp] EPA described the clear weight of evidence standard as follows: ''Weight of evidence" demonstrations attempt to make use of all available information and data which can inform a decision while recognizing the relative strengths and weaknesses of that information in arriving at the soundest decision possible. Factors which can be used in a weight of evidence determination in this context may include, but not be limited to, future projected emissions levels under the program as compared to under BART, future projected visibility conditions under the two scenarios, the geographic distribution of sources likely to reduce or increase emissions under the program as compared to BART sources, monitoring data and emissions inventories, and sensitivity analyses of any models used. (Emphasis added.) See 71 Fed. Reg. 60,612, 60,622 (Oct. 13, 2006). EPA recently confirmed the availability of the "other alternative measure" based on the "clear weight of evidence" approach in approving a "BART Alternative" under the Arizona regional haze state implementation plan. 80 Fed. Reg. 19220 (April 10, 2015).

Response: The referenced language from EPA's 2006 revisions to the regional haze rule and the Arizona SIP has been added to Section VIII of the Staff Review to further support the use of this approach when evaluating the alternative measures.

39. [PacifiCorp] The Alternative Measure is projected to reduce overall NO_X, SO_2 and PM emissions by 2,856 more tons per year than would be reduced assuming the installation of the most stringent NO_X technology at the most stringent potential NO_X emission limit. EPA has approved, or proposed approval, of other BART Alternatives that included "inter-pollutant trading" when SO_2 levels were lowered. 79 Fed. Reg. 33,438, 33,440-41 (Washington, June 11, 2014); 79 Fed. Reg. 56,322, 56,328 (Arizona, Sept. 19, 2014).

Response: The reference to other EPA approvals has been added as a footnote in Section VII of the Staff Review to provide further support for using a similar approach when evaluating the alternative measures.

40. [PacifiCorp] Based on extensive dispersion modeling using CALPUFF, Utah determined that the Alternative Measure projects better visibility conditions using a number of different metrics, including: (i) better visibility improvement because of the focus on SO_2; (ii) more days of visibility improvement; (iii) better average deciview improvement across Class 1 Areas; and (iii) better 90th percentile average deciview improvement across Class 1 Areas. EPA has proposed approval of an Alternative Measure for the Apache Generating Station in Arizona on similar "weight of evidence" grounds. 79 Fed. Reg. 56,322, 56,327 (Sept. 19, 2014). EPA has also approved a similar Alternative

Measure in Washington based, in part, on a reduction in the number of days of impairment greater than 0.5 dv and 1.0 dv. 79 Fed. Reg. 33,438, 33,440-42 (June 11, 2014).

Response: The citations to EPA's approval of a similar weight of evidence approach has been added as a footnote in Section VIII.B.5 of the Staff Review.

41. [PacifiCorp] Because the BART-eligible Units and the Units covered under the Alternative Program are the same, and because Hunter Unit 3 and Carbon Unit 1 and Unit 2 are in the same general geographic location as the Units, Utah properly concluded that emissions under the Alternative Measure impact "the same general area" as would be impacted by the application of the most stringent NO_x BART surrogate.

Response: Comment noted.

42. [PacifiCorp] The Alternative Program provides emission reductions earlier than required, "providing a corresponding early and on-going visibility improvement." *See* Staff Review, Section VII, page 9. The U.S. Circuit Court of Appeals for the 10th Circuit explicitly acknowledged that the consideration of early reductions was proper as part of a qualitative or clear weight of evidence approach to determining greater reasonable progress. *WildEarth Guardians v. E.P.A.*, 770 F.3d 919, 938 (10th Cir. 2014).

Response: A reference to the Court opinion has been added as a footnote to Section VII.

43. [PacifiCorp] The Alternative Program provides "greater reductions of SO_2, the most significant anthropogenic pollutant affecting Class I areas on the Colorado Plateau that affects visibility year-round…." *See* Staff Review, Section VII, page 9. EPA has approved, or proposed approval, of BART Alternatives on similar grounds. 79 Fed. Reg. at 56,327-28; 79 Fed. Reg. at 33,440-42.

Response: The suggested citations have been added as a footnote to Section VII.

44. [PacifiCorp] In addition, PacifiCorp encourages Utah to specifically recognize that the Alternative Measure includes "non-BART sources" (i.e., Carbon Unit 1 and Unit 2 (PM, NO_x and SO_2) and Hunter Unit 3 (NO_x)). The Tenth Circuit Court recognized non-BART sources as a legitimate factor to consider in a "weight of the evidence" analysis. *WildEarth Guardians v. E.P.A.*, 770 F.3d 919, 935-36 (10th Cir. 2014).

Response: The requested language has been added to section V of the Staff Review.

45. [EPA] In Section VIII.C states that PacifiCorp did not quantify the energy penalty associated with SCR. However, PacifiCorp did quantify the energy penalty in terms of both power (kW) and cost ($/yr) in Appendix A of its August 4, 2014 five factor analysis. Also, it would be helpful if Utah could quantify or, at least expand on, the solid wastes that would be eliminated from the Carbon plant when shutdown.

Response: The following information from PacifiCorp's August 4, 2014 BART Analysis Update has been added to the Section VIII in response to this comment.

PacifiCorp quantified the energy penalty associated with SCR in their August 4, 2014 BART Analysis Update, Appendix A. The energy penalty was included as part of the total cost for installing SCR on each of the units.

	Energy Penalty	
	kW	$/yr
Hunter Unit 1	2,090	$494,247
Hunter Unit 2	2,090	$494,247
Huntington Unit 1	2,182	$516,098
Huntington Unit 2	2,182	$516,098
Total	**8,544**	**$2,020,690**

The Carbon Plant, like most coal-fired power plants, produces solid wastes in the form of fly ash from the ESPs controlling both units, as well as the bottom ash conveyors which clean the residuals from both boilers. This ash is currently being landfilled. The plant also runs water through both steam generating units (the boilers), as well as a pair of cooling towers. This uses water, and has an associated wastewater discharge. Hauling the ash to landfill requires additional fuel use and water or chemical dust suppression for minimization of fugitive dust. Finally, for maintenance and emergency purposes, the plant has a number of emergency generators, fire pumps, and ancillary equipment - all of which must be periodically operated, tested and maintained - with associated air emissions, fuel use, painting, and the like. All of these non-air quality impacts are reduced as the result of the closure of the Carbon Plant.

Modeling Results

46. [EPA] We suggest clarifying in the text that accompanies the data in Table 6 of the staff review, Average Δdeciview across all Class I areas, what it represents and how it was calculated.

Response: The following information has been added to the description of Table 6 in response to this comment. The average impact was calculated by averaging all modeling results for each year and then calculating a three year average from the annual average. The average deciview metric shows the benefit that will be achieved day in and day out in the Class I areas. This information is valuable as part of the overall weight of evidence because reductions in SO_2 and reductions in NOx improve visibility at different times of year. Ammonium sulfate is an issue year round while ammonium nitrate is primarily an issue in the winter. This means that the benefits of SO_2 reductions are more apparent when looking at longer averaging periods while the benefits of NOx reductions are more apparent when looking at the worst days. The average monitoring data shown earlier in this document in Figure 1 illustrates this difference. As can be seen in the figure, ammonium sulfate is the most significant visibility impairing pollutant on average. As explained in Section VIII.A, DAQ has less confidence in the modeled results in

the winter when the worst days occur because emission reductions have not led to the expected improvements during that time period.

47. [EPA] Table 8 of the staff review, Average 98th percentile (24th High) across all three years, should show the 22nd high as opposed to the 24th high for the three-year period.

Response: Table 8 has been modified to show the 22nd high as requested.

48. [EPA] Table 9 of the staff review should also include the 98th percentile in the highest year for the base case.

Response: The information has been added to Table 9 as requested.

49. [EPA] Utah should clarify in Section XI that the state has chosen to use a weight of evidence approach under 40 CFR 51.308(e)(2)(i)(E), as described in section VIII of the staff review. We understand that the separate visibility analysis described in section VIII is part of the weight-of-evidence demonstration, and is not intended to provide the type of modeling demonstration that would otherwise be required under 40 CFR 51.308(e)(3).

Response: The following language has been added to Section XI in response to this comment. Utah has chosen to use a weight of evidence approach under 40 CFR 51.308(e)(2)(i)(E), as described in section VIII of the staff review. The separate visibility analysis described in section VIII is part of the weight-of-evidence demonstration, and is not intended to provide the type of modeling demonstration that would otherwise be required under 40 CFR 51.308(e)(3).

50. [NPS] In its 2/13/2015 "Review of 2008 PM Determination and Recommended Alternative to BART for NO_X," UT DAQ presented CALPUFF modeling results in the form of several different metrics. Only Tables 8 and 9 use model results for the 98th percentile (8th highest impact) as required by Appendix Y of the BART Guidelines; the metrics presented in Tables 4-7 do not conform to EPA Guidance.

Response: The comment is incorrect. The alternative to BART is not evaluated through a 5-factor analysis as would occur for a case-by-case BART determination under 40 CFR 51.308(e)(1) using the methodology described in Appendix Y of the BART Guidelines. Instead, a weight of evidence approach is used, as allowed under 40 CFR 51.308(e)(2). The weight of evidence approach allows a broader analysis that is more appropriate for this circumstance where different pollutants that affect visibility at different times of year are compared. EPA further described the weight of evidence approach in the preamble to the 2006 revisions to the regional haze rule. "Weight of evidence demonstrations attempt to make use of all available information and data which can inform a decision while recognizing the relative strengths and weaknesses of that information in arriving at the soundest decision possible." (71 FR 60622)

51. [NPS] Tables 4 & 5 showed that there would be fewer days across the nine Class I areas evaluated when the impact of its BART Alternative exceeded 1.0 and 0.5 deciview (dv), respectively, compared to the impacts of its "Most Stringent NO_x" control scenario. However, this metric does not accurately compare improvements to visibility. For example, if the results of hypothetical Scenario A

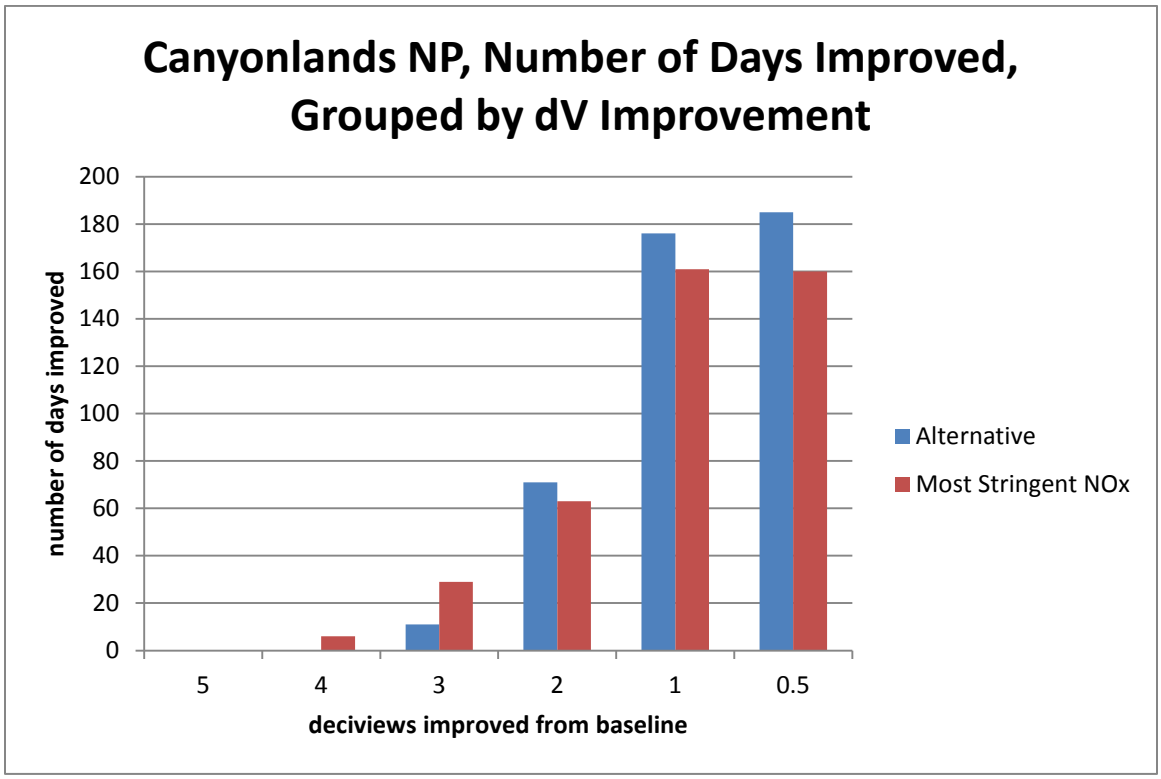
show ten days at 0.9 dv and hypothetical Scenario B show ten days at 0.6 dv, there would be no change in the number of days exceeding either 1.0 or 0.5 dv, even though visibility has improved by 0.3 dv. On the other hand, if the results of Scenario A show ten days at 0.6 dv and Scenario B show ten days at 0.4 dv, the metric would show a greater reduction of ten days above the 0.5 dv metric, even though the amount of visibility improvement is less (0.2 dv versus 0.3 dv). This method cannot be used to compare control strategies because it is too sensitive to the model result versus the metric threshold.

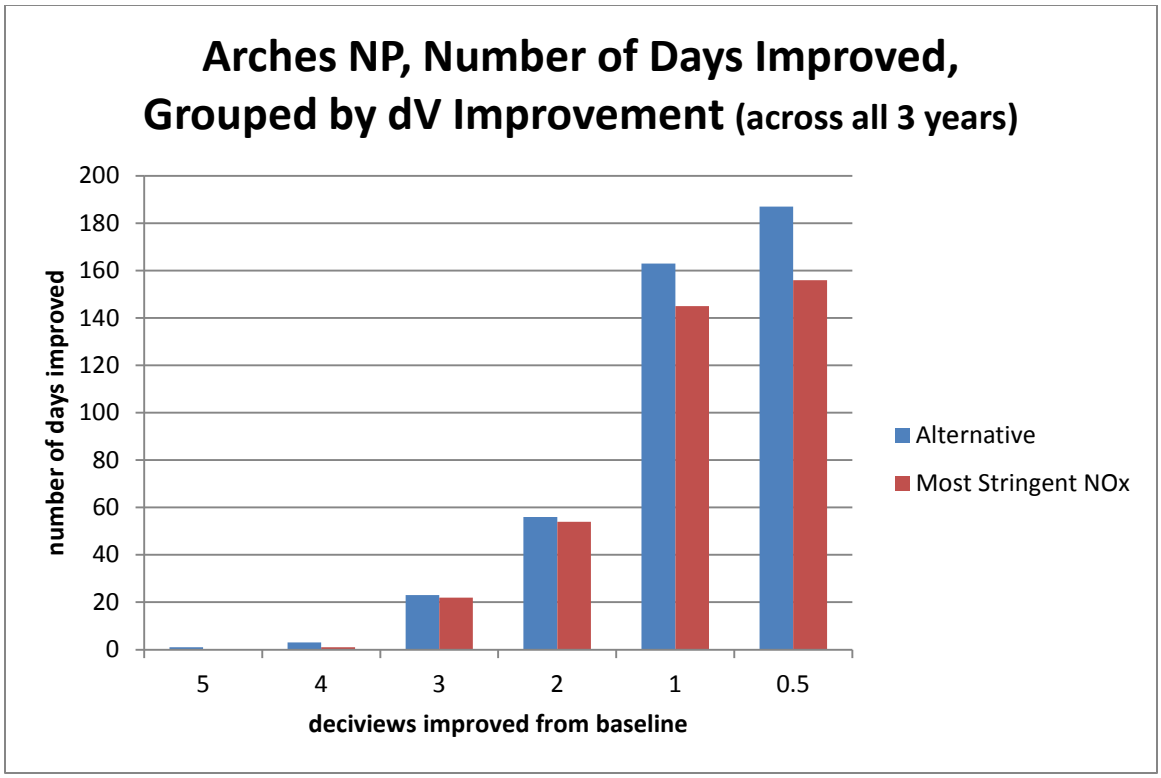
Response: The number of days with an impact of greater than 1.0 dV and 0.5 dV is one of the standard outputs from CALPOST and has been commonly referenced in other BART determinations. However, to address the concerns raised in this comment, DAQ staff evaluated the number of days improved using a different methodology. Instead of focusing on the result (number of days with an impact above a certain threshold) the analysis focused on the improvement (number of days that are improved by a specific amount). The visibility impairment in deciviews for each alternative was subtracted from the basecase impairment for each day in the three year modeling period. The results were then grouped by deciview improvement (any improvement greater than or equal to 4 dV and less than 5 dV was included in the 4 dV category and so on). The following groups were used: 5, 4, 3, 2, 1, 0.5 dV. The following summary tables were added to the Staff Review in response to this comment.

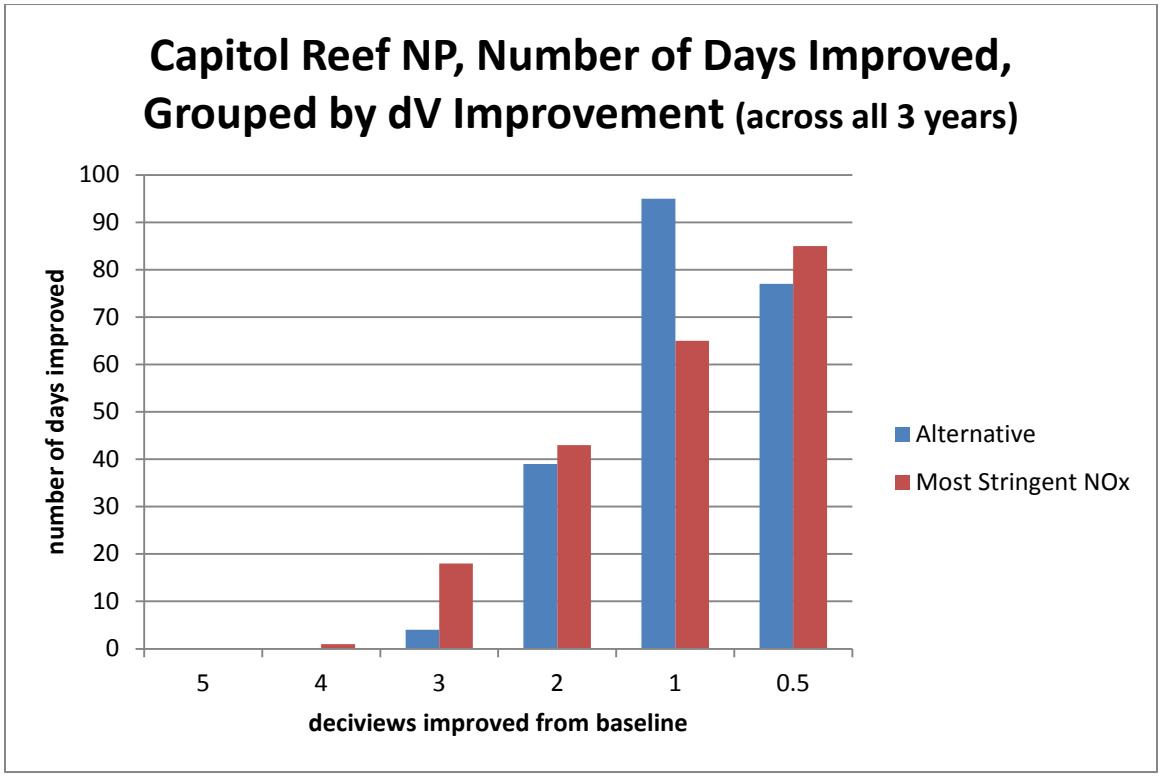
Number of Days that Improved ≥ 0.5 dV impact (across all 3 years)		
	Alternative	Most Stringent NOx Control
Arches	433	378
Black Canyon	138	116
Bryce Canyon	66	62
Canyonlands	443	419
Capitol Reef	215	212
Flat Tops	181	144
Grand Canyon	78	78
Mesa Verde	138	132
Zion	37	34
Total	1729	1575
Number of Days that Improved ≥ 1.0 dV impact (across all 3 years)		
	Alternative	Most Stringent NOx Control
Arches	246	222

Black Canyon	51	43
Bryce Canyon	27	28
Canyonlands	258	259
Capitol Reef	138	127
Flat Tops	63	51
Grand Canyon	33	35
Mesa Verde	51	53
Zion	18	19
Total	885	837

The results are presented in more detail in the following figures for the three most impacted Class I areas: Canyonlands, Arches, and Capitol Reef. Similar figures for the other Class I areas are included in the TSD. The groupings showing dV improvement of 3 or greater are almost all days during the winter months of December – February. The largest number of days improved are found in the 1 dV group and the .5 dV group and contain days throughout the year, including the high visitation period of March – November.







52. [NPS] Table 6 uses an average delta-dv across all Class I areas. This approach has been consistently rejected by EPA because it does not capture the magnitude of the impacts, but, instead, simply dilutes the impact by spreading it across the Class I area. Under this approach, for example, the 4.1

dv (98th percentile) impact at Capitol Reef NP becomes a 0.4 dv impact averaged across Capitol Reef NP. In effect, UT DAQ has artificially diluted an impact that would be clearly perceptible to an impact that is considered imperceptible.

Response: The commenter did not provide references to EPA actions that rejected the use of average visibility values. The alternative to BART was not evaluated through a 5-factor analysis as would occur for a case-by-case BART determination under 40 CFR 51.308(e)(1) using the methodology described in Appendix Y of the BART Guidelines. DAQ used a weight of evidence approach, as allowed under 40 CFR 51.308(e)(2). The weight of evidence approach allows a broader analysis that is more appropriate for this circumstance where different pollutants that affect visibility at different times of year are compared. EPA further described the weight of evidence approach in the preamble to the 2006 revisions to the regional haze rule. "Weight of evidence demonstrations attempt to make use of all available information and data which can inform a decision while recognizing the relative strengths and weaknesses of that information in arriving at the soundest decision possible." (71 FR 60622)

The average impact is only one metric evaluated as part of the broader weight of evidence evaluation. The average deciview metric shows the benefit that will be achieved day in and day out in the Class I areas. This information is valuable as part of the overall weight of evidence because reductions in SO_2 and reductions in NOx improve visibility at different times of year and at different Class I areas. Ammonium sulfate is an issue year round while ammonium nitrate is primarily an issue in the winter. This means that the benefits of SO_2 reductions are more apparent when looking at longer averaging periods while the benefits of NOx reductions are more apparent when looking at the worst days. As described in the response to comment 46, additional text has been added to better describe how the average values were calculated and why they are important.

53. [NPS] Table 7 presents 90th percentile values which have been consistently rejected by EPA. For example, this approach converts a perceptible 1.3 dv (98th percentile) impact at Mesa Verde NP to an imperceptible 0.4 dv impact.

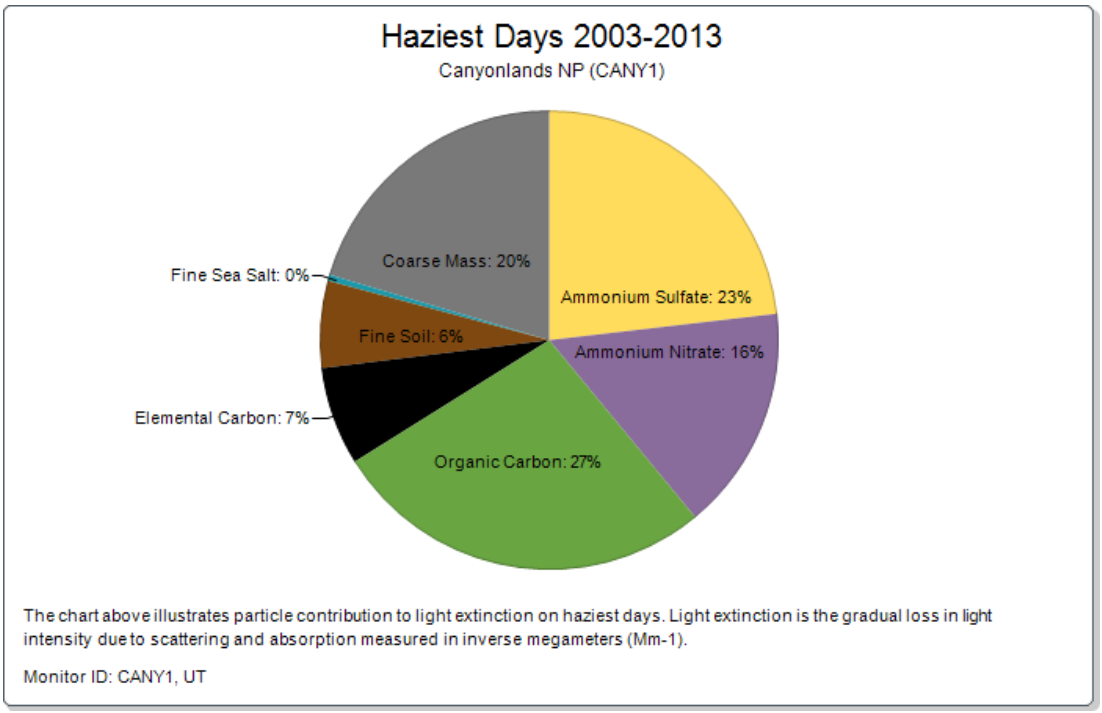
Response: The 90th percentile is only one metric evaluated as part of the broader weight of evidence evaluation. The following text has been added to the document to better describe the usefulness of this metric. "This metric shows that even on higher impact days the benefits of the alternative are comparable to the most stringent NOx scenario. Ammonium sulfate affects visibility year round and also impacts visibility on days with greater impairment. The alternative scenario that contains greater SO_2 reductions achieves comparable results to the most stringent NOx scenario that contains greater NOx reductions on these impaired days.

54. [NPS] The most appropriate comparative statistical metrics consistently used by other states and EPA are the 98th percentile values presented in Tables 8 & 9, both of which show that the cumulative impact of UT DAQ's BART Alternative does not make more reasonable progress than the Most Stringent NO_x scenario. Furthermore, Table 8 shows that UT DAQ's BART Alternative fails this test at seven of nine Class I areas, while Table 9 shows failure at five of nine Class I areas. Thus the UT DAQ BART Alternative does not meet current regulatory "clear weight of evidence" requirements.

Response: The 98th percentile value is only one metric evaluated as part of the broader weight of evidence evaluation. As the commenter noted, this metric shows greater visibility improvement under the most stringent NOx scenario. The weight of evidence analysis is not based on just one metric and instead takes a broader approach to consider multiple metrics, monitoring results, and other factors. The 98th percentile modeled values show greater improvement under the most stringent NOx scenario, while other metrics such as the number of days improved, annual average, and 90th percentile modeled values show greater improvement under the alternative scenario.

The ammonium nitrate impacts are greatest in the winter and therefore the 98th percentile metric is weighted towards wintertime impacts. The Staff Review notes that there is greater uncertainty regarding the effect of NOx reductions on wintertime nitrate values because past emission reductions have not resulted in corresponding reductions in monitored nitrate values during the winter months. Further research is needed to better understand the visibility benefits of NOx reductions and DAQ anticipates that regional modeling for the next RH SIP that is due in 2018 will improve our understanding of this important issue. DAQ has greater confidence in the visibility improvement due to reductions of SO_2 because past reductions have resulted in corresponding reductions in monitored sulfate values throughout the year. The following language has been added to the Staff Review to further explain that the highest impact modeled days do not necessarily correspond to the highest impact monitored days because the model does not include other significant sources of visibility impairing pollutants.

The CALPUFF modeling that is summarized in this document does not include impacts from other significant sources such as wildfire, windblown dust, other stationary sources, and mobile sources. As can be seen in Figure 9, organic carbon (fire) and coarse mass (windblown dust) are greater contributors to haze than ammonium nitrate on the 20% worst days. So, the modeled results do not give a complete picture of the visibility improvements that will be seen by visitors to Class I areas, especially on the worst days that are impacted by other emission sources.



55. [Conservation Organizations] In the table, "98th Percentile in Highest Year", the delta-dV for Capitol Reef under the Most Stringent NOx scenario was incorrectly listed as 3.39. The correct value should be 4.12. The average delta-dV for all Class I areas was also therefore incorrectly computed for this scenario to be 2.61; the correct average for all Class I areas should be 2.70.

Response: The table has been corrected.

56. [Conservation Organizations] In the final table in Appendix D (showing the 98th percentile delta-dV for all three modeled scenarios for each year and at each Class I area), the modeled 2003 average delta-dV for all Class I areas under the Baseline scenario was incorrectly computed to be 4.156; the correct "Class I Average" delta-dV for 2003 Baseline should be 3.823. The visibility improvements (relative to Baseline) for the Alternative and Most Stringent NOx scenarios, which are computed as the difference between those scenarios and the Baseline were also therefore incorrectly computed in the table.

Response: The table has been corrected.

Monitoring

57. [NPS] UT DAQ argues that past emission reductions at the four BART EGUs have not resulted in corresponding reductions in monitored nitrate values at Canyonlands NP. Figure 6 in the TSD illustrates that ammonium sulfate levels have decreased in winter months, while ammonium nitrate is trending up in winter months. These nitrate trends do not necessarily lead to the conclusion that additional NO_X controls for the BART sources will not be effective. UT DAQ has not accounted for more ammonium being available to form ammonium nitrate in winter months due to decreases in ammonium sulfate, nor the increase in NO_X emissions (e.g. oil and gas development adjacent to Canyonlands NP) that offset emission reductions. Such an increase in emissions from this source category is all the more reason to obtain NO_X reductions wherever they are technically and economically feasible.

Response: DAQ agrees with the commenter that reductions in available SO_2 will free up ammonium to react with available NOx. This issue was discussed in the 5-factor analysis that was presented to the Board in October 2014. The shift from the formation of ammonium sulfate to ammonium nitrate is important because in ammonia-limited conditions emission reductions may not lead to visibility improvement because there is not enough ammonia available to react with all of the SO_2 and NOx available in the area. The ammonia levels in Southern Utah are very low in the winter as can be seen from ammonia monitoring data from Canyonlands and Navajo Lake in New Mexico. Ammonium nitrate levels are low most of the year and are only significant during the winter months, so if NOx emission reductions do not lead to visibility improvements in the winter, the overall effect may not be as great as expected. Ammonium sulfate, on the other hand, is an issue year round. For this reason, DAQ has more confidence that reductions in SO_2 will lead to real visibility improvement. The improvements due to NOx reductions are more uncertain. To better explain the issue, information from the proposed 5-factor analysis has been added to the Staff Review in response to this comment.

DAQ also considered the effect of changes in NOx emission from other sources in the region as a possible explanation for the increase in ammonium nitrate levels. A discussion about regional NOx emissions was included in the 5-factor analysis that was presented to the Board in October 2014 and has been added to the Staff Review in response to this comment. NOx emissions are decreasing significantly at other EGUs in the area. Mobile source NOx emissions are decreasing nationwide due to implementation of the Tier 1 and Tier 2 emission standards and should continue to be reduced through the implementation of Tier 3 emission standards. Oil and gas emissions are increasing in some areas, and this was considered as a possible impact, but the overall scale of the emission increase is small when compared to the decrease in emissions from EGUs in the region.

The largest increase in NOx emissions is occurring in the Uinta Basin, located to the north of Utah's Class I areas. It is worth noting that during the winter months when ammonium nitrate levels are increasing at Canyonlands, a significant portion of the Uinta Basin emissions are trapped under a tight inversion layer throughout much of the winter. Extensive research through the multi -year Uinta Basin Ozone Study (UBOS) has indicated that there is little exchange between the air below and above the inversion layer when an inversion is in place. The emissions are transported out of the Uinta Basin during

significant storm events that break up the inversion. These storm events affect the entire region and are unlikely to transport significant emissions to nearby Class I areas. DAQ is currently working with EPA, the Ute Tribe, and producers in the Uinta Basin to improve the oil and gas inventory.

The fact that ammonium nitrate levels are decreasing during most of the year, but are increasing during the winter is the best indication that the increase in ammonium nitrate is not due to changes in emissions because the emission changes are not seasonal. If emissions were increasing the effect should be seen year round.

58. [EPA] We understand that Utah may consider additional ammonia monitoring information and conduct further analysis. As that information and analysis are not available, we have not included comments on these issues; and we welcome the opportunity to provide comments in the future.

Response: DAQ has added additional information regarding the potential effects of ammonia limiting conditions to the Staff Review in response to comment 57. The purpose of the discussion of ammonia is to explain why DAQ has more confidence in the effect of SO_2 reductions. Regional photochemical modeling for the next regional haze SIP that is due in 2018 will provide a more in depth opportunity to examine the effect of NOx reductions during the winter. DAQ looks forward to working with EPA in the future to better understand this issue.

Alternative to BART – Timing of Reductions

59. [PacifiCorp] Utah properly included in the SIP Revision a requirement that the emissions reductions associated with the Alternative Measure "take place during the period of the long-term strategy for regional haze." Noting that the end of the period of the long-term strategy will take place in 2018, Utah concludes that the Alternative Measure "will be fully implemented prior to 2018" in satisfaction of this requirement. By including the Alternative Program requirements in SIP Section IX, Parts H.21 and H.22, Utah also assured that enforceable emission limits, administrative and technical procedures for implementing the Alternative Measure, and rules for accounting and monitoring emissions, and procedures for enforcement are included in the SIP Revision.

Response: Comment noted.

60. [PacifiCorp] Because the applicable rule requires that emission reductions associated with the Alternative Measure "take place during the period of the long-term strategy for regional haze" which does not end until 2018, PacifiCorp questions whether the August 15, 2015 closure deadline proposed by Utah is appropriate. Instead, PacifiCorp believes that it is more appropriate for Utah to require closure of the Carbon Plant for purposes of the Revised SIP on a date that is no later than the end of "the period of the long-term strategy for regional haze." This approach is consistent with PacifiCorp's December 22, 2014 comment letter (pages 6 – 7).

Response: DAQ has carefully considered when to make the closure of the Carbon Plant enforceable in light of the possibility that the Supreme Court could overturn or stay the MATS rule later this year. The Carbon Plant was closed on April 14, 2015 due to the difficulty and expense of complying with the MATS rule, but the plant could legally be reopened under its existing operating permit if the MATS rule were overturned. DAQ recommended making the closure effective under the RH SIP on August 15, 2015. This date was chosen because it was shortly after the date when the rule would become effective and the requirement could not be retroactive under Utah's rules. After considering PacifiCorp's comment, DAQ still recommends making the closure enforceable on August 15, 2015. The alternative measures were determined to provide greater reasonable progress than BART in part based on the early reductions that have been achieved under Utah's RH SIP. No change has been made to the proposal as a result of this comment.

Alternative to BART – Emission Reductions Surplus

61. [PacifiCorp] ***§51.308(e)(2)(vi)*** – Utah properly concluded that the NOx, SO2 and PM emissions reductions resulting from the retirement of Carbon Unit 1 and Unit 2, and the NOx emission reductions resulting from Hunter Unit 3, "are surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP." Because Utah determined the baseline date of the SIP to be 2002, and because the emission reductions associated with Carbon Unit 1 and Unit 2, and Hunter Unit 3, will occur after that date, the resulting emission reductions satisfy the surplus requirement. *See* Staff Review, Section X, pages 20 - 22. Utah's actions here are consistent with EPA's actions in other states. *See e.g.,* 79 Fed. Reg. at 33,441-42; 79 Fed. Reg. at 56,328.

Response: The references to EPA's actions in other states have been added as footnote in section X of the Staff Review.

62. [EPA] Include in the documentation whether or not reductions at the Carbon power plant are necessary for other states' Class I areas to meet their reasonable progress goals. That is, describe whether or not the WRAP assumed any reductions from Carbon for the 2018 preliminary reasonable progress inventory.

Response: The following information has been added to the Staff Review. The WRAP compiled regional inventories and completed regional modeling to support the development of RH SIPs in the western states. For all of these analyses, WRAP assumed continued operation of the Carbon plant. There were two projected inventories that were used by western states depending on when their SIPs were completed: PRP18a and PRP18b. These inventories assumed BART emission reductions from Hunter Units 1 and 2 and Huntington Units 1 and 2 based on the presumptive BART emission rate established in 40 CFR Part 51 Appendix Y, or actual emissions if lower. As can be seen in the following table, the NOx emissions from the Carbon plant (shown as reductions in the 4th column) are comparable to the WRAP projected inventories while the SO_2 emissions were about 1,200 tons higher than the WRAP projected inventory. However, current SO_2 emissions for the Hunter and Huntington Plant are lower than had been projected so when SO_2 emissions from all 3 plants are combined the total is less than had been

projected by the WRAP. The last column in the table shows that even if the emission reductions from the Carbon Plant and Hunter 3 are excluded, the NOx, SO_2, and PM_{10} emissions are lower than the WRAP projected inventories. The emission reductions from the Carbon Plant and Hunter 3 were not necessary for other states to meet their reasonable progress goals and therefore provide an added benefit for other states.

NOx	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	3,366	3,366	0	3,348	3,348
Hunter	15,331	16,503	11,446	1,908	13,354
Huntington	8,251	8,559	7,437		7,437
Total	26,947	28,429	18,883	5,256	24,139

SO_2	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	6,824	6,824	0	8,005	8,005
Hunter	6,109	6,350	4,091		4,091
Huntington	3,811	3,955	2,355		2,355
Total	16,744	17,129	6,446	8,005	14,451

PM_{10}	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	221	221	0	573	573
Hunter	1,049	1,049	460		460
Huntington	654	654	376		376
Total	1,924	1,924	836	573	1,409

Combined	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	10,411	10,411	0	11,926	11,926
Hunter	22,489	23,903	15,997	1,908	17,905
Huntington	12,716	13,169	10,168	0	10,168
Total	45,615	47,482	26,165	13,834	39,999

63. [EPA] We suggest further clarification regarding the state's intent regarding regional haze SIP shut down requirements for the Carbon power plant. We suggest such clarification in light of the discussion included in this section related to the challenges to the EPA's MATS rule before the Supreme Court.

Response: Section X of the staff review has been revised to include the following language: "An enforceable requirement is included in Section IX.H.22 of the SIP to make enforceable the permanent closure of the Carbon Plant by August 15, 2015. This provision will ensure that the substantial emission reductions that are relied upon as part of the alternative strategy will occur if the MATS rule is overturned or delayed."

64. [Conservation Organizations] It is worth noting that each SIPs long-term strategy already must account for emissions reductions expected to be achieved under other CAA requirements. EPA requires that, in developing reasonable progress goals, States should include all air quality improvements that will be achieved by other programs and activities under the CAA and any State air pollution control requirements. Therefore, any reasonable progress goal for a Class I area should reflect at least the rate of visibility improvement expected from the implementation of other 'applicable requirements' under the CAA during the period covered by the long-term strategy." 1999 Regional Haze Rule, 64 Fed. Reg. at 35,733. Allowing state to take credit for any such "applicable requirements" under the CAA in lieu of BART would effectively nullify any reasonable progress requirements over and above BART.

Response: BART is an independent requirement that must be evaluated according to the provisions established in the regional haze rule. The reasonable progress demonstration then accounts for the emission reductions due to BART as well as all other known emission reductions at the time of the demonstration. As described in the response to comment 62, the significant emission reductions due to Utah's 2008 BART determination were included in WRAP's PRP18 and PRP 18b inventories. As further described in the response to comment 62, the additional emission reductions due to the closure of the Carbon Plant and the installation of low-NOx burners on Hunter Unit 3 were not included in those inventories and will provide an even greater reduction in emissions.

The commenter also fails to consider the specific language in 40 CFR 51.308(e)(2)(iv) that allows measures adopted after the baseline date of the SIP (2002 for regional haze purposes) to be accounted for in the alternative measure.

65. [NPS, Conservation Organizations] In modeling the impacts of the "Most Stringent NOx" control scenario and the UT BART Alternative for NOx, UT DAQ had to include SO_2 and PM emissions in addition to NOx emissions from each facility to account for interactions among pollutants and total impacts. However, SO_2 reductions statewide are already being credited under Utah's 2003 Regional Haze SIP and the 40 CFR 51.309 SO_2 Milestone program. Crediting the same SO2 emissions under UT DAQ's NOx BART Alternative appears to be double-counting.

Response: As described in the Staff Review, Utah met the BART requirement for SO_2 as provided under 40 CFR 51.309(d)(4) through the establishment of SO_2 emission milestones with a backstop regulatory

trading program to ensure that SO_2 emissions in the three-state region of Utah, Wyoming, and New Mexico decreased substantially between 2003 and 2018. The final SO_2 milestone in 2018 was determined to provide greater reasonable progress than BART and the overall RH SIP was deemed to meet the reasonable progress requirements for Class I areas on the Colorado Plateau and for other Class I areas. The modeling supporting the RH SIP included regional SO_2 emissions based on the 2018 SO_2 milestone and also included NOx and PM emissions from the Carbon Plant. Actual emissions in the three-state region are calculated each year and compared to the milestones. The 2018 milestone was met seven years early in 2011, and SO_2 emissions have continued to decline. The most recent milestone report for 2013 demonstrates that SO_2 emissions are currently 26% (36,765 tons) lower than the 2018 milestone. For comparison purposes, SO_2 emissions from the Carbon Plant are around 8,000 tons SO_2.

Since 2013 (the most recent year evaluated in the milestone reports), DAQ has not issued any new approval orders that would significantly increase SO_2 emissions, and the Utah $PM_{2.5}$ SIP that was adopted in December 2013 requires further reductions in $PM_{2.5}$ precursors, including SO_2. DAQ is not aware of any significant new sources of SO_2 in Wyoming or New Mexico since 2013 that would increase SO_2 emissions and the commenter has not provided any information that would indicate that SO_2 emissions will increase between now and 2018. The Carbon Plant was fully operational in the years 2011-2013 when the 2018 milestone was initially achieved for those years. Therefore the SO_2 emission reductions from the closure of the Carbon Plant are surplus to what is needed to meet the 2018 milestone established in Utah's RH SIP.

66. [NPS, Conservation Organizations] DAQ modeled the Carbon Plant (which is not BART-eligible) in its Most Stringent NO_X scenario with no additional SO_2 controls despite the Mercury and Air Toxics Standard (MATS) that requires that the Carbon Plant meet an SO_2 limit of 0.2 lb/mmBtu (on a 30-day rolling average) by 4/15/2015 in lieu of controlling hydrochloric acid emissions. The Most Stringent NOx scenario and the BART Alternative should have been modeled as conforming to the MATS rule (using the same emissions for both scenarios). Modeling the current regulatory requirements would result in about 450 lb SO_2/hr emitted instead of the 3,000+ lb SO_2/hr modeled by UT DAQ in its Most Stringent NO_x scenario. Had UT DAQ modeled the allowable MATS SO_2 emissions for the Carbon Plant, for both scenarios to eliminate the double-crediting of SO_2 reductions, the impacts of its Most Stringent NO_x scenario would have been significantly lower, and the impacts of the BART Alternative would have been higher, thus shifting the weight of evidence even more in favor of the Most Stringent NO_x scenario and away from the UT DAQ NO_X BART Alternative.

Response: 40 CFR 51.308(e)(2)(iv) establishes the criteria for when emission reductions due to other requirements may be included as part of an alternative measure. This section requires "a demonstration that the emission reductions resulting from the alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP. " EPA discussed this issue when the alternative to BART requirements were proposed on August 1, 2005.

> "In some cases, emission reductions required to fulfill CAA requirements other than BART…may also apply to some or all BART eligible sources. In such a situation, a State may wish to determine whether the reductions thus obtained would result in greater reasonable progress than would the installation and operation of BART at all sources subject to BART which are covered by the program." One prominent example is CAIR. " CAIR would result in emission reductions surplus to CAA requirements as of the baseline date of the SIP defined as 2002 for regional haze purposes), we determined that it was appropriate to treat participation in this program as a potential means of satisfying BART requirements for that source sector." "EPA is…simply allowing States, at their option, to utilize the CAIR cap and trade program as a means to satisfy BART for affected EGUs. This same reasoning would be applicable whenever any requirement other than BART defines the emission reductions requited by the alternative program." (70 FR 44161)

The MATS rule was proposed on May 3, 2011 and finalized on December 21, 2011. Because this requirement occurred well after the 2002 base year for Utah's regional haze SIP, it is clearly surplus and may be credited as part of the alternative program in the same way that CAIR (and later CSPAR) was credited as an alternative to BART. The following language has been added to section X of the Staff Review to provide a more complete explanation: "To make a valid comparison that the "alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP" as required by 40 CFR 51.308(e)(2)(iv) the most stringent NOx scenario includes measures required before the baseline date of the SIP, but does not include later measures that are credited as part of the alternative scenario."

67. [Conservation Organizations] Utah admits that "PacifiCorp could choose to meet the MATS requirements through other measures…" than retirement. Thus, Utah admits that: 1) had PacifiCorp continued to operate the Carbon plant, it would have had to meet MATS requirements; and 2) PacifiCorp would have had to implement "other measures" (i.e., SO2 pollution controls) to continue operating. Despite these admissions, Utah's emission reduction analysis and visibility modeling use false and inflated SO2 emission data from 2012-2013 that ignores the admitted SO2 emission reductions that would have to occur for Carbon to operate into the future. As such, Utah's emission reduction analysis and visibility modeling is inaccurate, and has no basis in reality.

Response: As described in the response to comment 66, the MATS rule was adopted after the 2002 base year of Utah's RH SIP and therefore any emission reductions due to the implementation of the MATS rule are fully creditable under an alternative program. The discussion regarding PacifiCorp's options under the MATS rule addresses the need to make the closure of the Carbon Plant enforceable. The plant is currently closed, but there are no enforceable requirements under Utah's rules that would prevent PacifiCorp from reopening the plant. If the Carbon Plant were to reopen, then PacifiCorp would be required to fully comply with the MATS rule. If the MATS rule is overturned or delayed by the Supreme Court, PacifiCorp could reopen the plant without any changes to their operation. This is why the enforceable requirement has been added to Section IX, Part H.22. Language has been added to

section X.B of the Staff Review to further clarify the need for an enforceable requirement to permanently close the Carbon plant.

68. [Conservation Organizations] Utah incorrectly states that PacifiCorp was under no enforceable requirement to permanently close and retire the Carbon units. This statement is factually inaccurate for a number of reasons. First, the requirement to permanently retire Carbon Units 1 and 2 by April 15, 2015 was made enforceable through public service commission filings in several states. The commenter cites several PSC filings. Accordingly, the Carbon retirement (and corresponding emission reductions) is currently enforceable and statements to the contrary in Utah's latest RH SIP are factually and legally erroneous.

Response: PSC filings and orders address cost recovery and are not enforceable under Utah air quality statutes. The closure of the Carbon Plant must be made enforceable through Utah's SIP and through the rescission of the operating permit for the facility before Utah can rely on this closure as part of the alternative program. The enforceable requirement is therefore retained in Section IX.H.22 of the SIP.

69. [Conservation Organizations] Even if PacifiCorp had elected to operate the Carbon units in violation of MATS, the CAA authorizes either EPA or citizens to seek injunctive relief requiring closure of the units or compliance with the MATS emission limits. Thus, Utah's assumption that these units could have defied the law in perpetuity is arbitrary and capricious.

Response: The process outlined by the commenter could occur but has not yet occurred. DAQ could not rely on the possibility of a citizen challenge that would potentially be successful at some uncertain date in the future. The closure of the Carbon Plant must be made enforceable through Utah's SIP and through the rescission of the operating permit for the facility before Utah can rely on this closure as part of the alternative program. The enforceable requirement is therefore retained in Section IX.H.22 of the SIP.

70. [PacifiCorp] Hunter Unit 3 installed LNB/OFA in 2008. Although the 1990 Clean Air Act Amendments include provisions for reducing NO_x emissions, no specific actions were required at Hunter Unit 3. Under the 1990 CAA, Hunter Unit 3 was classified as a "Phase II" unit and required to meet an annual 0.46 lb/MMBtu emission rate by 2000.

Response: DAQ agrees. The Phase II emission limit of 0.46 lb/MMBtu was an enforceable requirement in the approval order for Hunter Unit 3 prior to the modification in 2008 that allowed installation of low NOx burners with the current NOx emission limit of 0.26 lb/MMBtu heat input for a 30-day rolling average.

71. [Conservation Organizations] Similar to the Carbon plant, Utah's projected emission reduction analysis assumes, under the Most Stringent NOx scenario, that Hunter Unit 3 could emit NOx emissions without operating its 2008 low-NOx burners and the corresponding permitted emission limit. There is no evidence supporting Utah's assumption that PacifiCorp plans to, or could, remove its 2008 LNBs and defy the corresponding already-permitted NOx emission limit. Accordingly, the assumptions used in Utah's projected emission reduction analysis have no factual support in the

administrative record, are arbitrary, capricious, and contrary to law. In fact, when the proper post-2008 Hunter 3 NOx emission reductions are included in the "Most Stringent NOx" scenario, it becomes clear that Utah's BART alternative does not result in greater emission reductions, or greater reasonable progress, than would installation of SCR BART controls on the Hunter and Huntington BART units.

Response: The commenter is incorrect. DAQ does not assume that Hunter 3 could operate in violation of its permit. DAQ does account for creditable emission reductions as allowed by the regional haze rule. 40 CFR 51.308(e)(2)(iv) establishes the criteria for when emission reductions due to other requirements may be included as part of an alternative measure. This section requires "a demonstration that the emission reductions resulting from the alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP. " EPA discussed this issue when the alternative to BART requirements was proposed on August 1, 2005.

> "In some cases, emission reductions required to fulfill CAA requirements other than BART…may also apply to some or all BART eligible sources. In such a situation, a State may wish to determine whether the reductions thus obtained would result in greater reasonable progress than would the installation and operation of BART at all sources subject to BART which are covered by the program. " One prominent example is CAIR. " CAIR would result in emission reductions surplus to CAA requirements as of the baseline date of the SIP defined as 2002 for regional haze purposes), we determined that it was appropriate to treat participation in this program as a potential means of satisfying BART requirements for that source sector." "EPA is…simply allowing States, at their option, to utilize the CAIR cap and trade program as a means to satisfy BART for affected EGUs. This same reasoning would be applicable whenever any requirement other than BART defines the emission reductions required by the alternative program." (70 FR 44161)

The installation of low-NOx burners with an emission limit of 0.26lb/MMBtu heat input for a 30-day rolling average was included in the approval order for Hunter Unit 3 in 2008. Because this requirement occurred well after the 2002 base year for Utah's regional haze SIP it is clearly surplus and may be credited as part of the alternative program in the same way that CAIR (and later CSPAR) was credited as an alternative to BART. The following language has been added to section X of the Staff Review to provide a more complete explanation. "To make a valid comparison that the "alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP" as required by 40 CFR 51.308(e)(2)(iv) the Most Stringent NOx scenario includes measures required before the baseline date of the SIP, but does not include later measures that are credited as part of the alternative scenario." Further clarifying language stating that the emission reductions at Hunter Unit 3 are clearly surplus under 40 CFR 51.308(e)(2)(vi) has been added to Section X.C of the Staff Review.

Cost

72. [PacifiCorp] PacifiCorp also notes that the Alternative Measure not only produces greater reasonable progress, including lower emissions and improved visibility, but it does so at a capital cost savings to PacifiCorp and its customers of over $700 million as compared to the most stringent NO_x technology and limits. The importance of this cannot be overstated. In other words, the Alternative Measure achieves better visibility improvements than would be achieved by requiring SCR as BART at the Units, and at a significantly lower cost. This presents a classic "win/win" scenario – visibility proponents win because the Alternative Measure results in greater reasonable progress and PacifiCorp customers win because that greater reasonable progress is achieved at a much lower price compared to SCR.

Response: The following discussion of the cost savings has been added to the weight of evidence discussion in the Staff Review in response to this comment.

PacifiCorp noted in their comments on the proposed SIP revision that the Alternative Measure not only produces greater reasonable progress, including lower emissions and improved visibility, but it does so at a significant capital cost savings to PacifiCorp and its customers as compared to the most stringent NO_x technology and limits. While DAQ has not officially determined the cost of installing SCR on the four units, it is clear that it would be a significant cost. On the other hand, the Carbon Plant has already been closed due to the high cost of complying with the MATS rule. The costs to Utah rate payers (and those in other states served by PacifiCorp) to replace the power generated by the Carbon Plant have already occurred; there will be no additional cost to achieve the co-benefit of visibility improvement. In other words, the Alternative Measure achieves better visibility improvements than would be achieved by requiring SCR as BART at the four EGUs, and at a significantly lower cost. This presents a classic "win/win" scenario –the Alternative Measure results in greater reasonable progress and that greater reasonable progress is achieved at a much lower price compared to SCR. Cost is one of the factors listed in section 169A(g)(2) that should be considered when determining BART.

73. [PacifiCorp] Some of the information contained in PacifiCorp's July 12, 2012 letter to EPA regarding system-wide impacts, which also is included among the Technical Support documents, is no longer current, and as such PacifiCorp requests that the Division not rely on that letter for purposes of the SIP Revision.

Response: The July 12, 2012 letter has been removed from the TSD as requested. DAQ notes, however, that the broader issue of system-wide impacts is still valid and would be a consideration in a 5-factor analysis. Because Utah has chosen to use an alternative to BART approach under 40 CFR 51.308(e)(2), the 5-factor analysis that was proposed in October 2014 was not finalized.

74. [Individual] Rocky Mountain Power complains that it would cost $170M/unit to upgrade these two plants and that the upgrades would result in "substantial expense to consumers". Not true! The $340M cost to upgrade those two plants would result in a one-time charge to each of RMP's 1.7M customers of only $200! If spread over time - 10 years, for example - the charges would be insignificant and unnoticed by RMP's ratepayers.

Response: Because Utah has chosen to use an alternative to BART approach under 40 CFR 51.308(e)(2) the 5-factor analysis that was proposed in October 2014 was not finalized. Therefore a final cost was not determined. However, while there may be different estimates of the final cost of installing SCR, all of the estimates show that there is a significant cost to install these controls. As noted by PacifiCorp in comment 72, the alternative provides a win/win situation because the benefits are achieved without the additional expense of post-combustion controls. The costs to Utah rate payers and those in other states served by PacifiCorp to replace the power generated by the Carbon Plant have already occurred; there will be no additional cost to achieve the co-benefit of visibility improvement.

75. [NPS] In its August 2014 BART update submittal, PacifiCorp noted that SCR can achieve 0.05 lb/mmBtu on an annual average basis, but used 0.07 lb/mmBtu in its cost-effectiveness calculations; underestimation of the potential emission reductions biases the cost-effectiveness analysis against SCR. UT DAQ assumed that these EGUs would meet 0.05 lb/mmBtu on an annual average.

Response: Because Utah has chosen to use an alternative to BART approach under 40 CFR 51.308(e)(2) the 5-factor analysis that was proposed in October 2014 was not finalized. Therefore a final cost/ton of NOx reduced was not finalized. This comment is not relevant to the current proposal.

76. [NPS] The commenter disagreed with the cost assumptions that PacifiCorp provided regarding the cost of installing SCR. The commenter cited a number of instances in the analysis where they believed the costs were overestimated. The commenter estimated the average cost-effectiveness of LNB/OFA + SCR = $2,800 - $3,000/ton of NO_x removed, and the incremental cost of adding SCR to LNB/OFA = $4,300 - $5,300/ton. These estimates are in the range of cost-effectiveness values accepted by many states and by EPA. BART is not necessarily the most cost-effective solution. Instead, it represents a broad consideration of technical, economic, energy, and environmental (including visibility improvement) factors. It appears that $4,000 - $8,000/ton represents the typical range of cost/ton thresholds. In this context, both the PacifiCorp and NPS cost estimates for SCR appear cost-effective.

Response: Because Utah has chosen to use an alternative to BART approach under 40 CFR 51.308(e)(2) the 5-factor analysis that was proposed in October 2014 was not finalized. Therefore a final cost/ton of NOx reduced was not finalized. However, while there may be different estimates of the final cost of installing SCR, all of the estimates show that there is a significant cost to install these controls. As noted by PacifiCorp in comment 72, the alternative provides a win/win situation because the benefits are achieved without the additional expense of post-combustion controls. The costs to Utah rate payers and those in other states served by PacifiCorp to replace the power generated by the Carbon Plant have already occurred; there will be no additional cost to achieve the co-benefit of visibility improvement.

77. [Conservation Organizations] Our previous comment letter provided cost estimates for Hunter Units 1 and 2 and Huntington Units 1 and 2 demonstrating that SCR on these units would be very cost effective. The control costs are also significantly lower than those EPA has found reasonable in other states. Specifically, the cost effectiveness of SCR on these units is in the range of $2,222-2,276/ton of NOx removed[5]. The cost effectiveness for SCR on these units is much less than at other coal units in the west where EPA has required SCR as BART.

Response: Because Utah has chosen to use an alternative to BART approach under 40 CFR 51.308(e)(2) the 5-factor analysis that was proposed in October 2014 was not finalized. Therefore a final cost/ton of NOx reduced was not finalized. However, while there may be different estimates of the final cost of installing SCR, all of the estimates show that there is a significant cost to install these controls. As noted by PacifiCorp in comment 72, the alternative provides a win/win situation because the benefits are achieved without the additional expense of post-combustion controls. The costs to Utah rate payers and those in other states served by PacifiCorp to replace the power generated by the Carbon Plant have already occurred; there will be no additional cost to achieve the co-benefit of visibility improvement.

Section XX.D.6 SIP Language

78. [PacifiCorp] PacifiCorp suggests that Utah remove the word "existing" from SIP Section XX.D.6.c because the "existing" technology referred to by Utah no longer exists. This is because, as noted in the Staff Review at page 4, the first generation LNB technology already has been replaced with Alstom TSF 2000TTM LNBs, including the installation of two elevations of separated overfire air, which results in even greater NO_x emission reductions.

Response: The word existing has been removed.

79. [EPA] Section 6.d., BART Summary, p. 25-26: BART emission "rates" should be referred to as emission "limits" in the discussion preceding Table 5 and in the Table 5 title. Also the averaging period for each emission limit included in Table 5 should be specified. In Section 6.e., BART emission "rates" should be referred to as emission "limits."

Response: The correction has been made as requested.

80. [EPA] The discussion in Section 6.d. and the information in Table 5 includes information about the four Hunter and Huntington units meeting the presumptive limits; and since it is not germane to SIP analysis and demonstration, we recommend removing it.

Response: DAQ disagrees with the commenter. The fact that the four EGUs meet the presumptive limits for NOx established by EPA in 40 CFR Part 51, Appendix Y, independently of the alternative measures is important because the alternative was not intended to exempt these units from any emission reduction requirements, as implied by other commenters. Instead, the alternative achieves

[5] The cost estimates included in the commenter's previous letter regarding the October 2014 proposal were average costs that include the installation of low-NOx burners with overfire air that has already been installed on the four EGUs rather than the incremental cost to install SCR.

the presumptive emission rate and also achieves greater reasonable progress than the most stringent NOx technology. DAQ believes that meeting both requirements strengthens the alternative approach for both NOx and SO_2.

Part H Enforceable Limitations

81. [PacifiCorp, EPA] The NOx emission limit associated with Hunter Unit 3 appears to have been inadvertently left out of SIP Section IX.H.22.a.

Response: DAQ agrees with this comment. The missing NOx emission limit will be included in SIP Section IX.H.22.a. For reference, this limit is as follows:

iii NOx Limitation on Unit #3

A. Emissions of NOx shall not exceed 0.34 lb/MMBtu heat input for a 30-day rolling average.
B. Measuring of all NOx emissions shall be performed by CEM.

82. [EPA] H.21.f.i.A., B., and C., p. 2: Please replace "or other EPA-approved methods acceptable to the Director" in all three places with "or the most recent version of the EPA-approved test method if approved by the Director."

Response: DAQ agrees with this comment with reservations. The original intent of the language quoted by the commenter was to allow for the use of an alternative testing method in the event that such proved necessary to obtain more accurate emissions data for a particular pollutant. For example, the current reference method for determination of back-half condensable particulate emissions is Method 202. This method cannot be used when a source has a "wet stack" or one is which water droplets are present. The fallback testing method is typically to use reference Method 5 and estimate condensable emissions based on emission factors. Yet this methodology comes with an obvious loss of accuracy.

Although DAQ does not anticipate or expect that any alternatives to the testing methods listed in SIP Section IX.H.21 will be required for the limited number of sources listed in Section IX.H.22, the original intent remains the same. While it could be argued that a larger list of alternative test methods could be included in Section IX.H.21, DAQ cannot anticipate every possible alternative or new testing methodology that might be developed over the lifetime of the SIP. Through the removal of the word "other" in its suggested language, the commenter does not allow for alternatives to the existing choices listed in IX.H.21. Instead, the suggested language only allows for the most recently approved version of those same test methods already listed in Section IX.H.21.

However, given that the sources listed in Section IX.H.22 of the SIP represent only one type of source (coal-fired boilers), all owned and operated by a single entity; and given that these sources have existed for a number of years, with a long history of established emission testing using those methods already listed in Section IX.H.21 – DAQ agrees to the language change requested by the commenter. Paragraphs H.21.f.i.A., B., and C. will all be changed as follows:

f. Stack Testing:

i. As applicable, stack testing to show compliance with the emission limitations for the sources in Subsection IX.H.22 shall be performed in accordance with the following:

A. Sample Location: The testing point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or the most recent version of the EPA-approved test method if approved by the Director.

B. Volumetric Flow Rate: 40 CFR 60, Appendix A, Method 2 or the most recent version of the EPA-approved test method if approved by the Director.

C. Particulate (PM): 40 CFR 60, Appendix A, Method 5B, or the most recent version of the EPA-approved test method if approved by the Director. A test shall consist of three runs, with each run at least 120 minutes in duration and each run collecting a minimum sample of 60 dry standard cubic feet. The back half condensables shall also be tested using Method 202. The back half condensables shall not be used for compliance demonstration but shall be used for inventory purposes.

83. [EPA] To ensure clarity and enforceability, we suggest revising H.22.c.i.A. to state "The owner/operator shall permanently cease operation of Carbon…".

Response: DAQ agrees with this comment. The addition of the suggested language adds clarification that the Carbon plant is being permanently shut down. SIP Section IX.H.22.c.i.A shall be revised to say the following:

c. PacifiCorp Carbon

i. Conditions on Units #1 and #2

A. The owner/operator shall permanently close and cease operation of Carbon Units #1 and #2 by August 15, 2015.

84. [EPA] Please revise H.22.c.i.B. to clearly describe the procedure that will be followed. The procedure should indicate that the owner/operator shall request recission of the Operating Permit by a date specified in the SIP and that the state will rescind the permit by no later than a reasonable date, which is also specified in the SIP, after the request is received.

Response: DAQ agrees with this comment. The commenter suggests revising SIP Section IX.H.22.c.i.B to describe the procedure that will be followed in the rescission of the Operating Permit. Specifically, the suggestion is that a timeline be established whereby the owner/operator shall request rescission[sic] by a specific listed date, and that the state shall then rescind the permit by a second listed date.

This comment is directly related to comment #85, which requested that the owner/operator notify the state when it ceased operations at the Carbon Plant. In keeping with the dates already outlined in the existing language of SIP Section IX.H.22.c.i.A. and B. the following changes will be made:

c. PacifiCorp Carbon

i. Conditions on Units #1 and #2

A. The owner/operator shall permanently close and cease operation of Carbon units #1 and #2 by August 15, 2015. The owner/operator shall notify the Director of the permanent closure of the Carbon Plant by no later than September 15, 2015.

B. The owner/operator shall request a rescission of Operating Permit # 700002004 and Approval Order DAQE-AN0100810005-08 by no later than September 15, 2015.

C. *Operating Permit # 700002004 and Approval Order DAQE-AN0100810005-08 shall be rescinded by no later than December 15, 2015.*

85. [EPA] Specify whether the owner/operator [of Carbon] is required to notify the state when they cease operations.

Response: DAQ agrees with this comment. This comment requests that the owner/operator be required to notify the state when it ceases operations at the Carbon Plant. Please see the response to comment #84 for additional details, as comment #84 also addresses the same change to Section H.22.c.i.B.

86. [EPA] It appears that the Carbon power plant has at least one AO DAQE-01000810005-08, which is referenced in the Title V permit on page 3. Provisions should be added to the SIP that specify that all approval orders for the Carbon power plant must also be rescinded, including the procedures and associated deadlines.

Response: DAQ agrees with this comment, with one correction. The commenter notes that the Carbon Power Plant has one active AO, which must also be rescinded as part of the plant closure process. This AO is referenced in the current Operating Permit for the Carbon Plant. However, the referenced AO is misidentified by the Operating Permit. The correct AO identifier is DAQE-AN0100810005-08. As part of the plant closure and permit rescission process, the AO will be included with the Operating Permit in the revised language of SIP Section IX.H.22.c.i. This revised language is included below:

c. PacifiCorp Carbon

i. Conditions on Units #1 and #2

A. The owner/operator shall permanently close and cease operation of Carbon units #1 and #2 by August 15, 2015. The owner/operator shall notify the Director of the permanent closure of the Carbon Plant by no later than September 15, 2015.

B. *The owner/operator shall request a rescission of Operating Permit # 700002004 and Approval Order DAQE-AN0100810005-08 by no later than September 15, 2015.*

C. *Operating Permit # 700002004 and Approval Order DAQE-AN0100810005-08 shall be rescinded by no later than December 15, 2015.*

Utah State Implementation Plan

Section XX

Regional Haze

Addressing Regional Haze Visibility Protection for the Mandatory Federal Class I Areas Required Under 40 CFR 51.309

Adopted by the Air Quality Board
[~~April 6, 2011~~]June 3, 2015

1

6. Best Available [~~Control~~]Retrofit Technology (BART) Assessment for NO_x and PM.

a. Regional Haze Rule BART Requirements

Pursuant to 40 CFR 51.309(d)(4)(vii), certain major stationary sources are required to evaluate, install, operate and maintain BART technology or an approved BART alternative for NO_x and PM emissions. [~~BART requirements can be addressed through a case-by-case review under 40 CFR 51.308(e)(1) or through an alternative program under 40 CFR 51.308(e)(2).~~]The State of Utah has chosen to evaluate BART for [~~NO_x and~~]PM under the case-by-case provisions of 40 CFR 51.308(e)(1) and BART for NOx through alternative measures under 40 CFR 51.308(e)(2). BART for SO_2 is addressed through an alternative program under 40 CFR 51.309 that is described in Part E of this plan.

b. BART for Particulate Matter

EPA issued guidelines for case-by-case BART determinations on July 6, 2005 that are codified in Appendix Y to 40 CFR Part 51. These guidelines establish a three step process.

- States identify sources which meet the definition of BART eligible
- States determine which BART eligible sources are "subject to BART"
- For each source subject to BART States identify the appropriate control technology.

[~~The determination of NO_x limits for fossil-fuel fired power plants having a total generating capacity greater than 750 megawatts must be made pursuant to the guidelines in 40 CFR 51 Appendix Y, Section E.5.~~ [1]]

[~~CFR Part 51 Appendix Y Guidelines for BART Determinations under the Regional Haze Rule (70 FR 39158)~~]

(1) BART-Eligible Sources.

BART-eligible sources are those sources that fall within one of 26 specific source categories, were built during the 15-year window of time from 1962 to 1977, and have potential emissions of at least 250 tons per year of any visibility impairing air pollutant (40 CFR 51.301). Pursuant to 40 CFR 51.308 (e)(1)(i) a State is required to list all BART-eligible sources within the State.

Four BART-eligible electric generating units have been identified in the State of Utah: PacifiCorp's Hunter Units 1 and 2 and Huntington Units 1 and 2. The units are located at fossil-fuel fired steam electric plants of more than 250 million Btu per hour heat input, one of the 26 specific BART source categories. The units have potential emissions greater than 250 tons per year of a visibility impairing pollutant. The units had commenced construction within the BART time frame of August 7, 1962 to August 7, 1977.

Table 3. BART-Eligible Sources in Utah.

SOURCE	UNIT ID	SERVICE DATE	NET DEPENDABLE CAPACITY (MWn)	BART CATEGORY	COAL TYPE	BOILER TYPE
Hunter	1	1978	430	Fossil fuel fired	Bituminous	Tangential
Hunter	2	1980	430	Fossil fuel fired	Bituminous	Tangential
Huntington	1	1977	430	Fossil fuel fired	Bituminous	Tangential
Huntington	2	1974	430	Fossil fuel fired	Bituminous	Tangential

Note: Hunter Unit 3 commenced construction after 1977 and is therefore not BART-eligible.

(2) Sources Subject to BART

Pursuant to 40 CFR 51.308(e)(1)(ii) the State is required to determine which BART-eligible sources are also "subject to BART." BART-eligible sources are subject to BART if they emit any air pollutant that may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area.

PacifiCorp's Hunter Units 1 and 2 and Huntington Units 1 and 2 were determined by the State to be subject to BART. The State utilized the technical modeling services of the WRAP Regional Modeling Center (RMC). Modeling was performed according to the RMC modeling protocols[2]. For the WRAP BART exemption screening modeling, the RMC followed the EPA BART Guidelines in 40 CFR 51, Appendix Y and the applicable CALMET/CALPUFF modeling guidance (e.g., IWAQM, 1998; FLAG, 2000; EPA,

[2] CALMET/CALPUFF Protocol for BART Exemption Screening Analysis for Class I Areas in the Western United States

2003c) including EPA's March 16, 2006 memorandum: "Dispersion Coefficients for Regulatory Air Quality Modeling in CALPUFF".[3]

The basic assumptions of the WRAP BART CALMET/CALPUFF modeling protocols are as follows:

- Three years of modeling (2001, 2002 and 2003) were used.
- Visibility impacts due to emissions of SO_2, NO_x and primary PM emissions were calculated
- Visibility was calculated using the Original IMPROVE equation and Annual Average Natural Conditions.
- The effective range of CALPUFF modeling was set at 300km from the sources
- For pre-control modeling, maximum 24-hour average actual emissions from the Acid Rain database were used in CALPUFF model.
- ~~[For post-control modeling, expected New Source Review (NSR) permitted limits were used in the CALPUFF model.~~]

According to 40 CFR Part 51, Appendix Y, a BART-eligible source is considered to "contribute" to visibility impairment in a Class I area if the modeled 98th percentile change in deciviews is equal to or greater than the "contribution threshold." The State of Utah evaluated BART exemption screening modeling results at the EPA-suggested contribution threshold of 0.5 deciviews within a 300 Km radius of the BART-eligible sources.[4] BART-eligible sources Hunter Unit 1, Hunter Unit 2, Huntington Unit 1, and Huntington Unit 2 had a modeled impact greater than the threshold level of 0.5 change in deciviews in at least one of the seven Class I areas within a 300 km radius of the sources.

[3] Atkinson and Fox, 2006

[4] WRAP RMC BART Modeling for Utah Draft #6 April 21, 2007

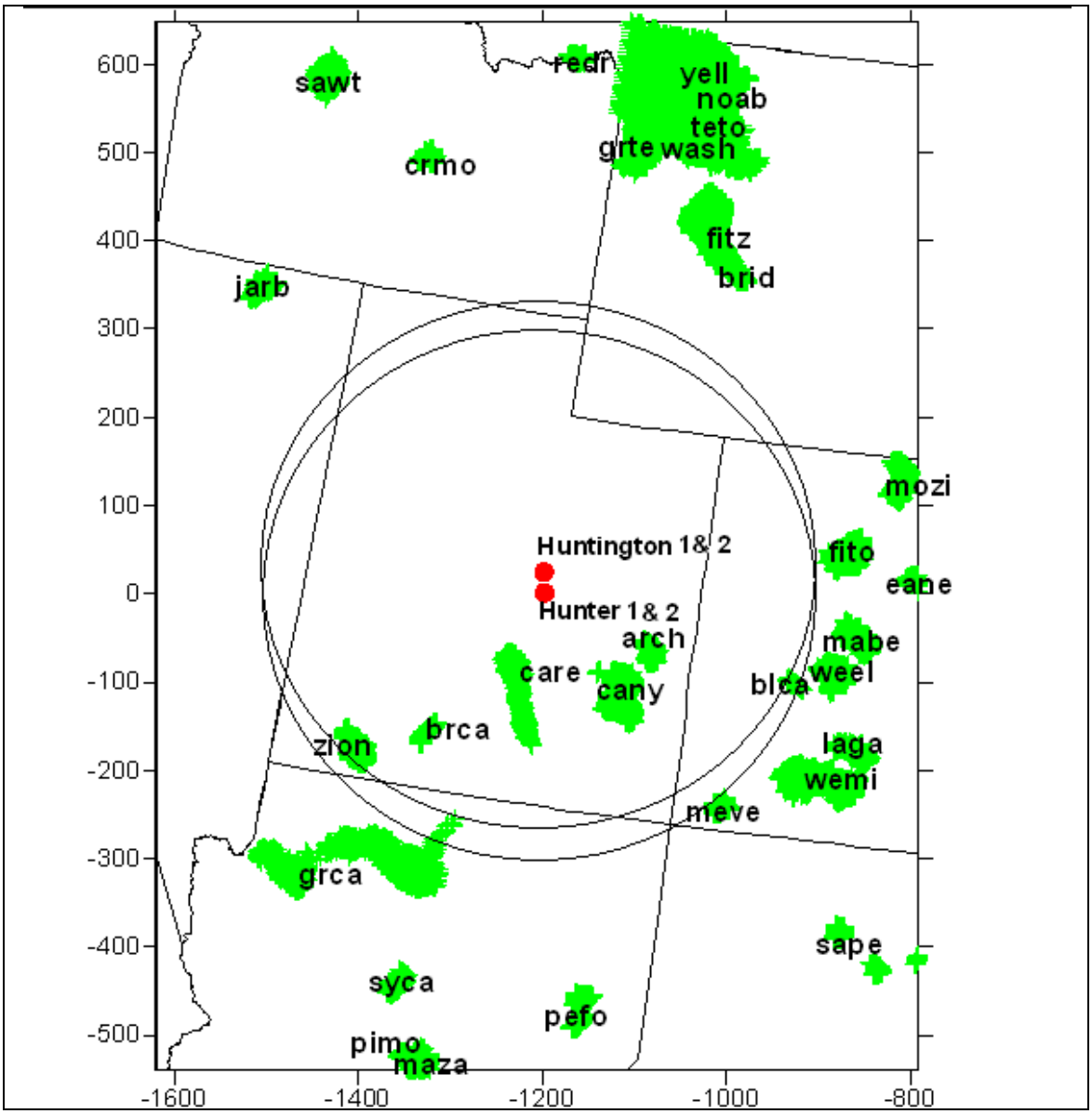


Figure 4. Relationship between Utah potential BART-eligible sources and Class I areas. Hunter Units 1 and 2 and Huntington Units 1 and 2 modeled separately at maximum 300 km.

Table 4. Subject to BART Modeling

	Subject to BART Modeling - 98th Percentile 3 year average Delta Deciview							
	Capitol Reef	Canyonlands	Arches	Bryce Canyon	Zion	Grand Canyon	Black Canyon Gunnison	Mesa Verde
Hunter 1	2.13	1.87	1.53	0.55	0.46	0.59	0.60	0.53
Hunter 2	1.89	1.62	1.36	0.47	0.41	0.52	0.53	0.47
Huntington 1	1.92	1.64	1.39	0.48	0.43	0.55	0.56	0.48
Huntington 2	2.43	2.26	1.89	.091	.078	.099	1.14	0.91

(3) BART [~~Determination~~]Analysis

As required under 51.308 (e)(1)(A) the determination of BART must be based on an analysis of the best system of continuous emission control technology available. In the analysis the State must take in to account five factors:

- Available technology
- Costs of compliance
- Energy and non-air quality environmental impacts
- Existing control equipment and the remaining useful life of the facility
- The degree of improvement in visibility reasonably anticipated to result from the use of such technology

In 2008, Utah determined that BART for PM was the replacement of existing electrostatic precipitators with pulse-jet fabric filter baghouses with a PM emission ~~rate~~ limit of 0.015 lb/MMBtu at all four EGUs that were subject-to-BART. PacifiCorp installed the control technology, as required, and significant emission reductions of PM were achieved. On December 12, 2012, the EPA disapproved Utah's BART determination for PM after concluding that Utah did not submit an adequate 5-factor analysis as required by the BART Rule. In June 2012, PacifiCorp provided a new 5-factor analysis for each of the four subject to BART EGUs. On August 4, 2014, PacifiCorp provided additional information to supplement that analysis. DAQ reviewed the analysis, and determined that the required controls for PM were the most stringent controls available.

(4) BART Determination for PM

Appendix Y allows a streamlined 5-factor analysis when the most stringent controls are already required.

> "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 as 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." (40 CFR Part 51, Appendix Y, Section D.9)

Because the most stringent technology is in place and the PM emission ~~rates~~ limits have been made enforceable in SIP Section IX Part H.21 and H.22, no further analysis is required.

c. BART for NOx

BART for NOx is addressed through alternative measures as provided under 40 CFR 51.308(e)(2). The following emission reduction measures are required, and are made enforceable through emission limits established in Section IX, Part H.21 and H.22 of the State Implementation Plan.

- PacifiCorp Hunter Units 1 and 2 and Huntington Units 1 and 2: The replacement of ~~existing,~~ first generation low-NO_x burners with Alstom TSF 2000TM low-NO_x firing system and installation of two elevations of separated overfire air with an emission limit of 0.26 lb/MMBtu.

- PacifiCorp Hunter Unit 3 (not subject-to-BART): The replacement of ~~existing,~~ first generation low-NOx burners with improved low-NOx burners with overfire air with an emission limit of 0.34 lb/MMBtu.

- PacifiCorp Carbon Units 1 and 2 (not subject-to-BART): PacifiCorp shall permanently retire Carbon Units 1 and 2 by August 15, 2015.

40 CFR 51.308(e)(2) requires an analysis to demonstrate that the alternative measures achieve greater reasonable progress than would be achieved through the installation and operation of BART. This demonstration is included in the TSD[5]. Combined emissions of NOx, SO_2, and PM_{10} will be 2,876 tons/yr lower under the alternative than the most-stringent BART scenario for NOx, visibility will improve on a greater number of days under the alternative, and the average deciview impairment and 90th percentile deciview impairment will be better under the alternative.

d. BART Summary

The BART emission ~~rates~~ limits for NOx and PM are summarized in Table 5. While Utah has chosen to meet the NOx BART requirement through alternative measures established in Section XX Part D.6 of the SIP, and the SO_2 BART requirement through an alternative to BART program established in Section XX Part E of the SIP, the enforceable emission ~~rates~~ limits for both NOx and SO_2 established in the approval orders and in the SIP for the four EGUs also meet the presumptive emission rates for both NOx and SO_2 established in Appendix Y independently of the alternative programs.

[5] Review of 2008 BART Determination and Recommended Alternative to BART for NOx, Utah Division of Air Quality, February 13, 2015.

Table 5. Emission ~~Rates~~ Limits for the Retrofitted Hunter and Huntington Units

Units	Utah Permitted ~~Rates~~Limits[6]			Presumptive BART ~~Limits~~Rates[7]	
	SO_2 lb/MMBtu	NOx lb/MMBtu	PM lb/MMBtu	SO_2 lb/MMBtu	NO_x lb/MMBtu
Hunter 1	0.12	0.26	0.015	0.15	0.28
Hunter 2	0.12	0.26	0.015	0.15	0.28
Hunter 3		0.34			
Huntington 1	0.12	0.26	0.015	0.15	0.28
Huntington 2	0.12	0.26	0.015	0.15	0.28

[~~PacifiCorp has installed or has received permits to install the following retrofit control equipment at the Hunter Unit 1, Hunter Unit 2, Huntington Unit 1, and Huntington Unit 2 fossil fuel fired electric generating units (EGU):~~]

~~Hunter Units 1 and 2:~~

- ~~Conversion of existing electrostatic precipitators to pulse jet fabric filter bag-houses~~
- ~~The replacement of existing, first generation low-NO_x burners with Alstom TSF 2000TM low-NO_x firing system and installation of two elevations of separated overfire air.~~
- ~~Upgrade of existing flue gas desulfurization system to > 90% sulfur dioxide removal.~~

~~Huntington Units 1 and 2:~~

- ~~Conversion of existing electrostatic precipitators to pulse jet fabric filter bag-houses~~
- ~~The replacement of existing, first generation low-NO_x burners with Alstom TSF 2000TM low-NO_x firing system and installation of two elevations of separated overfire air.~~
- ~~Installation of a new wet-lime, flue gas de-sulfurization system at Unit 2 (FGD).~~
- ~~Upgrade of existing flue gas desulfurization system to > 90% sulfur dioxide removal at Unit 1.~~]

[6] Utah Division of Air Quality Approval Orders: Huntington Unit 2 - AN0238012-05, Huntington Unit 1 - DAQE-AN0102380019-09 (note – on January 19, 2010 an administrative amendment was made to the 2009 AO), Hunter Units I and 2 - DAQE-AN0102370012-08, and Section IX Part H.21 and H.22 of the SIP.

[7] 40 CFR Part 51 Appendix Y Guidelines for BART Determinations under the Regional Haze Rule (70 Federal Register 39135)

~~Table 5.Emissions Rates (lb/MMBtu) for the Retrofitted Hunter and Huntington Units~~

~~Units~~	~~Utah [Permitted Rates]BART Emission Rate~~[8]			~~Presumptive BART Limits~~[9]	
~~Rate: lb/MMBtu~~	~~SO_2 lb/MMBtu~~	~~NOx lb/MMBtu~~	~~PM lb/MMBtu~~	~~SO_2 lb/MMBtu~~	~~NO_x lb/MMBtu~~
~~Hunter 1~~	~~0.12~~	~~0.26~~	~~0.05~~	~~0.15~~	~~0.28~~
~~Hunter 2~~	~~0.12~~	~~0.26~~	~~0.05~~	~~0.15~~	~~0.28~~
~~Huntington 1~~	~~0.12~~	~~0.26~~	~~0.05~~	~~0.15~~	~~0.28~~
~~Huntington 2~~	~~0.12~~	~~0.26~~	~~0.05~~	~~0.15~~	~~0.28~~

~~Table 6. Change in Emissions (tons/yr) for Retrofitted BART Units~~

~~Unit~~	~~Pre-Control SO_2~~	~~Pre-Control NOx~~	~~Pre-Control PM_{10}~~	~~Post-Control SO_2~~	~~Post-Control NO_x~~	~~Post-Control PM_{10}~~	~~Delta SO_2~~	~~Delta NO_x~~	~~Delta PM_{10}~~
~~**Hunter 1**~~	~~2741~~	~~6833~~	~~533~~	~~2239~~	~~4851~~	~~280~~	~~-502~~	~~-1981~~	~~**-253**~~
~~**Hunter 2**~~	~~2425~~	~~5922~~	~~533~~	~~2185~~	~~4734~~	~~273~~	~~-240~~	~~-1187~~	~~**-260**~~
~~**Huntington 1**~~	~~2538~~	~~5676~~	~~444~~	~~2052~~	~~4445~~	~~256~~	~~-486~~	~~-1231~~	~~**-188**~~
~~**Huntington 2**~~	~~13703~~	~~5582~~	~~443~~	~~1743~~	~~3776~~	~~218~~	~~-11960~~	~~-1806~~	~~**-225**~~
~~**TOTALS**~~	~~**21,407**~~	~~**24,013**~~	~~**1,953**~~	~~**8,219**~~	~~**17,807**~~	~~**1,027**~~	~~**-13,189**~~	~~**-6,206**~~	~~**-926**~~

]

e. Schedule for Installation of Controls

Pursuant to 51.308(e)(1)(C)(iv) each source subject to BART is required to install and operate BART no later than 5 years after approval of the implementation plan, and pursuant to 51.308(e)(2)(E)(3) all alternative measures must take place within the first planning period. Table 6 shows that the required schedule will be met for all units.[~~The PacifiCorp schedule for the four EGUs at Huntington and Hunter sources is as follows.~~]

Table 6. Installation Schedule

Source	**Notice of Intent Submitted**	**Permit Issued**	**[~~Estimated~~]In Service Date**
Hunter 1	June 2006	March 2008	Spring 2014
Hunter 2	June 2006	March 2008	Spring 2011
Hunter 3			Summer 2008
Huntington 1	April 2008	August 2009	Fall 2010
Huntington 2	October 2004	April 2005	Dec 2006

Carbon 1			Shut down August 2015
Carbon 2			Shut down August 2015

[~~EPA under the BART Rule requires coal-fired electric generating plants of greater than 750 MW to meet BART presumptive limits. While EPA considers presumptive limits to be appropriate for all coal-fired power plants greater than 750 MW, the State may establish different requirements if the State can demonstrate that an alternative is justified based on a consideration of the five BART factors.~~

> ~~"States, as a general matter, must require owners and operators of greater than 750 MW power plants to meet these BART emission limits… 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."~~[10]
>
> ~~"For Coal-fired EGU's 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 NOx limits, differentiated by boiler design and type of coal burned. You may determine that an alternative control level is appropriate based on careful consideration of the statutory factors." (Appendix Y Part 51 – IV (E)(5).~~[11]

~~EPA determined presumptive limits for SO_2 and NO_x for EGUs based on a methodology equivalent to that required in 50 CFR 51 Appendix Y for BART Rule. The EPA determination of presumptive limits included:~~

- ~~Identification of all potential BART-eligible EGUs (all BART-eligible EGU's were assumed to be Subject to BART)~~
- ~~Technical analyses and industry research to determine applicable and appropriate SO_2 and NO_x control options,~~
- ~~Economic analysis to determine cost effectiveness for each potentially BART-eligible EGU~~
- ~~Evaluation of historical emissions and forecast emission reductions for each potentially BART-eligible EGU~~[12]~~.~~
- ~~NOx and SO_2 CALPUFF modeling of emission impacts at model Class I area.~~

~~The analysis included 491 potential BART EGUs including Hunter Units 1 and 2 and Huntington Units 1 and 2. The technical analysis conducted by EPA to~~

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[10] ~~Ibid. (70 Federal Register 39131).~~

[11] ~~70 Federal Register 39171~~

[12] ~~Ibid. (70 Federal Register 39134)~~

~~determine presumptive BART limits for SO_2 and NO_x is in effect a BART determination analysis for 419 EGUs including Hunter Units 1 and 2 and Huntington Units 1 and 2.~~[13]

~~Section IV (E) (5) of Appendix Y Part 51 clearly requires the implementation of presumptive NOx limits for coal-fired EGU's greater than 200 MW located at greater than 750 MW power plants. Under Appendix Y, states are given the discretion to challenge presumptive limits through a five factor analysis, but presumptive limits were developed by EPA as a reasonable, equivalent and mandated substitution for a five factor analysis.~~[14]

]

Utah's long-standing Prevention of Significant Deterioration (PSD) permitting program (SIP Section VII and R307-405), New Source Review permitting program (SIP Section II and R307-401) and Visibility program (SIP section XVII and R307-406) will continue to protect Class I area visibility by ensuring that the BART emission ~~rates~~limits established in Part H.21 and H.22 of this plan are maintained, requiring best available control technology for new sources, and assuring that there is not a significant degradation in visibility at Class I areas due to new or modified major sources.

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[13] ~~"Methodology for Developing BART NOx Presumptive Limits" EPA Clean Air Market Division June 15, 2005 HQ-OAR-2002-0076-0445 and "Technical Support Document for BART NOx Limits for Electric Generating Units Excel Spreadsheet, Memorandum April 15, 2005 HQ-OAR-2002-0076-0369~~

[14] ~~CFR Part 51 Appendix Y Guidelines for BART Determinations under the Regional Haze Rule (70 Federal Register 39171)~~

Utah State Implementation Plan

Emission Limits and Operating Practices

Section IX, Part H

Adopted by the Air Quality Board [~~December 3, 2014~~]June 3, 2015

H.21. General Requirements: Control Measures for Area and Point Sources, Emission Limits and Operating Practices, Regional Haze Requirements

a. Except as otherwise outlined in individual conditions of this Subsection IX.H.21 listed below, the terms and conditions of this Subsection IX.H.21 shall apply to all sources subsequently addressed in Subsection IX.H.22. Should any inconsistencies exist between these two subsections, the source specific conditions listed in IX.H.22 shall take precedence.

b. The definitions contained in R307-101-2, Definitions and R307-170-4, Definitions, apply to Section IX, Part H. In addition, the following definition also applies to Section IX, Part H.21 and 22:
Boiler operating day means a 24-hour period between 12 midnight and the following midnight during which any fuel is combusted at any time in the boiler. It is not necessary for fuel to be combusted for the entire 24-hour period.

c. The terms and conditions of R307-107-1 and R307-107-2 shall apply to all sources subsequently addressed in Subsection IX.H.22.

d. Any information used to determine compliance shall be recorded for all periods when the source is in operation, and such records shall be kept for a minimum of five years. All records required by IX.H.21.c shall be kept for a minimum of five years. Any or all of these records shall be made available to the Director upon request.

e. All emission limitations listed in Subsections IX.H.22 shall apply at all times, unless otherwise specified in the source specific conditions listed in IX.H.22.

f. Stack Testing:

i. As applicable, stack testing to show compliance with the emission limitations for the sources in Subsection IX.H.22 shall be performed in accordance with the following:

A. Sample Location: The testing point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or the most recent version of the EPA-approved test method if approved by the Director.~~or other EPA-approved methods acceptable to the Director.~~

B. Volumetric Flow Rate: 40 CFR 60, Appendix A, Method 2, or the most recent version of the EPA-approved test method if approved by the Director.~~or other EPA-approved testing methods acceptable to the Director.~~

C. Particulate (PM): 40 CFR 60, Appendix A, Method 5B, or the most recent version of the EPA-approved test method if approved by the Director.~~or other EPA-approved testing methods acceptable to the Director.~~ A test shall consist of three runs, with each run at least 120 minutes in duration and each run collecting a minimum sample of 60 dry standard cubic feet. The back half condensables shall also be tested using Method 202. The back half condensables shall not be used for compliance demonstration but shall be used for inventory purposes.

D. Calculations: To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors to give the results in the specified units of the emission limitation.

E. A stack test protocol shall be provided at least 30 days prior to the test. A pretest conference shall be held if directed by the Director.

g. Continuous Emission and Opacity Monitoring.

i. For all continuous monitoring devices, the following shall apply:

A. Except for system breakdown, repairs, calibration checks, and zero and span adjustments required under paragraph (d) 40 CFR 60.13, the owner/operator of an affected source shall continuously operate all required continuous monitoring systems

and shall meet minimum frequency of operation requirements as outlined in R307-170 and 40 CFR 60.13.

B. The monitoring system shall comply with all applicable sections of R307-170; 40 CFR 13; and 40 CFR 60, Appendix B – Performance Specifications.

C. For any hour in which fuel is combusted in the unit, the owner/operator of each unit shall calculate the hourly average NOx concentration in lb/MMBtu.

D. At the end of each boiler operating day, the owner/operator shall calculate and record a new 30-day rolling average emission rate in lb/MMBtu from the arithmetic average of all valid hourly emission rates from the CEMS for the current boiler operating day and the previous 29 successive boiler operating days.

E. An hourly average NOx emission rate in lb/MMBtu is valid only if the minimum number of data points, as specified in R307-170, is acquired by the owner/operator for both the pollutant concentration monitor (NOx) and the diluent monitor (O2 or CO2).

H.22. Source Specific Emission Limitations: Regional Haze Requirements, Best Available Retrofit Technology

a. PacifiCorp Hunter

i. Particulate Limitations on Units #1 and #2

A. Emissions of particulate (PM) shall not exceed 0.015 lb/MMBtu heat input from each boiler based on a 3-run test average.

B. Stack testing for the emission limitation shall be performed each year on each boiler.

C. Monitoring for PM shall be conducted in accordance with the compliance assurance monitoring requirements of 40 CFR 64 as detailed in the source's operating permit.

ii. NOx Limitations on Units #1 and #2

A. Emissions of NOx from each boiler shall not exceed 0.26 lb/MMBtu heat input for a 30-day rolling average.

B. Measuring of all NOx emissions shall be performed by CEM.

iii. NOx Limitation on Unit #3

A. Emissions of NOx shall not exceed 0.34 lb/MMBtu heat input for a 30-day rolling average.

B. Measuring of all NOx emissions shall be performed by CEM.

b. PacifiCorp Huntington

i. Particulate Limitations on Units #1 and #2

A. Emissions of particulate (PM) shall not exceed 0.015 lb/MMBtu heat input from each boiler based on a 3-run test average.

B. Stack testing for the emission limitation shall be performed each year on each boiler.

C. Monitoring for PM shall be conducted in accordance with the compliance assurance monitoring requirements of 40 CFR 64 as detailed in the source's operating permit.

ii. NOx Limitations on Units #1 and #2

A. Emissions of NOx from each boiler shall not exceed 0.26 lb/MMBtu heat input for a 30-day rolling average.

B. Measuring of all NOx emissions shall be performed by CEM.

c. PacifiCorp Carbon

i. Conditions on Units #1 and #2

A. The owner/operator shall permanently close and cease operation of Carbon units #1 and #2 by August 15, 2015. The owner/operator shall notify the Director of the permanent closure of the Carbon Plant by no later than September 15, 2015.

B. The owner/operator shall request a rescission of Operating Permit # 700002004 and Approval Order DAQE-AN0100810005-08 by no later than September 15, 2015.

C. Operating Permit # 700002004 and Approval Order DAQE-AN0100810005-08 shall be rescinded by no later than December 15, 2015.

~~c. PacifiCorp Carbon~~

~~i. Conditions on Units #1 and #2~~

~~A. The owner/operator shall permanently close Carbon units #1 and #2 by August 15, 2015.~~

~~B. The owner/operator shall rescind Operating Permit # 700002004 by no later than December 31, 2015.~~

Staff Review

2008 PM BART Determination and

Recommended Alternative to BART for NOx

Utah Division of Air Quality

May 13, 2015

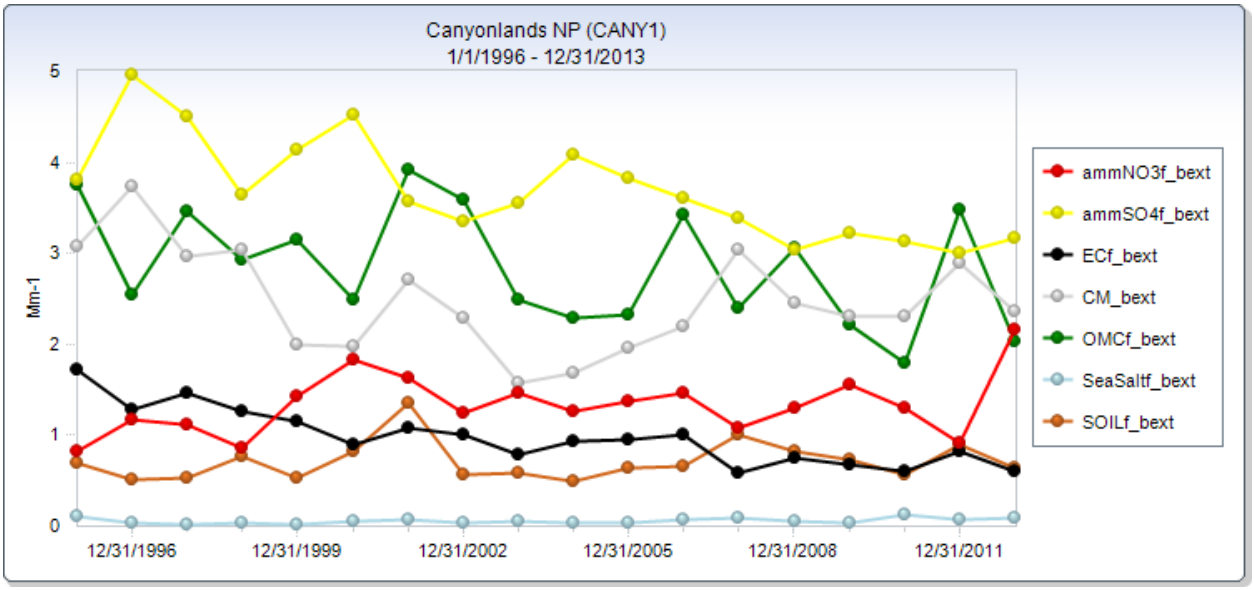
I. Purpose

On December 14, 2012, the Environmental Protection Agency (EPA) disapproved the Best Available Retrofit Technology (BART) determination for nitrogen oxides (NOx) and particulate matter (PM) that was adopted in Utah's 2008 Regional Haze State Implementation Plan (RH SIP). The purpose of this analysis is to provide additional documentation to support the 2008 BART determination for PM and to recommend an alternative to BART for NOx that will provide greater visibility improvement than would be achieved through the installation of the most stringent NOx controls on the four electrical generating units (EGU) that are subject to BART.

II. History

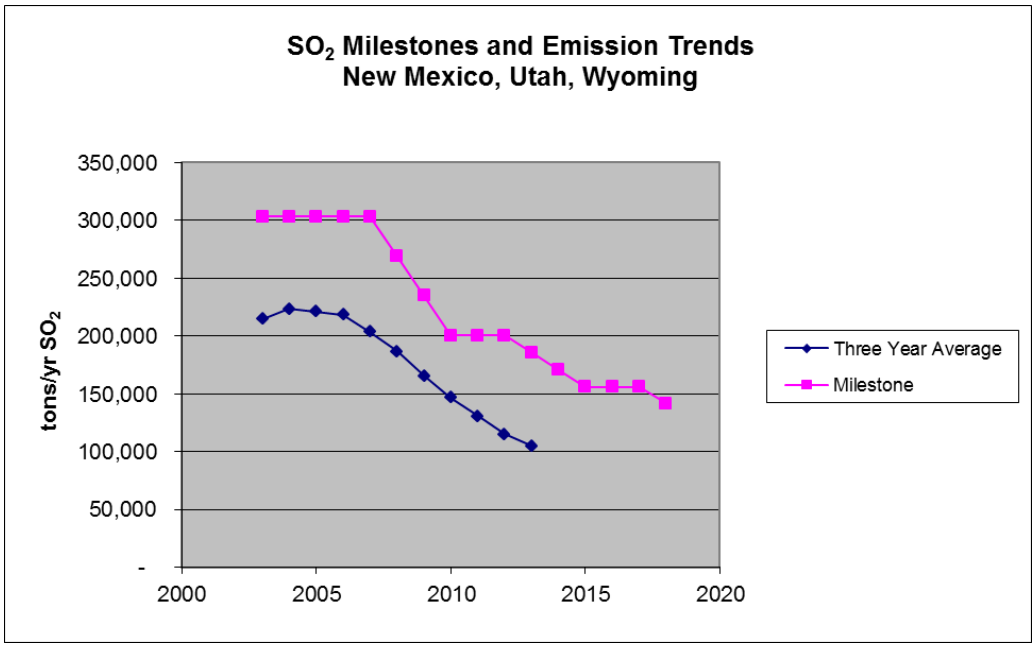
Utah's RH SIP, originally adopted in 2003, was based on the recommendations of the Grand Canyon Visibility Transport Commission (GCVTC). The GCVTC evaluated haze at Class I Areas on the Colorado Plateau, and determined that stationary source reductions should be focused on sulfur dioxide (SO_2) because it is the pollutant that has the most significant impact on haze on the Colorado Plateau. Utah's 2008 BART determination was developed within the context of the overall SIP and reflected this focus on SO_2. Figure 1 shows the contributions of various species to visibility impairment at Canyonlands National Park. As can be seen, sulfate (ammSO4) is the most significant contributor to haze. Fire (OMC) and dust (CM) are also a significant components but the impact is variable from year to year.

Figure 1. Speciated Annual Average Light Extinction at Canyonlands.



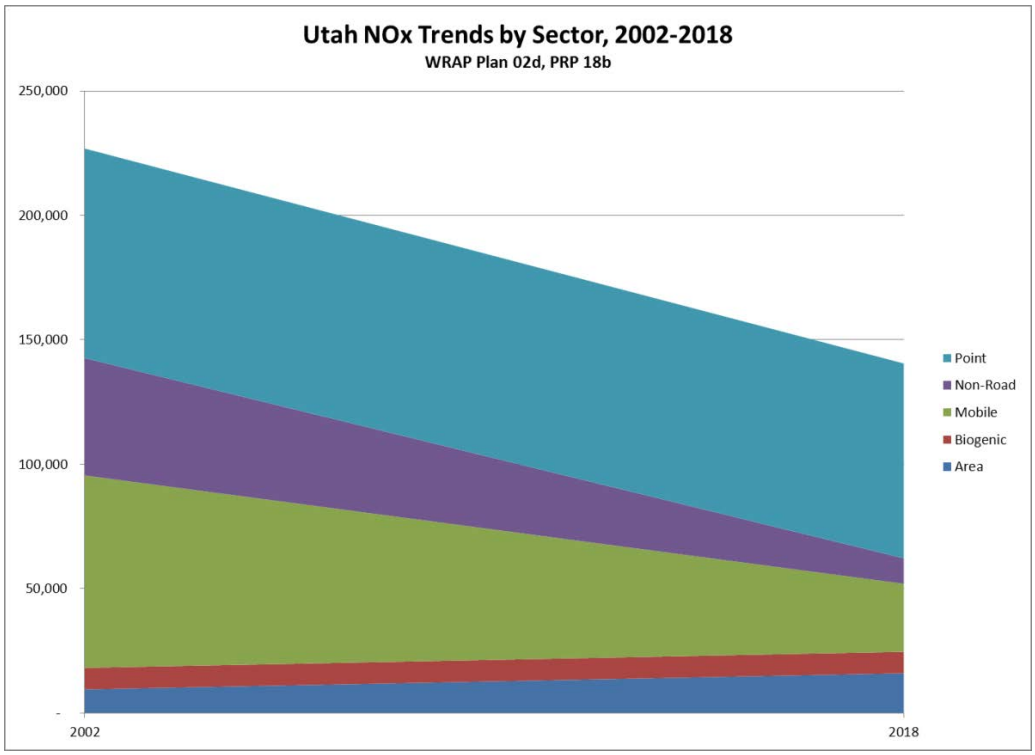
Utah's 2003 RH SIP included SO_2 emission milestones with a backstop regulatory trading program to ensure that SO_2 emissions in the transport region decreased substantially between 2003 and 2018. The milestones were adjusted in 2008 and 2011 to reflect changes in the number of states participating in the regional program. Actual SO_2 emissions decreased by 51% between 2003 and 2013 in the current 3-state region, and in 2013 were significantly below the 2018 milestone in Utah's RH SIP (See Figure 2).

Figure 2. SO_2 Milestones and Emission Trends



While Utah's RH SIP is focused on achieving SO_2 reductions from stationary sources, substantial reductions in nitrogen oxide (NOx) emissions will also occur from stationary sources as well as mobile and non-road sources. Figure 3 shows the projected decrease in NOx emissions between 2002 and 2018 as documented in Section K of Utah's 2008 RH SIP.[1]

Figure 3. Utah RH SIP Expected NOx Reductions 2002-2018.



A. BART Determination in 2008 RH SIP

On September 3, 2008, the Utah Air Quality Board adopted a revision to Utah's RH SIP to include Best Available Retrofit Technology (BART) requirements for NO_x and particulate matter (PM) as required by 40 CFR 51.309(d)(4)(vii). PacifiCorp's Hunter Unit 1, Hunter Unit 2, Huntington Unit 1, and Huntington Unit 2 fossil fuel fired electric generating units (EGUs) were determined to be subject to BART. The 2008 RH SIP required PacifiCorp to install the following BART controls at these EGUs:

Hunter Units 1 and 2:

- Conversion of electrostatic precipitators to pulse jet fabric filter bag-houses.
- The replacement of first generation low-NO_x burners with Alstom TSF 2000TM low-NO_x firing system and installation of two elevations of separated overfire air.
- Upgrade of flue gas desulfurization system to > 90% sulfur dioxide removal.

[1] WRAP Plan 02d and PRP 18b inventory (PRP 18a mobile)
http://vista.cira.colostate.edu/TSS/Results/Emissions.aspx

Huntington Units 1 and 2:

- Conversion of electrostatic precipitators to pulse jet fabric filter bag-houses.
- The replacement of first generation low-NO_x burners with Alstom TSF 2000TM low-NO_x firing system and installation of two elevations of separated overfire air.
- Installation of a new wet-lime, flue gas de-sulfurization system at Unit 2 (FGD).
- Upgrade of flue gas desulfurization system to > 90% sulfur dioxide removal at Unit 1.

The emission rates established in the 2008 RH SIP for Hunter Units 1 and 2 and Huntington Units 1 and 2 were more stringent than the presumptive BART emission rates for SO_2 and NO_x established in 40 CFR Part 51 Appendix Y, Guidelines for BART Determinations under the Regional Haze Rule as shown in Table 1. (Note, Table 1 corrects a typographical error in Table 5 of the RH SIP where the permitted rate for PM was listed as 0.05 lb/MMBtu when it should have been 0.015 lb/MMBtu, the limit established in the approval orders for each of the units.)

Table 1. BART Emission Rates in Utah's 2008 SIP

Units	Utah Permitted Rates[2]			Presumptive BART Limits[3]		Year of Installation
Rate: lb/MMBtu	SO_2[a]	NOx[a]	PM	SO_2	NOx	
Hunter 1	0.12	0.26	0.015	0.15	0.28	2014
Hunter 2	0.12	0.26	0.015	0.15	0.28	2011
Huntington 1	0.12	0.26	0.015	0.15	0.28	2010
Huntington 2	0.12	0.26	0.015	0.15	0.28	2006

[a]30-day rolling average

[2] Utah Division of Air Quality Approval Orders: Huntington Unit 2 - AN0238012-05, Huntington Unit 1 - DAQE-AN0102380019-09 (note – on January 19, 2010 an administrative amendment was made to the 2009 AO), Hunter Units I and 2 - DAQE-AN0102370012-08.

[3] 40 CFR Part 51 Appendix Y Guidelines for BART Determinations under the Regional Haze Rule (70 Federal Register 39135)

B. Partial Approval, Partial Disapproval of Utah's Regional Haze SIP

On December 14, 2012, EPA approved the majority of Utah's Regional Haze SIP but disapproved Utah's BART determinations for NOx and PM for PacifiCorp's Hunter Unit 1, Hunter Unit 2, Huntington Unit 1, and Huntington Unit 2[4]. EPA determined that the SIP did not contain a full 5-factor analysis as required by the rule. Prior to EPA's disapproval, Utah's BART determination was in place and enforceable under state law and state permits. The required controls were installed and operating on three of the four EGUs prior to EPA's proposed disapproval, and were installed on the 4th EGU in 2014 as required by Utah's SIP under state law.

III. BART for Particulate Matter

In June 2012, after EPA had proposed to disapprove Utah's BART determination, PacifiCorp prepared a new 5-factor BART analysis to satisfy the requirements of the BART rule. PacifiCorp submitted an update to that analysis on August 5, 2014 to address issues that EPA had raised with other regional haze SIPs.

PacifiCorp's 5-Factor analysis identified three available technologies: upgraded electrostatic precipitator (ESP) and flue gas conditioning (0.040 lb PM_{10}/MMBtu); polishing fabric filter (0.015 lb PM10/MMBtu); and replacement fabric filter (0.015 lb PM_{10}/MMBtu). The 2008 BART determination had required PacifiCorp to install a fabric filter baghouse with a PM emission limit of 0.015 lb/MMBtu at Hunter Units 1 and 2 and Huntington Units 1 and 2[5]. DAQ staff have reviewed PacifiCorp's 2012 analysis and determined that the baghouse technology required in 2008 is still the most stringent technology available and 0.015 lb PM/MMBtu represents the most stringent emission limit. The PM emission limit has been added to SIP Section IX, Part H.21 and H.22 to ensure that it is federally enforceable.

40 CFR Part 51, Appendix Y, *Guidelines for BART Determinations Under the Regional Haze Rule*, allows a streamlined 5-factor analysis when the most stringent controls are already required.

> "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 as 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." (40 CFR Part 51, Appendix Y, Section D.9)

[4] 77 FR 74355

[5] The AOs established a PM_{10} emission limit of 74 lb/hr at Huntington Unit 1; and a PM emission limit of 70 lb/hr at Huntington Unit 2. The pound per hour emission limit for the Huntington units was based on a 0.015 lb/MMBtu emission rate and a maximum hourly heat input.

Because the most stringent technology is in place and the SIP contains a federally enforceable emission limit for PM of 0.015 lb/MMBtu, no further analysis is required[6,7,8].

IV. Alternative to BART for NOx

> *40 CFR 51.308(e)(2) A State may opt to implement or require participation in an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate, and maintain BART. Such an emissions trading program or other alternative measure must achieve greater reasonable progress than would be achieved through the installation and operation of BART. For all such emission trading programs or other alternative measures, the State must submit an implementation plan containing the following plan elements and include documentation for all required analyses:*

Utah has opted to establish an alternative measure for NOx as provided in 40 CFR 51.308(e)(2).[9] The alternative measure requires the installation of low-NOx burners with overfire air with an emission limit

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[6] In Colorado, with regard to similar electric generating units (EGU), EPA explained that "[f]abric filter baghouses are the most stringent control technology for controlling PM emissions." 77 Fed. Reg. 18,052, 18,066 (Mar. 26, 2012). EPA further explained, "consistent with the BART Guidelines, the State did not provide a full five-factor analysis because the State determined BART to be the most stringent control technology and limit" and "assumes the BART limit can be met with the operation of the existing fabric filter baghouses." *Id.* Significantly, EPA concluded that it "agree[d] with the State's conclusions and we are proposing to approve its PM BART determinations." *Id.*

[7] In Wyoming, EPA approved the State's conclusions that "fabric filters represent the most stringent PM control technology" and that "[c]onsistent with the BART Guidelines, the State did not provide a five-factor analysis because the State determined BART to be the most stringent control technology and limit." 77 Fed. Reg. 33,022, 33,035. (*citing* 70 Fed. Reg. at 39,165 (Appx. Y)). EPA also has approved or proposed to approve in numerous other actions, including Wyoming, the same 0.015 lb/MMBtu PM BART emissions limit adopted in the prior Utah RH SIP and in this SIP Revision. *See, e.g.*, 79 Fed. Reg. 5,032, 5,220. *See also* EPA's approval of PM BART in Arizona (77 Fed. Reg. at 72,523 (December 5, 2012)) and for the Four Corners Power Plant (77 Fed. Reg. 51, 620, 51, 636 (August 24, 2012)).

[8] In other actions, EPA has approved PM BART limits that are twice as high as those included for the Units in the SIP Revision. For example, EPA approved a RH SIP with a PM BART emissions limit of 0.03 lb/MMBtu for nine EGUs in Colorado. *See, e.g.*, 77 Fed. Reg. 18,051,18,066 (Mar. 26, 2012); 77 Fed. Reg. at 76,872 . EPA approved PM BART emissions limits of 0.03 and 0.04 lb/MMBtu for certain EGUs in Wyoming, where the most stringent limit was 0.015 lb/MMBtu. 79 Fed. Reg. at 5,220. EPA also approved PM limits of 0.07 lb/MMBtu for four EGUs in North Dakota. 76 Fed. Reg. at 58,585; 77 Fed. Reg. at 20,930. In addition, EPA also adopted a PM limit of 0.26 lb/MMBtu for Corette in its FIP for Montana. 77 Fed. Reg. at 57,911.

[9] Greater reasonable progress can be demonstrated using one of two methods: (i) "greater emission reductions" than under BART (40 C.F.R. §51.308(e)(3)); or (ii) "based on the clear weight of evidence" (40 C.F.R. §51.308(e)(2)(E)). As the U.S. Circuit Court of Appeals for the 10th Circuit recently observed, the state is free to choose one method or the other. *WildEarth Guardians v. E.P.A.*, 770 F.3d 919, 935-37 (10th Cir. 2014). The court characterized the former approach as a "quantitative" and the later as "qualitative," and specifically sanctioned the use of qualitative factors under the clear weight of evidence.

more stringent than the presumptive BART emission limit at the four EGUs that are subject-to-BART, and additional reductions of visibility impairing pollutants from three EGUs that are not subject to BART: PacifiCorp Hunter Unit 3, PacifiCorp Carbon Unit 1, and PacifiCorp Carbon Unit 2.

> **PacifiCorp Hunter Units 1 and 2 and PacifiCorp Huntington Units 1 and 2**: the replacement of first generation low-NO_x burners with Alstom TSF 2000TM low-NO_x firing system and installation of two elevations of separated overfire air.
>
> **PacifiCorp Hunter Unit 3** (not subject-to-BART): the replacement of first generation low-NOx burners with upgraded low-NOx burners with overfire air.
>
> **PacifiCorp Carbon Units 1 and 2** (not subject-to-BART): permanent closure of both units by August 15, 2015 and rescission of the plant's operating permit by December 31, 2015.

PacifiCorp has announced plans to shut down the Carbon Power Plant in 2015[10] due to the high cost to control mercury to meet the requirements of EPA's Mecury and Air Toxics Standards (MATS). The MATS rule was finalized in 2011, well after the 2002 base year for Utah's RH SIP, and therefore any reductions required to meet the MATS rule may be considered as part of an alternative strategy under 40 CFR 51.308(e)(2)(vi). This plant is located about 30 miles northeast of the Huntington Plant and about 40 miles northeast of the Hunter Plant and its emissions impact the same general area as the Hunter and Huntington Plants. Average SO_2 emissions from the Carbon Plant in 2012-13 were 8,005 tons/yr, and average NOx emissions were 3,342 tons /yr. PacifiCorp and ultimately Utah rate payers must pay the cost to replace the electricity generated by this plant, but there will also be a visibility benefit due to the emission reductions. Overall emission reductions of SO_2 and NOx due to the closure of this plant will be greater than the NOx reductions that could be achieved by installing the most stringent NOx control, SCR, on the four subject-to-BART EGUs and the emission reductions will occur close to the location of the Hunter and Huntington plants.

While PacifiCorp has announced plans to shut down the Carbon Plant, this decision is not enforceable, and PacifiCorp could choose to meet the MATS requirements through other measures. On November 25, 2014, the Supreme Court agreed to consider challenges to the MATS rule, so there is a possibility that the mercury control requirements could be overturned or delayed. An enforceable requirement in the RH SIP to permanently close the Carbon Plant as part of an alternative to BART would lock in substantial emission reductions.

[10] "PacifiCorp continues to plan for retirement of its Carbon facility in early 2015 as the least-cost alternative to comply with MATS and other environmental regulations. Implementation of the transmission system modifications necessary to maintain system reliability following disconnection of the Carbon facility generators from the grid are underway." 2013 Integrated Resource Plan Update Redacted, PacifiCorp, March 21, 2014, page 16.

V. BART-eligible Sources Covered by Alternative Measure for NOx

40 CFR 51.308(e)(2)(i)(A) A list of all BART-eligible sources within the state.
40 CFR 51.308(e)(2)(i)(B) A list of all BART-eligible sources and all BART source categories covered by the alternative program. The state is not required to include every BART source category or every BART-eligible source with a BART source category in an alternative program, but each BART-eligible source in the state must be subject to the requirements of the alternative program, have a federally enforceable emission limitation determined by the state and approved by EPA as meeting BART in accordance with section 302(c) or paragraph (e)(1) of this section, or otherwise addressed under paragraphs (e)(1) or (e)(4) of this section.

Four EGUs were the only BART-eligible sources identified in Utah's 2008 RH SIP. All four of these EGUs are covered by the alternative program.

- PacifiCorp Hunter, Unit 1
- PacifiCorp Hunter, Unit 2
- PacifiCorp Huntington, Unit 1
- PacifiCorp Huntington, Unit 2

The Alternative Measure includes "non-BART sources" (i.e., Carbon Unit 1 and Unit 2 (PM, NO_x and SO_2) and Hunter Unit 3 (NO_x)). The Tenth Circuit Court recognized non-BART sources as a legitimate factor to consider in a "weight of the evidence" analysis. *WildEarth Guardians v. E.P.A.*, 770 F.3d 919, 935-36 (10th Cir. 2014).

VI. NOx emission reductions achievable

40 CFR 51.308(e)(2)(i)(C) An analysis of the best system of continuous emission control technology available and associated emission reductions achievable for each source within the state subject to BART and covered by the alternative program. This analysis must be conducted by making a determination of BART for each source subject to BART and covered by the alternative program as provided for in paragraph (e)(1) of this section, unless the emissions trading program or other alternative measure has been designed to meet a requirement other than BART (such as the core requirement to have a long-term strategy to achieve the reasonable progress goals established by the states). In this case, the state may determine the best system of continuous emission control technology and associated emission reductions for similar types of sources within a source category based on both source-specific and category-wide information, as appropriate.

In June 2012, PacifiCorp prepared a new 5-factor BART analysis to satisfy the requirements of the BART rule. PacifiCorp submitted an update to that analysis on August 5, 2014 to address issues that EPA had raised with other regional haze SIPs. The technologies identified in the analysis range from the currently required low NOx burners with overfire air (presumptive BART) to the most-stringent NOx technology (SCR + low NOx burners with overfire air). DAQ reviewed PacifiCorp's analysis and agreed that SCR + low NOx burners with overfire air with an annual emission rate of 0.05 lb/MMBtu was the most stringent technology available to reduce NOx emissions from the four subject-to-BART EGUs.[11] This technology is very expensive to install on the subject-to-BART EGUs considering their current configuration and the unique characteristics of Utah's coal and would require careful consideration through a case-by-case 5-factor analysis before determining if it was cost effective. However, this technology can be used as a stringent benchmark for comparison with an alternative program. DAQ's use of this technology as a benchmark is not a determination that this technology is BART, it is merely a conservative approach to evaluate the effectiveness of the alternative program (see Table 2).

[11] EPA has used a 0.05 lb/MMBtu NOx emissions rate for SCR for other regional haze SIP analyses, recently in New Mexico and Arizona. *See e.g.*, 79 Fed. Reg. 60,978, 60, 984 (New Mexico, Oct. 9 2014)("In promulgating the FIP, we evaluated the performance of both new and retrofit SCRs and determined that 0.05 lb/MMBtu on a 30-boiler-operating-day average was the appropriate emission limit for SCR at the San Juan Generating Station units. See 76 FR 491 and 76 FR 52388. New Mexico appropriately used this same rate in their cost and visibility analyses for the four-SCR scenario as part of its BART evaluation."); 79 Fed. Reg. 52,420, 52,431 (Arizona, Sept. 3, 2014)("We agree that our use of a 0.05 lb/MMBtu annual average design value for SCR is consistent with other BART determinations for coal-fired power plants."). EPA has agreed that even higher NOx emission rates can qualify as the most stringent emission rate for modeling visibility impacts. For example, EPA accepted state-mandated SCR emission rates of 0.07 and 0.08 in Colorado, as well as its SCR related analyses based on 0.07. 77 Fed. Reg. 76,871 (Colorado, Dec. 21, 2012). EPA also used 0.083 to 0.098 for the Reid Gardner Station in Nevada. 77 Fed. Reg. 50,936, 50,942 (Nevada, Aug. 23, 2012).

VII. Projected Emission Reductions from Alternative Measures

*40 CFR 51.*308(e)(2)(i)(D) An analysis of the projected emissions reductions achievable through the trading program or other alternative measure.

Table 2 shows the estimated annual emissions for NOx, SO_2, and PM_{10} for the most stringent NOx scenario and the alternative measure. As can be seen, NOx emissions are higher under the alternative measure, but emissions of SO_2 and PM_{10} are both lower under the alternative measure. Combined emissions of all three pollutants are 2,856 tons/yr lower under the alternative measure.[12]

Table 2. Estimated emissions under the most stringent NOx scenario and the alternative scenario

Units	NOx emissions (tons/yr)		SO_2 emissions (tons/yr)		PM_{10} emissions (tons/yr)[d]		Combined	
	Most Stringent NOx[b]	Alternative[c]	Most Stringent NOx[b]	Alternative[c]	Most Stringent NOx	Alternative	Most Stringent NOx	Alternative
Carbon 1	1,408	0	3,388	0	221	0	5,016	0
Carbon 2	1,940	0	4,617	0	352	0	6,909	0
Hunter 1[a]	775	3,412	1,529	1,529	169	169	2,473	5,100
Hunter 2	843	3,412	1,529	1,529	169	169	2,541	5,110
Hunter 3	6,530	4,622	1,033	1,033	122	122	7,685	5,777
Huntington	809	3,593	1,168	1,168	176	176	2,153	4,937
Huntington	856	3,844	1,187	1,187	200	200	2,243	5,231
Total	13,161	18,882	14,451	6,446	1409	836	29,020	26,164

[a] Hunter 1 controls were installed in the spring of 2014, therefore Hunter 2 actual emissions are used as a surrogate

[b] Most stringent NOx rate for BART-eligible units (see spreadsheet BART Analysis.pdf in the TSD), 2012-13 actual emissions Carbon, 2001-3 actual emissions Hunter 3 (EPA Acid Rain Program)

[c] Average actual emissions 2012-13 for Hunter and Huntington units, EPA Acid Rain Program

[d] Actual emissions for 2012, DAQ annual inventory

[12] EPA has approved, or proposed approval, of other BART Alternatives that included "inter-pollutant trading" when SO_2 levels were lowered. 79 Fed. Reg. 33,438, 33,440-41 (Washington, June 11, 2014); 79 Fed. Reg. 56,322, 56,328 (Arizona, Sept. 19, 2014).

VIII. Greater Reasonable Progress than BART

40 CFR 51.308(e)(2)(i) Demonstration that the emissions trading program or other alternative measure will achieve greater reasonable progress than would have resulted from the installation and operation of BART at all sources subject to BART in the state and covered by the alternative program.

40 CFR 51.308(e)(2)(i)(E) A determination under paragraph (e)(3) if this section or otherwise based on the clear weight of evidence that the trading program or other alternative measure achieves greater reasonable progress than would be achieved through the installation and operation of BART at the covered sources.

EPA described the clear weight of evidence standard as follows: ''Weight of evidence" demonstrations attempt to make use of all available information and data which can inform a decision while recognizing the relative strengths and weaknesses of that information in arriving at the soundest decision possible. Factors which can be used in a weight of evidence determination in this context may include, but not be limited to, future projected emissions levels under the program as compared to under BART, future projected visibility conditions under the two scenarios, the geographic distribution of sources likely to reduce or increase emissions under the program as compared to BART sources, monitoring data and emissions inventories, and sensitivity analyses of any models used. (Emphasis added.) See 71 Fed. Reg. 60,612, 60,622 (Oct. 13, 2006).[13]

The weight of evidence shows that the alternative program will provide greater reasonable progress than BART. The DAQ used a number of different metrics to reach this conclusion. First, as outlined in section VI, combined emissions of NOx, SO_2, and PM will be 2,856 tons/yr lower under the alternative scenario. The NOx reductions at Huntington 1 and 2 and Hunter 2 and 3 occurred between 2006 and 2011, earlier than was required by the rule, providing a corresponding early and on-going visibility improvement[14]. Second, as outlined in section VIII.A, the alternative provides greater reductions of SO_2, the most significant anthropogenic pollutant affecting Class I Areas on the Colorado Plateau that affects visibility year-round, including the high visitation seasons of Spring, Summer, and Fall. Finally, as outlined in section VIII.B, visibility modeling shows that the alternative will provide greater visibility improvement.

[13] EPA recently confirmed the availability of the "other alternative measure" based on the "clear weight of evidence" approach in approving a "BART Alternative" under the Arizona regional haze state implementation plan. 80 Fed. Reg. 19220 (April 10, 2015).

[14] The U.S. Circuit Court of Appeals for the 10th Circuit explicitly acknowledged that the consideration of early reductions was proper as part of a qualitative or clear weight of evidence approach to determining greater reasonable progress. WildEarth Guardians v. E.P.A., 770 F.3d 919, 938 (10th Cir. 2014).

DAQ conducted dispersion modeling using the CALPUFF model to compare the visibility improvement anticipated under the alternative measure with the visibility improvement under the most stringent NOx technology for the four subject-to-BART EGUs. The seven EGUs shown in Table 3 were included in the modeling. Detailed information regarding the modeling inputs, emission scenarios, and methods are described in the February 13, 2014 modeling protocol.[15]

Table 3. Emission units and Class I areas modeled

Company Name	Plant Name	Units
PacifiCorp	Hunter	Boilers #1,2,3
PacifiCorp	Huntington	Boilers #1,2
PacifiCorp	Carbon	Boilers #1,2

Source	Class I Areas to be Evaluated
PacifiCorp Hunter Plant, PacifiCorp Huntington Plant, PacifiCorp Carbon Plant	Arches National Park, Canyonlands National Park, Capitol Reef National Park, Bryce National Park, Zion National Park, Mesa Verde National Park, Black Canyon of the Gunnison National Park, Grand Canyon National Park, Flat Tops Wilderness

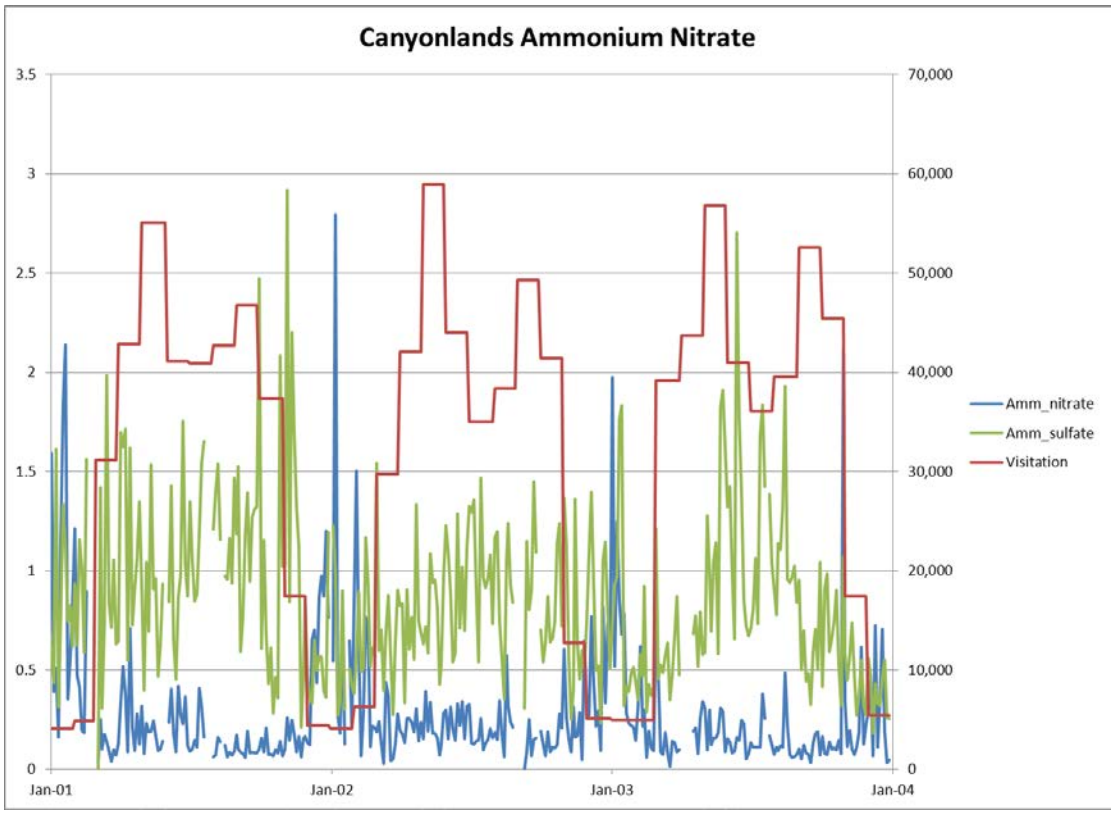
Because the emission reductions under the alternative included reductions of SO_2 in addition to reductions of NOx, visibility improvement under the two scenarios could occur during different episodes and during different times of the year. For this reason, a number of different metrics were evaluated to compare the two scenarios.

A. Continued Focus on SO_2 Reductions

Utah's 2003 RH SIP focused on SO_2 reductions because SO_2 has the greatest overall impact at Class I areas on the Colorado Plateau and revisions in 2008 and 2011 continued this focus. The alternative measures enhance that approach through additional, significant emission reductions of over 8,000 tons/yr SO_2 due to the closure of the Carbon Plant. Figure 1 shows that sulfates are the dominant visibility impairing pollutant at Canyonlands, the Class I area with the greatest overall impact from the four subject-to-BART sources. Figure 4 shows that sulfates affect visibility throughout the year and are the dominant visibility impairing pollutant from anthropogenic sources during the high visitation period of March through November. Similar results are seen at the other Class I areas and are documented in the TSD.

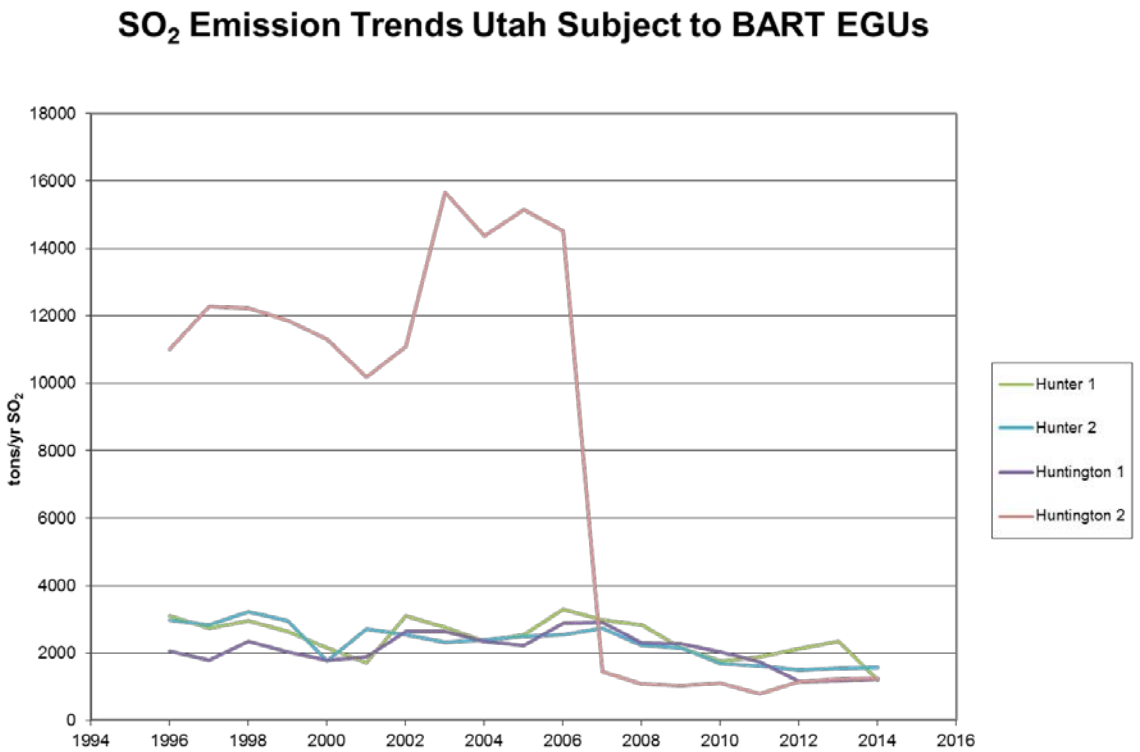
[15] Air Quality Modeling Protocol: Utah Regional Haze State Implementation Plan, Utah Division of Air Quality, February 13, 2015

Figure 4. Canyonlands ammonium sulfate and ammonium nitrate



DAQ has confidence that SO_2 reductions will achieve meaningful visibility improvement. The visibility improvement during the winter months due to NOx reductions is much more uncertain. Figure 5 shows the significant emission reductions of both SO_2 and NOx that have occurred from the four subject-to-BART EGUs over the last 15 years. Figure 6 shows corresponding improvements in ammonium sulfate values at Canyonlands throughout the year. However, ammonium nitrate values do not show similar improvement in the winter months, despite a 50% reduction in NOx over this time period.

Figure 5. SO_2 and NOx Emission Trends



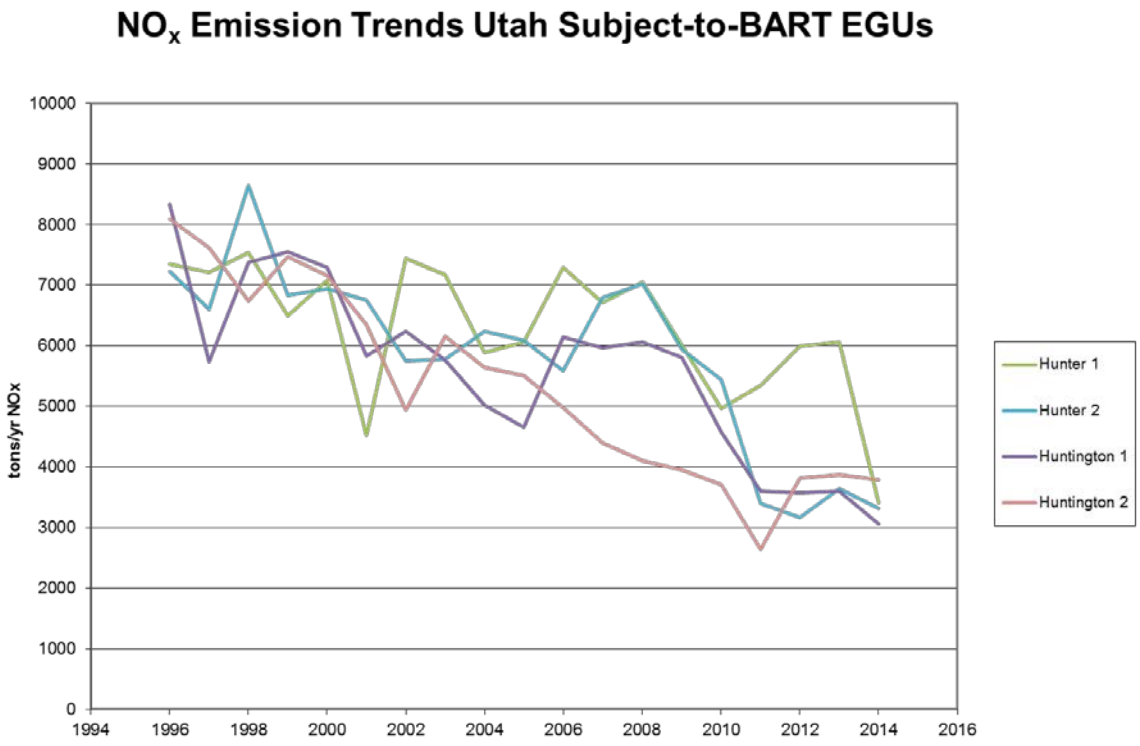
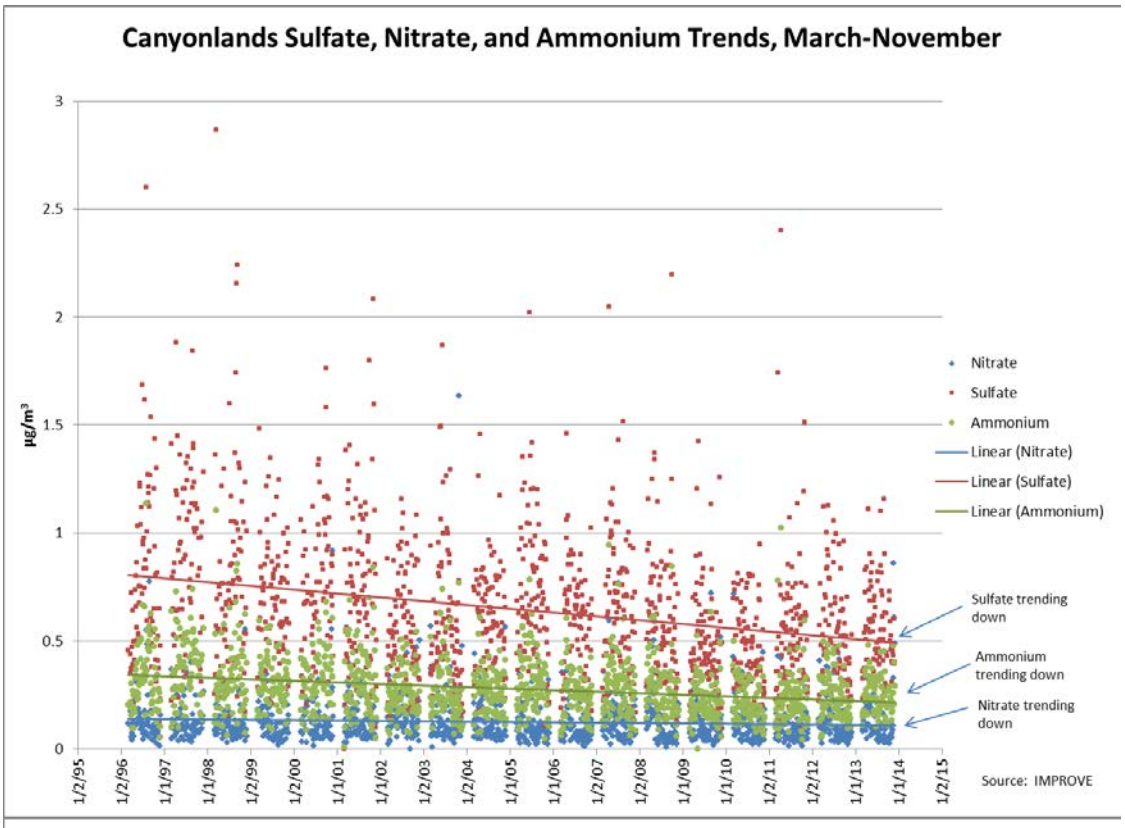
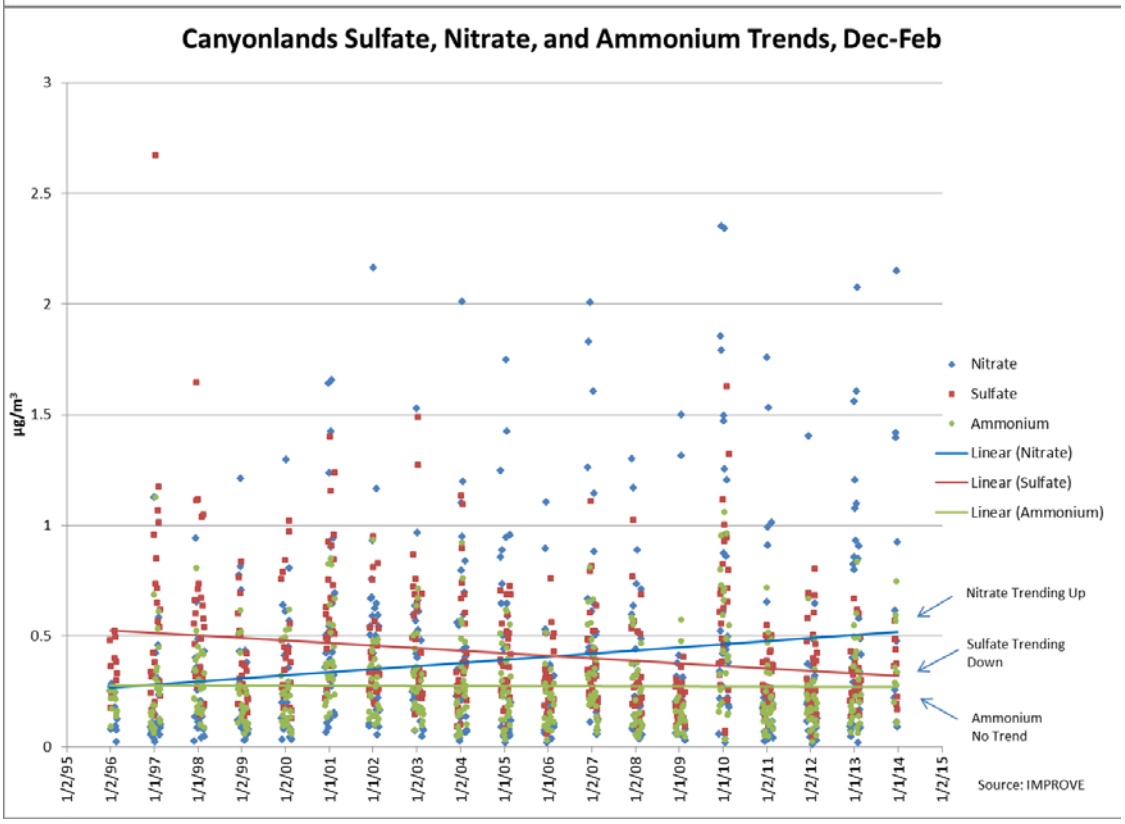


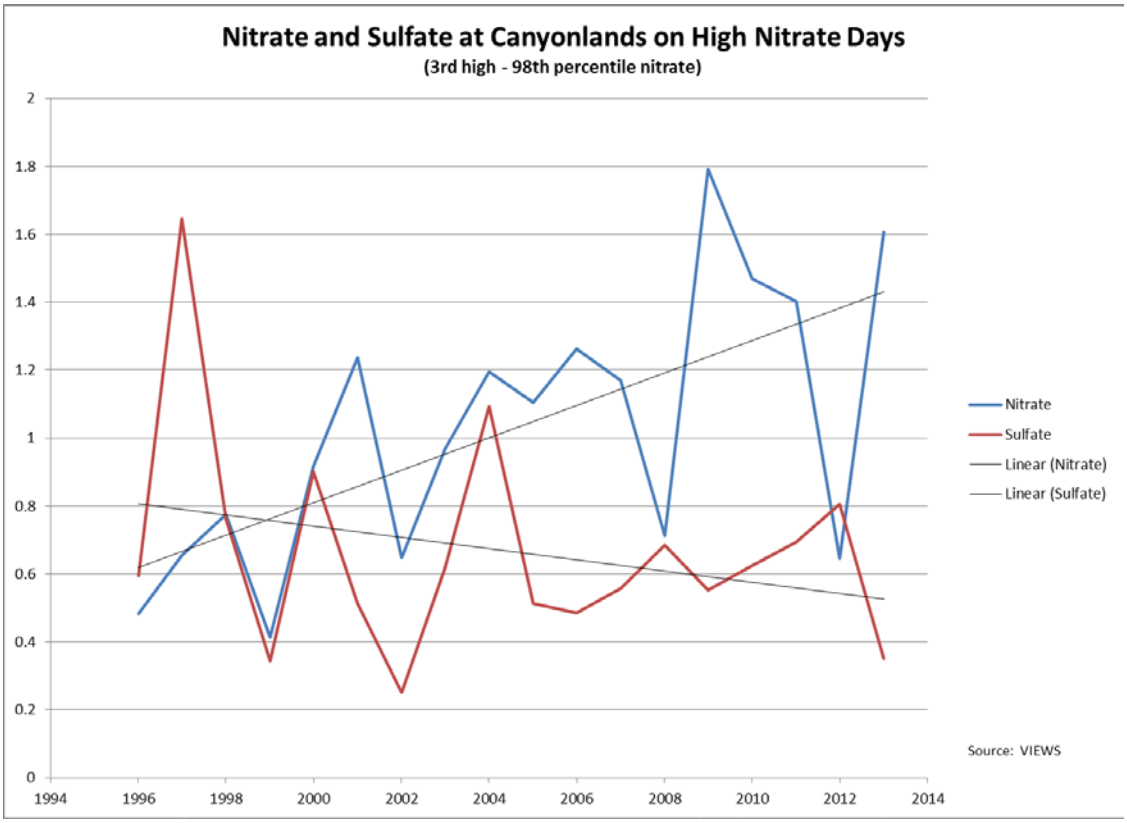
Figure 6. Sulfate and Nitrate Trends at Canyonlands





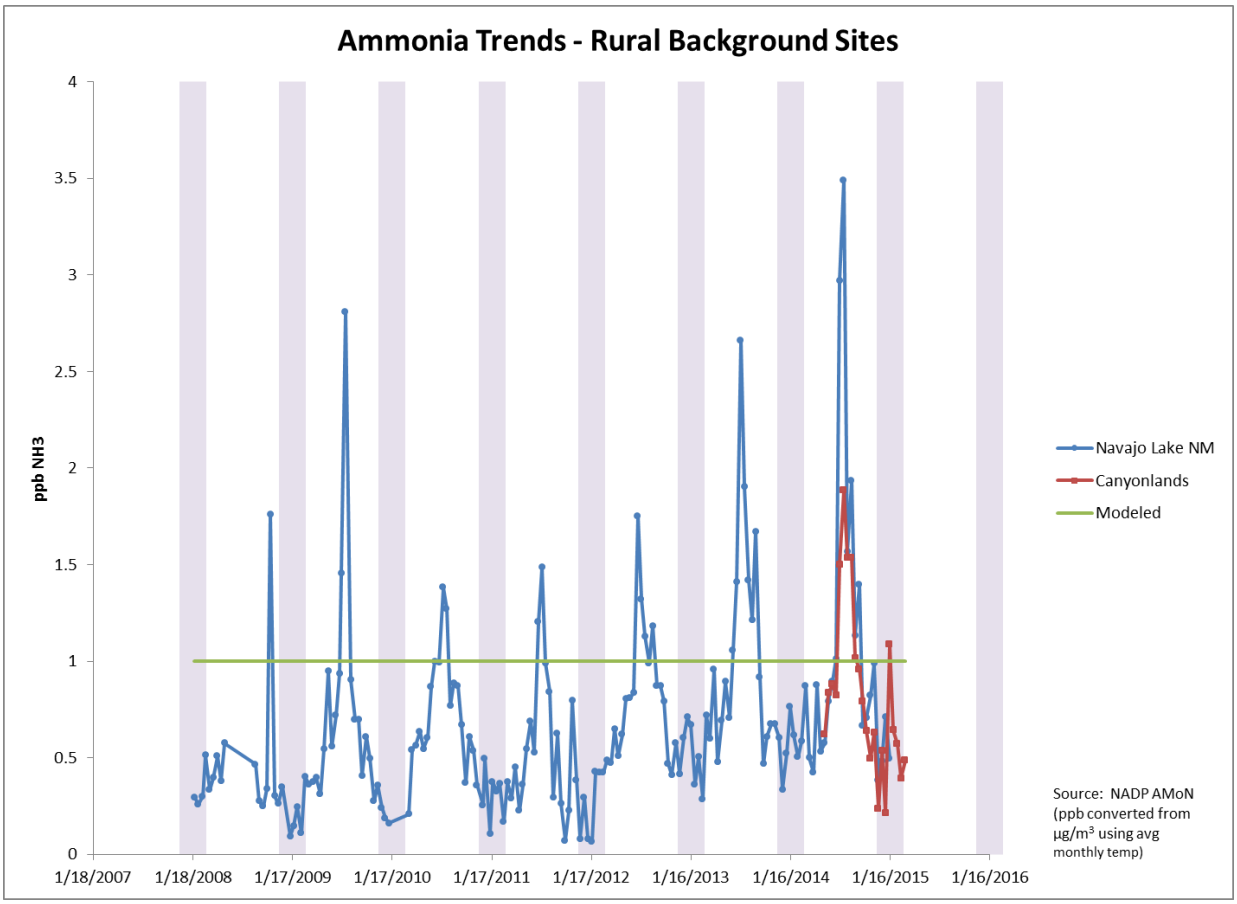
The explanation for the lack of improvement in winter nitrate levels may lie in the chemical reactions that lead to the formation of ammonium sulfate and ammonium nitrate. Ammonium sulfate forms more readily than ammonium nitrate when both SO_2 and NOx are available to react with ammonia. As SO_2 emissions decline and SO_2 is no longer available, the reaction shifts to form ammonium nitrate from available NOx. Figure 7 shows the nitrate and sulfate mass on the 98th percentile (3rd high) nitrate day showing the possible shift from formation of sulfate to nitrate. Figure 6 on the previous page shows that the decreases in sulfate are offset by increases in nitrate during the winter while ammonium levels show little change. This would make sense if ammonia is limiting the reaction because two molecules of ammonium nitrate (NH4)NO3 would be created for every molecule of ammonium sulfate (NH4)2SO4 that was decreased. During the summer sulfate, nitrate, and ammonium are all decreasing, indicating that ammonia is not limiting the reaction.

Figure 7. Nitrate and Sulfate on High Nitrate Days



The overall result is that emission reductions may not lead to visibility improvement in the winter because there is not enough ammonia available to react with all of the SO2 and NOx available in the area. Figure 8 shows ammonia monitoring data from Canyonlands National Park and Navajo Lake in New Mexico. Ammonia levels at these two sites are very low during the winter.

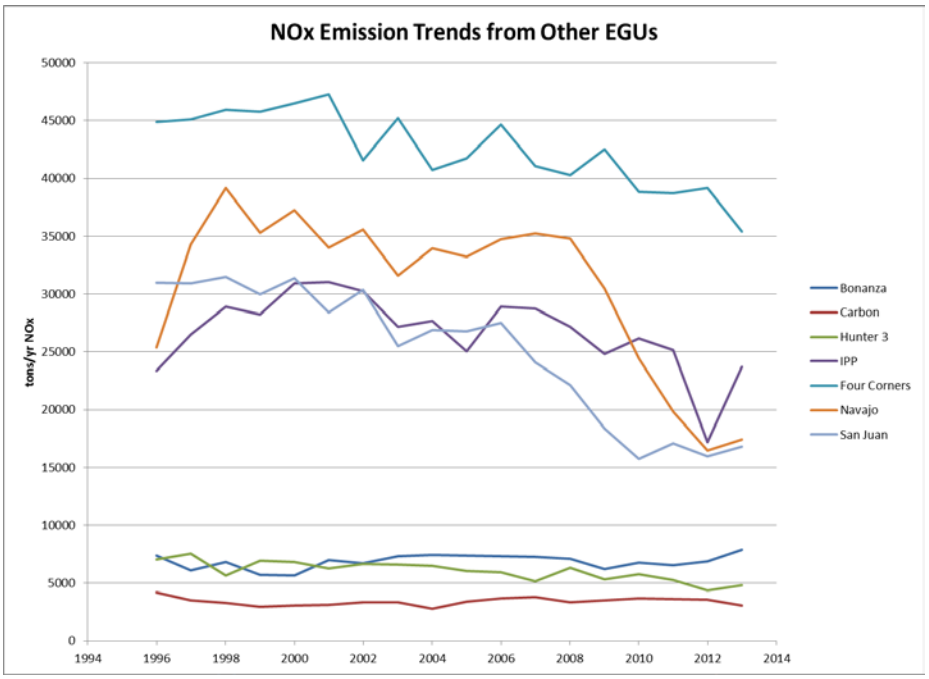
Figure 8. Ammonia Trends at Rural Background Sites



Ammonium nitrate levels are low most of the year and are only significant during the winter months (see figure4) so if NOx emission reductions do not lead to visibility improvements in the winter the overall effect may not be a great as expected. Ammonium sulfate, on the other hand, is an issue year round. For this reason, DAQ has greater confidence that modeled improvements due to reductions in SO_2 will be reflected in improved visibility for visitors to the Class I areas, while reductions in NOx will have a more uncertain benefit.

DAQ also considered the effect of changes in NOx emission from other sources in the region as a possible explanation for the increase in ammonium nitrate levels. Figure 9 shows that NOx emissions are decreasing at other EGUs in the area. Mobile source NOx emissions are decreasing nationwide due to implementation of the Tier 1 and Tier 2 emission standards and should continue to be reduced through the implementation of Tier 3 emission standards.

Figure 9. NOx Emission Trends from EGUs



Oil and gas NOx emissions in the surrounding basins may be increasing as shown in Table 4, but the overall scale of the emission increase is small when compared to the decrease in emissions from EGUs and mobile sources in the region.

Table 4. NOx Emissions from the Oil and Gas Industry

Oil and Gas Inventory

	2006	2012	Change
Uinta Basin	13,093	19,801	6,708
Northern San Juan	5,700	4,195	(1,505)
Southern San Juan	42,075	43,050	975
Piceance	12,390	9,951	(2,439)
Total	73,258	73,747	3,739

Source: WRAP Phase III Inventory 2012 projection. Uinta Basin – 2011 NEI inventory area sources and state permitted, WRAP 2012 Indian Country permitted.

The largest increase in NOx emissions is occurring in the Uinta Basin, located to the north of Utah's Class I areas. It is worth noting that during the winter months when ammonium nitrate levels are increasing at Canyonlands, a significant portion of the Uinta Basin emissions are trapped under a tight inversion layer throughout much of the winter. Extensive research through the multi -year Uinta Basin Ozone Study (UBOS) has indicated that there is little exchange between the air below and above the inversion

layer when an inversion is in place. The emissions are transported out of the Uinta Basin during significant storm events that break up the inversion. These storm events affect the entire region and are unlikely to transport emissions to nearby Class I areas. The DAQ is currently working with EPA, the Ute Tribe, and producers in the Uinta Basin to improve the oil and gas inventory.

The fact that ammonium nitrate levels are decreasing during most of the year, but are increasing during the winter is the best indication that the increase in ammonium nitrate is not due to changes in emissions because the emission changes are not seasonal. If emissions were increasing, the effect should be seen year round.

B. Comparison of Modeled Results

The visibility modeling demonstrated greater visibility improvement across all Class I areas. The results of this modeling are described in sections VIII.B.1 through 4. The detailed modeling results are included in the TSD.[16]

1. Improvement in number of days with significant visibility impairment.

Modeled visibility improved more often under the alternative scenario leading to an average of six fewer days with a deciview impact greater than 1.0 dV per year and 58 fewer days with a deciview impact greater than 0.5 dV per year. The number of days improved is shown using two different methodologies. The first, shown in Tables 5 and 6, shows the 3-year average number of days at each Class I area with an impact of greater than 1.0 dv and 0.5 dv. The 3-year average is then totaled for all Class I areas to show the total number of days across all Class I areas /year.

Table 5. Average Number of Days > 1.0 dV Impact

	Basecase	Alternative	Most Stringent NOx Control
Arches	128	68	77
Black Canyon of the Gunnison	36	10	9
Bryce Canyon	19	9	8
Canyonlands	141	87	87
Capitol Reef	68	42	41
Flat Tops	46	13	15
Grand Canyon	22	11	10
Mesa Verde	40	13	12
Zion	11	6	6
Total	511	258	264

[16] Technical Support Document for Regional Haze SIP

Table 6. Average Number of Days > 0.5 dV Impact

	Basecase	Alternative	Most Stringent NOx Control
Arches	176	109	130
Black Canyon of the Gunnison	75	27	34
Bryce Canyon	36	17	19
Canyonlands	178	131	140
Capitol Reef	96	63	65
Flat Tops	93	34	44
Grand Canyon	38	19	20
Mesa Verde	71	32	37
Zion	21	10	10
Total	784	441	499

The second methodology focuses on the improvement rather than the results. In this case the improvement in visibility from the baseline for each scenario was calculated for each day in the 3-year period. The number of days was then totaled across all Class I areas showing the total days across the 3-year period. Tables 7 and 8 show the number of days improved by ≥ 1.0 dV and ≥ 0.5 dV across the 3-year period.

Table 7. Number of Days that Improved 1.0 dV impact (across all 3 years)

	Alternative	Most Stringent NOx Control
Arches	246	222
Black Canyon	51	43
Bryce Canyon	27	28
Canyonlands	258	259
Capitol Reef	138	127
Flat Tops	63	51
Grand Canyon	33	35
Mesa Verde	51	53
Zion	18	19
Total	885	837

Table 8. Number of Days that Improved > 0.5 dV impact (across all 3 years)

	Alternative	Most Stringent NOx Control
Arches	433	378
Black Canyon	138	116
Bryce Canyon	66	62
Canyonlands	443	419
Capitol Reef	215	212
Flat Tops	181	144
Grand Canyon	78	78
Mesa Verde	138	132
Zion	37	34
Total	1729	1575

The results are presented in more detail in Figures 10-12 for the three most impacted Class I areas, Canyonlands, Arches, and Capitol Reef. Similar figures for the other Class I areas are included in the TSD. The groupings showing dV improvement of 3 or greater are almost all days during the winter months of December – February. The largest number of days improved are found in the 1 dV group and the .5 dV group and contain days throughout the year, including the high visitation period of March – November.

Figure 10. Days Improved at Canyonlands

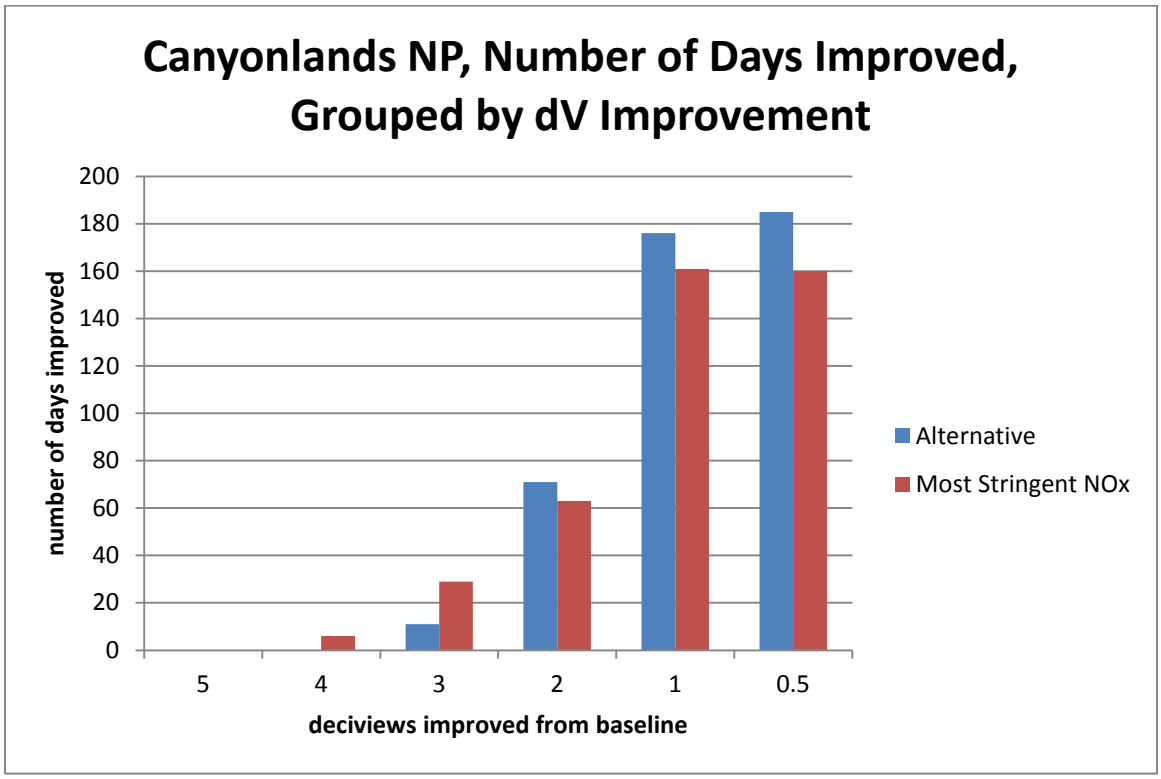


Figure 11. Days Improved at Arches

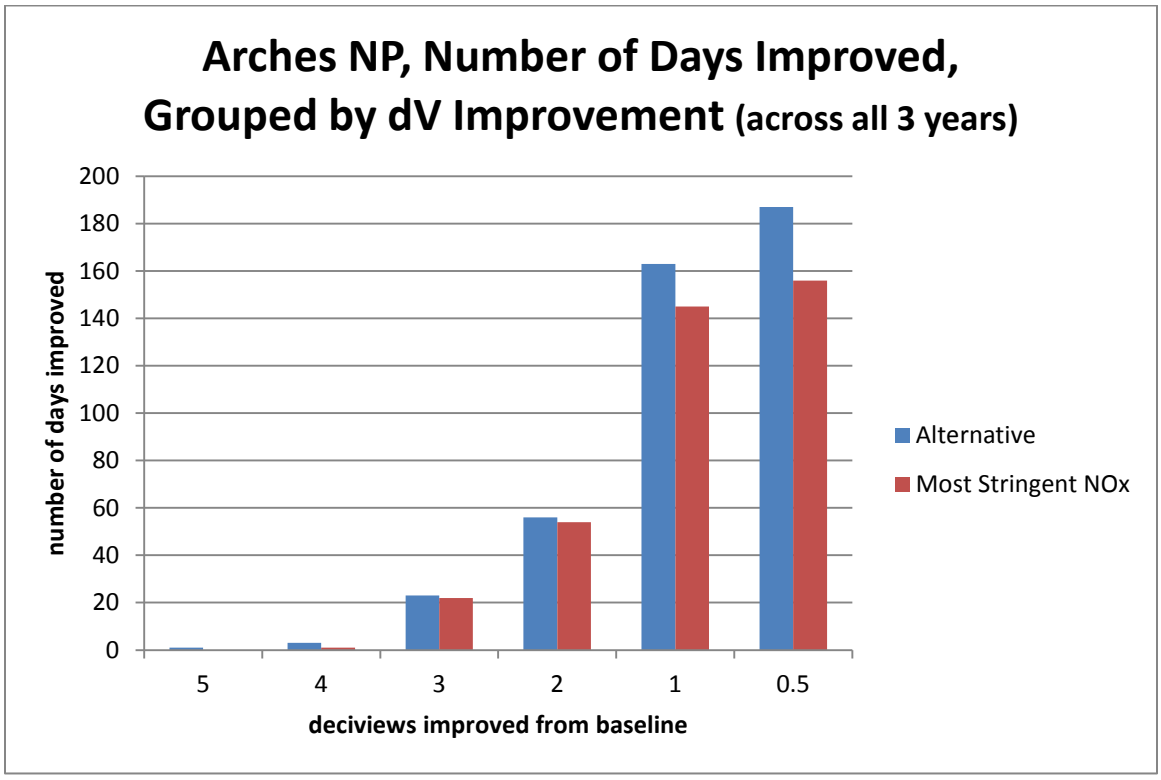
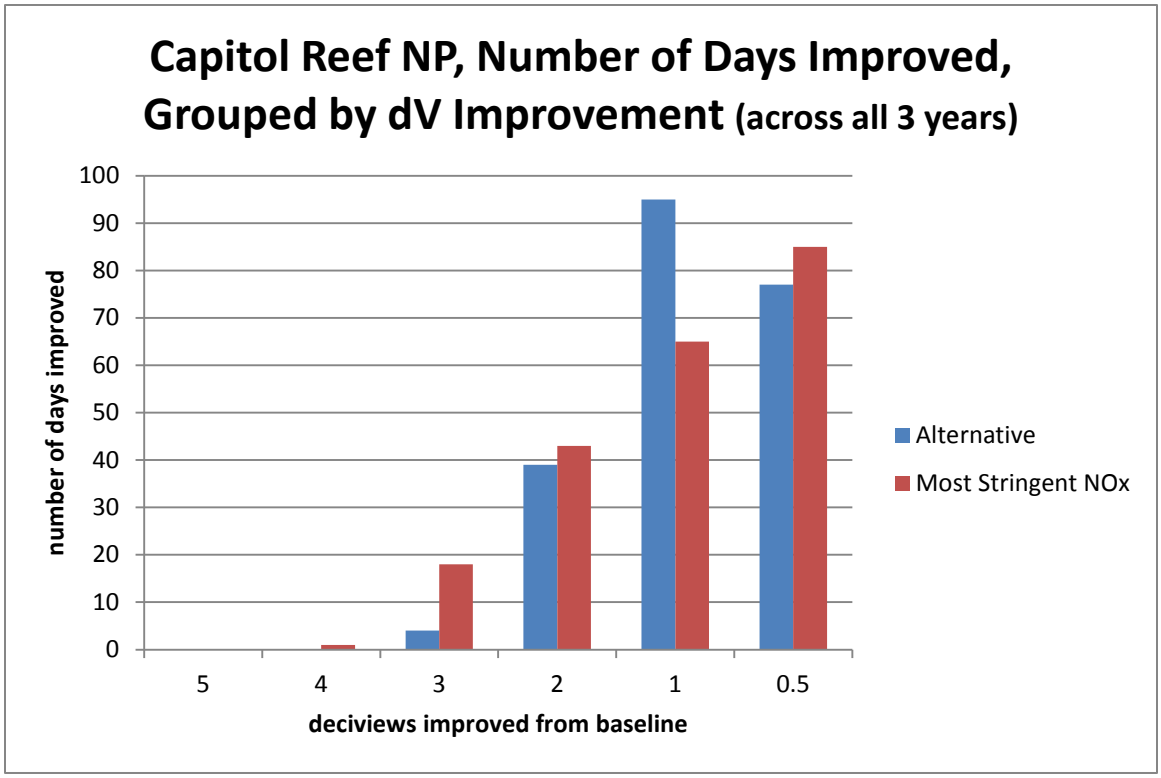


Figure 12. Days Improved at Capitol Reef



2. Average deciview impact

The average deciview impact at all Class I areas is better or the same under the alternative at six of the nine Class I areas, and is better on average across all the Class I areas. The average impact was calculated by averaging all modeling results for each year and then calculating a 3-year average from the annual average. The average deciview metric shows the benefit that will be achieved day in and day out in the Class I areas. This information is valuable as part of the overall weight of evidence because reductions in SO_2 and reductions in NOx improve visibility at different times of year and at different Class I areas. Ammonium sulfate is an issue year round while ammonium nitrate is primarily an issue in the winter. This means that the benefits of SO_2 reductions are more apparent when looking at longer averaging periods while the benefits of NOx reductions are more apparent when looking at the worst days. The average monitoring data shown earlier in this document in Figure 1 illustrates this difference. As can be seen in the figure, ammonium sulfate is the most significant visibility impairing pollutant on average. As explained in Section VIII.A, the DAQ has less confidence in the modeled results in the winter when the worst days occur because emission reductions have not led to the expected improvements during that time period.

Table 9. Average ΔdV across all Class I Areas

	Basecase	Alternative	Most Stringent NOx
Arches	1.236	0.616	0.688
Black Canyon of the Gunnison	0.334	0.137	0.158
Bryce Canyon	0.192	0.089	0.090
Canyonlands	1.389	0.791	0.760
Capitol Reef	0.719	0.398	0.367
Flat Tops	0.427	0.167	0.210
Grand Canyon	0.211	0.102	0.100
Mesa Verde	0.338	0.148	0.154
Zion	0.119	0.056	0.056
Average	0.552	0.278	0.287

3. 90th percentile deciview impact

The 90th percentile deciview impact is better or the same under the alternative at seven of the nine Class I areas, and is slightly better on average across all Class I areas. This metric shows that even on higher impact days the benefits of the alternative are comparable to the most stringent NOx scenario. Ammonium sulfate affects visibility year round and also impacts visibility on days with greater impairment. The alternative scenario that contains greater SO_2 reductions achieves comparable results to the most stringent NOx scenario that contains greater NOx reductions on these impaired days.

Table 10. 90th Percentile (110th highest) across all 3 years

	Basecase	Alternative	Most Stringent NOx
Arches	3.721	1.859	1.999
Black Canyon of the Gunnison	0.977	0.400	0.465
Bryce Canyon	0.495	0.189	0.227
Canyonlands	4.183	2.447	2.148
Capitol Reef	2.416	1.234	1.150
Flat Tops	1.221	0.466	0.555
Grand Canyon	0.559	0.222	0.241
Mesa Verde	1.124	0.430	0.501
Zion	0.183	0.067	0.089
Average	1.653	0.813	0.819

4. 98th percentile deciview impact

The only metric evaluated that showed greater improvement under the most stringent NOx scenario was the visibility impact on the most impaired days. Because high nitrate values occur primarily in the winter months, the most stringent NOx scenario achieved greater modeled visibility improvement on these high nitrate days. As discussed earlier, there is greater uncertainty regarding the effect of NOx reductions on wintertime nitrate values because past emission reductions have not resulted in corresponding reductions in monitored nitrate values during the winter months. DAQ has greater confidence in the visibility improvement due to reductions of SO_2 because past reductions have resulted in corresponding reductions in monitored sulfate values throughout the year.

Table 11. Average 98th Percentile (22nd High) Across 3 Years

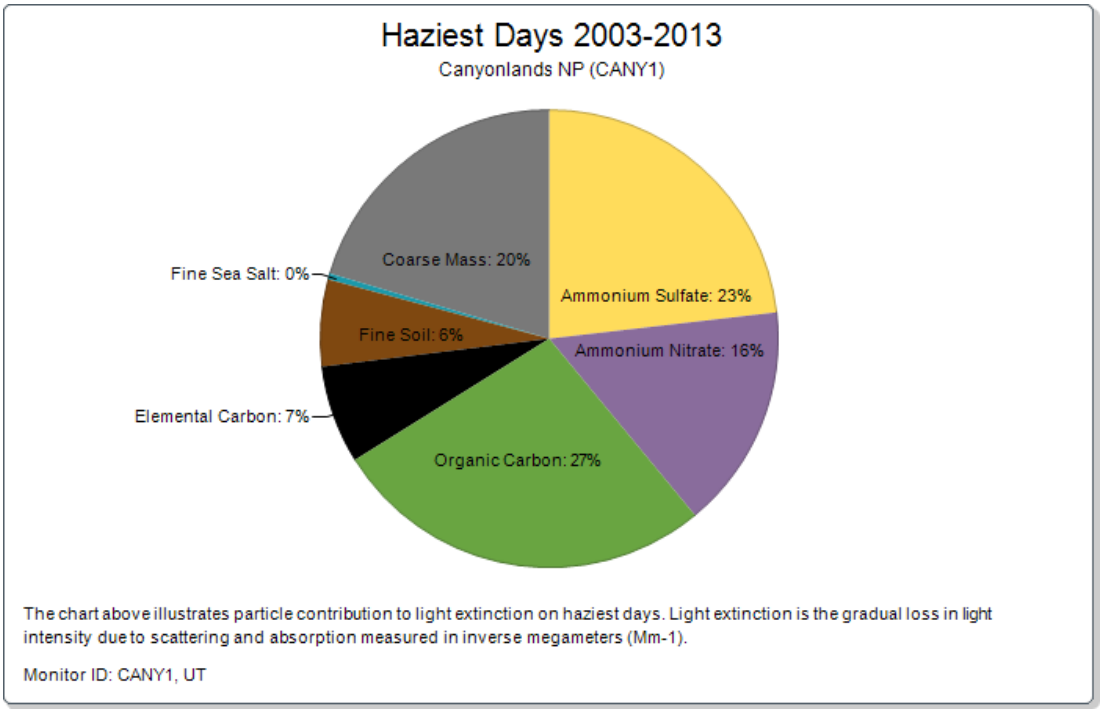
	Basecase	Alternative	Most Stringent NOx
Arches	7.25	4.43	4.57
Black Canyon of the Gunnison	2.40	1.16	1.07
Bryce Canyon	2.47	1.24	1.14
Canyonlands	8.43	6.08	5.14
Capitol Reef	6.53	4.26	3.76
Flat Tops	2.80	1.27	1.33
Grand Canyon	2.90	1.49	1.33
Mesa Verde	2.91	1.39	1.29
Zion	1.50	0.74	0.73
Average	**4.13**	**2.45**	**2.26**

Table 12. 98th Percentile (8th High) in Highest Year

	Basecase	Alternative	Most Stringent NOx
Arches	7.80	4.92	4.87
Black Canyon of the Gunnison	2.74	1.32	1.36
Bryce Canyon	4.03	1.89	1.96
Canyonlands	8.56	6.32	5.56
Capitol Reef	7.61	4.78	4.21
Flat Tops	3.20	1.37	1.81
Grand Canyon	3.64	1.98	1.81
Mesa Verde	3.08	1.52	1.48
Zion	2.61	1.14	1.22
Average	4.81	2.81	2.70

The CALPUFF modeling that is summarized in this document does not include impacts from other significant sources such as wildfire, windblown dust, other stationary sources, and mobile sources. As can be seen in Figure 13, organic carbon (fire) and coarse mass (windblown dust) are greater contributors to haze than ammonium nitrate on the 20% worst days. So, the modeled results do not give a complete picture of the visibility improvements that will be seen by visitors to Class I areas, especially on the worst days that are impacted by other emission sources.

Figure 13. Particle Contribution on Haziest Days



C. Energy and non-air quality benefits

Energy and non-air quality environmental impacts are one of the factors listed in section 169A(g)(2) that must be considered when determining BART. The alternative would avoid the energy penalty due to operating an SCR unit. PacifiCorp quantified the energy penalty associated with SCR in their August 4, 2014 BART Analysis Update, Appendix A. The energy penalty was included as part of the total cost for installing SCR on each of the units.

Table 13. SCR Energy Penalty

	Energy Penalty	
	kW	$/yr
Hunter Unit 1	2,090	$494,247
Hunter Unit 2	2,090	$494,247
Huntington Unit 1	2,182	$516,098
Huntington Unit 2	2,182	$516,098
Total	**8,544**	**$2,020,690**

The Carbon Plant, like most coal-fired power plants, produces solid wastes in the form of fly ash from the ESPs controlling both units, as well as the bottom ash conveyors which clean the residuals from both boilers. This ash is currently being landfilled. The plant also runs water through both steam generating units (the boilers), as well as a pair of cooling towers. This uses water, and has an associated

wastewater discharge. Hauling the ash to landfill requires additional fuel use and water or chemical dust suppression for minimization of fugitive dust control. Finally, for maintenance and emergency purposes, the plant has a number of emergency generators, fire pumps, and ancillary equipment - all of which must be periodically operated, tested and maintained - with associated air emissions, fuel use, painting, and the like. All of these non-air quality impacts are reduced as the result of the closure of the Carbon Plant.

D. Cost

PacifiCorp noted in their comments on the proposed SIP revision that the Alternative Measure not only produces greater reasonable progress, including lower emissions and improved visibility, but it does so at a significant capital cost savings to PacifiCorp and its customers as compared to the most stringent NO_x technology and limits. While DAQ has not officially determined the cost of installing SCR on the four units, it is clear that it would be a significant cost. On the other hand, the Carbon Plant has already been closed due to the high cost of complying with the MATS rule. The costs to Utah rate payers (and those in other states served by PacifiCorp) to replace the power generated by the Carbon Plant have already occurred; there will be no additional cost to achieve the co-benefit of visibility improvement. In other words, the Alternative Measure achieves better visibility improvements than would be achieved by requiring SCR as BART at the four EGUs, and at a significantly lower cost. This presents a classic "win/win" scenario –the Alternative Measure results in greater reasonable progress and that greater reasonable progress is achieved at a much lower price compared to SCR. Cost is one of the factors listed in section 169A(g)(2) that should be considered when determining BART.

E. Summary of Weight of Evidence

The weight of evidence shows that the alternative program will provide greater reasonable progress than BART. Combined emissions of NOx, SO_2, and PM will be 2,856 tons/yr lower under the alternative scenario. Reductions were achieved earlier than was required by the rule, providing a corresponding early and on-going visibility improvement. The alternative program provides greater reductions of SO_2, the most significant anthropogenic pollutant affecting Class I Areas on the Colorado Plateau that affects visibility year-round, including the high visitation seasons of spring, summer, and fall. Finally, visibility modeling shows that the alternative will provide visibility improvement on a greater number of days, greater average improvement, and greater improvement on the 90th percentile deciviews across all Class I areas.[17,18]

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[17] Greater reasonable progress can be demonstrated using one of two methods: (i) "greater emission reductions" than under BART (40 C.F.R. §51.308(e)(3)); or (ii) "based on the clear weight of evidence" (40 C.F.R. §51.308(e)(2)(E)). As the U.S. Circuit Court of Appeals for the 10th Circuit recently observed, the state is free to choose one method or the other. *WildEarth Guardians v. E.P.A.*, 770 F.3d 919, 935-37 (10th Cir. 2014). The court characterized the former approach as a "quantitative" and the later as "qualitative," and specifically sanctioned the use of qualitative factors under the clear weight of evidence.

[18] EPA has proposed approval of an Alternative Measure for the Apache Generating Station in Arizona on similar "weight of evidence" grounds. 79 Fed. Reg. 56,322, 56,327 (Sept. 19, 2014). EPA has also approved a similar Alternative Measure in Washington based, in part, on a reduction in the number of days of impairment greater than 0.5 dv and 1.0 dv. 79 Fed. Reg. 33,438, 33,440-42 (June 11, 2014).

IX. Timing of NOx Emission Reductions under Alternative Measure and Monitoring, Recordkeeping, and Reporting

40 CFR 51.308(e)(2)(iii) A requirement that all necessary emission reductions take place during the period of the first long-term strategy for regional haze. To meet this requirement, the state must provide a detailed description of the emission trading program or other alternative measure, including schedules for implementation, the emission reductions required by the program, all necessary administrative and technical procedures for implementing the program, rules for accounting and monitoring emissions, and procedures for enforcement.

The schedule for installation of the NOx controls required by the alternative measure is shown in Table 14. The alternative measure will be fully implemented prior to 2018, the end of the first long term strategy for regional haze.

Table 14. Implementation Schedule

Unit	Year Installed or Required
PacifiCorp Hunter Unit 1	2014
PacifiCorp Hunter Unit 2	2011
PacifiCorp Hunter Unit 3	2008
PacifiCorp Huntington Unit 1	2010
PacifiCorp Huntington Unit 2	2006
PacifiCorp Carbon Unit 1	2015
PacifiCorp Carbon Unit 2	2015

The enforceable emission limits, administrative and technical procedures for implementing the program, rules for accounting and monitoring emissions, and procedures for enforcement are addressed in SIP Section IX, Parts H.21 and 22.

X. Emission Reductions are Surplus

40 CFR 51.308(e)(2)(vi) A demonstration that the emission reductions resulting from the emissions trading program or other alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP.

A. Baseline Date of the SIP

When the regional haze rule was promulgated in 1999, EPA explained that the "baseline date of the SIP" in this context means "the date of the emissions inventories on which the SIP relies."[19] The baseline inventory for the regional SO_2 milestones and backstop trading program in Utah's 2003 SIP was 1990 while the inventory for the remaining elements in the 2003 SIP, including enhanced smoke management, mobile sources, and pollution prevention, was 1996. When the RH SIP was updated in 2008, a new baseline inventory of 2002 was established for regional modeling, evaluating the impact on Class I areas outside of the Colorado Plateau, and BART as outlined in EPA Guidance[20] and the July 6, 2005 BART Rule.[21] For purposes of evaluating an alternative to BART, the later baseline date of 2002 is therefore most appropriate. 2002 is the baseline inventory that was used by other states throughout the country when evaluating BART under the provisions of 40 CFR 51.308. Any measure adopted after 2002 is considered "surplus" under 40 CFR 51.308(e)(2)(iv)[22]. To make a valid comparison that the "alternative measure will be surplus to those reductions resulting from measures adopted to meet requirements of the CAA as of the baseline date of the SIP" as required by 40 CFR 51.308(e)(2)(iv), the Most Stringent NOx scenario includes measures required before the baseline date of the SIP but does not include later measures that are credited as part of the alternative scenario.

B. SO_2, NOx, and PM Reductions from the Closure of the PacifiCorp Carbon Plant

Utah met the BART requirement for SO_2 as provided under 40 CFR 51.309(d)(4) through the establishment of SO_2 emission milestones with a backstop regulatory trading program to ensure that SO_2 emissions in the 3-state region of Utah, Wyoming, and New Mexico decreased substantially between 2003 and 2018. The final SO_2 milestone in 2018 was determined to provide greater reasonable progress than BART and the overall RH SIP was deemed to meet the reasonable progress requirements for Class I areas on the Colorado Plateau and for other Class I areas[23]. The modeling supporting the RH SIP included regional SO_2 emissions based on the 2018 SO_2 milestone and also included NOx and PM

[19] 64 FR 35742, July 1, 1999

[20] Memorandum from Lydia Wegman and Peter Tsirigotis, 2002 Base Year Emission Inventory SIP Planning: 8-hr Ozone, PM2.5, and Regional Haze Programs, November 8, 2002.

[21] 70 FR 39143, July 6, 2005

[22] Utah's actions here are consistent with EPA's actions in other states. *See e.g.*, 79 Fed. Reg. at 33,441-42; 79 Fed. Reg. at 56,328.

[23] 77 FR 74355, December 14, 2012

emissions from the Carbon Plant. Actual emissions in the 3-state region are calculated each year and compared to the milestones. As can be seen in Table 15, the 2018 milestone was met seven years early in 2011 and SO_2 emissions have continued to decline. The most recent milestone report for 2013 demonstrates that SO_2 emissions are currently 26% lower than the 2018 milestone. The Carbon Plant was fully operational in the years 2011-2013 when the 2018 milestone was initially achieved for those years. Therefore the SO_2 emission reductions from the closure of the Carbon Plant are surplus to what is needed to meet the 2018 milestone established in Utah's RH SIP.

Table 15. SO_2 Milestone Trends

	Milestone	Three Year Average SO_2 Emissions (tons/yr)	Carbon Plant SO_2 Emissions (tons/yr)
2003	303,264	214,780	5,488
2004	303,264	223,584	5,642
2005	303,264	220,987	5,410
2006	303,264	218,499	6,779
2007	303,264	203,569	6,511
2008	269,083	186,837	5,057
2009	234,903	165,633	5,494
2010	200,722	146,808	7,462
2011	200,722	130,935	7,740
2012	200,722	115,115	8,307
2013	185,795	105,084	7,702
2014	170,868		
2015	155,940		
2016	155,940		
2017	155,940		
2018	141,849		

The Carbon Plant was built in the 1950s and is therefore grandfathered under Utah's permitting rules. The plant is equipped with an electrostatic precipitator for PM control and has no SO_2 or NOx controls. PacifiCorp shut down the Carbon Power Plant on April 14, 2015 due to the high cost to control mercury to meet the requirements of EPA's new Mecury and Air Toxics Standards (MATS) rule. The MATS rule was finalized in 2011, well after the 2002 base year for Utah's RH SIP, and therefore any reductions required to meet the MATS rule are clearly surplus and may be considered as part of an alternative strategy under 40 CFR 51.308(e)(2)(vi). While PacifiCorp has shut down the Carbon Plant, this decision is not enforceable, and PacifiCorp could choose to meet the MATS requirements through other measures. On November 25, 2014, the Supreme Court agreed to consider challenges to the MATS rule, so there is a possibility that the mercury control requirements could be overturned or delayed. An enforceable requirement is included in Section IX.H.22 of the SIP to make the permanent closure of the Carbon Plant

enforceable by August 15, 2015. This provision will ensure that the substantial emission reductions that are relied upon as part of the alternative strategy will occur if the MATS rule is overturned or delayed.

C. PacifiCorp Hunter Unit 3

PacifiCorp upgraded the low-NOx burners on Hunter Unit 3 in 2008. This upgrade was not required under the requirements of the Clean Air Act as of the 2002 baseline date of the SIP and is therefore clearly considered surplus and may be credited in the alternative program under 40 CFR 51.308(e)(2)(vi). Prior to the 2008 upgrade, the emission rate for Hunter Unit 2 was 0.46 lb/MMBtu heat input for a 30-day rolling average as required by Phase II of the Acid Rain Program.

XI. Visibility Analysis

40 CFR 51.308(e)(3) A State which opts under 40 CFR 51.308(e)(2) to implement an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate, and maintain BART may satisfy the final step of the demonstration required by that section as follows: If the distribution of emissions is not substantially different than under BART, and the alternative measure results in greater emission reductions, then the alternative measure may be deemed to achieve greater reasonable progress. If the distribution of emissions is significantly different, the State must conduct dispersion modeling to determine differences in visibility between BART and the trading program for each impacted Class I area, for the worst and best 20% of days. The modeling would demonstrate "greater reasonable progress" if both of the following two criteria are met:

(i) Visibility does not decline in any Class I area, and

(ii) There is an overall improvement in visibility, determined by comparing the average differences between BART and the alternative over all affected Class I areas.

The Hunter, Huntington, and Carbon plants are all located within 40 miles of each other in Central Utah. Because of the close proximity of the three plants, the distribution of emissions will not be substantially different under the alternative program. As described in section VII, combined emissions of all three pollutants are 2,856 tons/yr lower under the alternative measure . Therefore, the alternative measure may be deemed to achieve greater reasonable progress than BART.

Utah has chosen to use a weight-of-evidence approach under 40 CFR 51.308(e)(2)(i)(E), as described in section VIII of the staff review. The separate visibility analysis described in section VIII is part of the weight-of-evidence demonstration and is not intended to provide the type of modeling demonstration that would otherwise be required under 40 CFR 51.308(e)(3).

XII. Reasonable Progress

The WRAP compiled regional inventories and completed regional modeling to support the development of RH SIPs in the western states. For all of these analyses, WRAP assumed continued operation of the

Carbon plant. There were two projected inventories that were used by western states depending on when their SIPs were completed: PRP18a and PRP18b. These inventories assumed BART emission reductions from Hunter Units 1 and 2 and Huntington Units 1 and 2 based on the presumptive BART emission rate established in 40 CFR Part 51 Appendix Y, or actual emissions if lower. As can be seen in Table 16, the NOx emissions from the Carbon plant (shown as reductions in the 4th column) are comparable to the WRAP projected inventories while the SO_2 emissions were about 1,200 tons higher than the WRAP projected inventory. However, current SO_2 emissions for the Hunter and Huntington Plant are lower than had been projected, so when SO_2 emissions from all three plants are combined, the total is less than had been projected by the WRAP. The last column in the table shows that even if the emission reductions from the Carbon plant and Hunter 3 are excluded, the NOx, SO_2, and PM_{10} emissions are lower than the WRAP projected inventories. The emission reductions from the Carbon plant and Hunter 3 were not necessary for other states to meet their reasonable progress goals and therefore provide an added benefit for other states.

Table 16. Comparison of Alternative Measures to Reasonable Progress Inventories

NOx	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	3,366	3,366	0	3,348	3,348
Hunter	15,331	16,503	11,446	1,908	13,354
Huntington	8,251	8,559	7,437		7,437
Total	26,947	28,429	18,883	5,256	24,139

SO_2	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	6,824	6,824	0	8,005	8,005
Hunter	6,109	6,350	4,091		4,091
Huntington	3,811	3,955	2,355		2,355
Total	16,744	17,129	6,446	8,005	14,451

PM_{10}	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	221	221	0	573	573
Hunter	1,049	1,049	460		460
Huntington	654	654	376		376
Total	1,924	1,924	836	573	1,409

Combined	PRP18a	PRP18b	Alternative	Reductions Carbon and Hunter 3	Alternative with Reductions Excluded
Carbon	10,411	10,411	0	11,926	11,926
Hunter	22,489	23,903	15,997	1,908	17,905
Huntington	12,716	13,169	10,168	0	10,168
Total	45,615	47,482	26,165	13,834	39,999

XIII. Future Planning

The regional haze program is designed to achieve a long-term goal and updated SIPs are required every 10 years to ensure continued progress. The DAQ is beginning work on a RH SIP that will address the next planning period of 2018 – 2028. This next RH SIP is due in 2018, and the DAQ anticipates that this SIP will be completed in parallel with planning efforts to meet the new ozone standard that will be finalized in October, 2015. Both regional haze and ozone are affected by regional NOx emissions, and the DAQ anticipates that common emission strategies will lead to improvements in both areas. Significant technical work must be completed before these common benefits can be quantified in the next RH and ozone SIP.