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## **Demonstration that the SO<sub>2</sub> Milestones Provide Greater Reasonable Progress than BART**

### **A. Background**

In 1996 the Grand Canyon Visibility Transport Commission (GCVTC) submitted recommendations to EPA to improve visibility in the 16 Class I Areas on the Colorado Plateau. The GCVTC concluded that a broad-based approach that addressed multiple pollutants and source categories was necessary to reduce regional haze. The report recommended a series of strategies to address stationary sources, mobile sources, fire, pollution prevention, fugitive dust, and clean air corridors.

On July 1, 1999 the Environmental Protection Agency (EPA) published regulations to address regional haze visibility impairment. The regulations required States to address Best Available Retrofit Technology (BART) requirements for regional haze visibility impairment, and allowed nine western states to develop plans that were based on the GCVTC recommendations for stationary sources in lieu of BART.

In 2000, the Western Regional Air Partnership (WRAP) submitted an Annex to the GCVTC recommendations that provided more details regarding the regional SO<sub>2</sub> milestones and backstop trading program that had been recommended in the GCVTC Report, and included a demonstration that the milestones achieved greater reasonable progress than would have been achieved by the application of BART in the region. The Annex was approved by EPA in 2003, but this approval was later vacated by the DC Circuit Court of Appeals in 2005 due to problems with the methodology that was required in the regional haze rule for demonstrating greater reasonable progress than BART.<sup>1</sup>

On July 6, 2005 EPA revised the regional haze rule in response to the judicial challenges to the BART requirements. On October 13, 2006 EPA published additional revisions to address alternatives to source-specific BART determinations.

Five western states (Arizona, New Mexico, Oregon, Utah, and Wyoming) had submitted State Implementation Plans (SIPs) in 2003 under 40 CFR §51.309. Four of those states (Arizona, New Mexico, Utah, and Wyoming) have updated their SIPs to include new milestones that are based on more recent emission inventories as well as the revised BART requirements in the regional haze rule. The fifth state, Oregon, is no longer participating in the program. This demonstration shows that the SO<sub>2</sub> milestones will achieve greater reasonable progress than would have been achieved from the installation and operation of BART at all sources subject to BART in the participating states in accordance with the revised regional haze rule.

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<sup>1</sup> *Center for Energy and Economic Development v. EPA*, February 18, 2005; *American Corn Growers Association v. EPA*, May 24, 2002.

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## **B. RH Rule Requirements**

40 CFR 51.309(d)(4) states, “The milestones must be shown to provide for greater reasonable progress that would be achieved by application of BART pursuant to §51.308(e)(2).”

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:

(i) A 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. This demonstration must be based on the following:

(A) A list of all BART-eligible sources within the State.

(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 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 paragraph (e)(1) of this section, or otherwise addressed under paragraphs (e)(1) or (e)(4) of this section.

(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 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.

(D) An analysis of the projected emissions reductions achievable through the trading program or other alternative measure.

(E) A determination under paragraph (e)(3) of this section or otherwise based on the clear weight of evidence that the trading program or other alternative measure achieves greater

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reasonable progress than would be achieved through the installation and operation of BART at the covered sources.

### ***C. Identification of BART-Eligible Sources and Sources Subject to BART.***

Establishing BART emission limitations under 51.308(e)(1) is a three step process (70 FR 39106):

- 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 the State identifies the appropriate control technology.

#### **1. BART-Eligible Sources.**

Pursuant to 40 CFR 51.308(e)(2)(i), States submitting §309 SIPs are required to list all BART-eligible sources covered by the alternative program. BART-eligible sources are identified as those sources that fall within one of 26 specific source categories, were built between 1962 and 1977, and have potential emissions of at least 250 tons per year of any visibility impairing air pollutant (40 CFR 51.301). The BART-eligible sources identified by the four Section 309 States are shown in Table 1.

#### **2. Subject to BART Determination.**

Pursuant to 40 CFR 51.308(e)(2)(i)(B) and (e)(1)(ii), States are required to determine which BART-eligible sources are “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. §309 States have conducted individual source modeling to determine if a BART-eligible source causes or contributes to visibility impairment.

Three of the §309 States (Arizona, New Mexico, and Utah) utilized the technical modeling services of the WRAP Regional Modeling Center (RMC). Modeling was performed according to the RMC modeling protocols (CALMET/CALPUFF Protocol for BART Exemption Screening Analysis for Class I Areas in the Western United States). For the WRAP BART exemption screening modeling, the RMC followed the EPA BART Guidelines (EPA, 2005) and the applicable CALMET/CALPUFF modeling guidance (e.g., IWAQM, 1998; FLAG, 2000; EPA, 2003c) including EPA’s March 16, 2006 memorandum: “Dispersion Coefficients for Regulatory Air Quality Modeling in CALPUFF” (Atkinson and Fox, 2006).

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

- Three years (2001, 2002 and 2003) were modeled.
- Visibility impacts due to emissions of SO<sub>2</sub>, NO<sub>x</sub> 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.
- According to 40 CFR Part 51, Appendix Y (EPA BART Guidelines; EPA, 2005), a BART-eligible source is considered to “contribute” to visibility impairment in a Class I area if the modeled 98<sup>th</sup> percentile change in deciviews is equal to or greater than the “contribution threshold.”
- The threshold for visibility impact, for a single source, was a 0.5 deciviews change or more to “contribute” to visibility impairment. This threshold is consistent with the EPA BART Guidelines (EPA 2005) that states, “As a general matter, any threshold that you use for determining whether a source ‘contributes’ to visibility impairment should not be higher than 0.5 deciviews.” This threshold is also consistent with long-standing visibility modeling practices. States have the discretion to set a lower threshold, but the four participating states have not determined that a lower threshold is needed or justified.

The State of Wyoming performed modeling in-house that was also based on EPA BART Guidelines and the applicable CALMET/CALPUFF guidelines. The basic assumptions were the same as used in the RMC modeling with the following exception: meteorological data for 1995, 1996, and 2001 that were prepared for a previous modeling analysis were used for the southwest Wyoming modeling domain. Wyoming’s *BART Air Modeling Protocol*, September 2006, is posted at <http://deq.state.wy.us/aqd/BART.asp>.

**Table 1. Subject to BART Status for 309 BART-Eligible Sources**

State	Plant Name	Unit	BART Eligible	Subject to BART	Modeling Entity	BART Category
AZ	Abitibi Consolidated Sales Corp – Snowflake Pulp Mill	Power Boiler 2	Y	Y	WRAP	22
AZ	Apache Nitrogen Products Nitric Acid Plant	AOPs 3-4	Y	N	WRAP	10
AZ	Arizona Electric Power Coop – Apache Power Plant	Units 1-3	Y	Y	WRAP	01
AZ	Arizona Portland Cement Company	Kiln 4	Y	Y	WRAP	04
AZ	Arizona Public Service – Cholla Power Plant	Units 2-4	Y	Y	WRAP	01
AZ	Arizona Public Service – West Phoenix Power Plant	CC 1-3	Y	Y	WRAP	01
AZ	Chemical Lime Company – Douglas Lime Plant	Kilns 4-5	Y	N	WRAP	12
AZ	Chemical Lime Company – Nelson Lime Plant	Kilns 1-2	Y	Y	WRAP	12
AZ	Kennecott (ASARCO) – Hayden	Converters 1-5,	Y	Y	WRAP	08

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	Copper Smelter	Anode Furnaces 1-3				
AZ	Phelps Dodge Corporation – Morenci Plant	Gas Turbine 1-2, Gas Boilers 1-2, Boiler 4	Y	N	WRAP	22
AZ	Phelps Dodge Miami Copper Smelter	Hoboken Converters 1-5, Remelt Furnace, Shaft Furnace	Y	Y	WRAP	08
AZ	Salt River Project – Coronado Power Plant	Units 1-2	Y	Y	WRAP	01
AZ	Salt River Project – Santan Power Plant	Units 1-4	Y	N	WRAP	01
NM	Amoco Empire Abo	SRU Only	Y	N	WRAP	15
NM	SWPS Cunningham Station (Xcel Energy)	One Unit	Y	N	WRAP	01
NM	Duke Energy Artesia Gas Plant	SRU Only	Y	N	WRAP	15
NM	Duke Energy Linam Ranch Gas Plant	SRU Only	Y	N	WRAP	15
NM	Dynegy Saunders	SRU Only	Y	N	WRAP	15
NM	Giant Refining San Juan Refinery	Unit #1 FCCP ESP Stack	Y	N	WRAP	11
NM	Giant Refining, Ciniza Refinery	4 B&W CO boiler	Y	N	WRAP	11
NM	SWPS Maddox Station (Xcel Energy)	One Unit	Y	N	WRAP	01
NM	Marathon Indian Basin Gas Plant	SRU Only	Y	N	WRAP	15
NM	PNM, San Juan	Units 1-4	Y	Y	WRAP	01
NM	Rio Grande Station	One Unit	Y	N	WRAP	01
NM	Western Gas Resources San Juan River Gas Plant	SRU Only	Y	N	WRAP	15
UT	PACIFICORP – Hunter Power Plant	Units 1-2	Y	Y	WRAP	01
UT	PACIFICORP – Huntington Power Plant	Units 1-2	Y	Y	WRAP	01
WY	BASIN ELECTRIC POWER COOP – LARAMIE RIVER	Units 1-3	Y	Y	WY DEQ	01
WY	BLACK HILLS POWER & LIGHT = NEIL SIMPSON 1	Unit 1	Y	N	WY DEQ	01
WY	Dyno Nobel (formerly Coastal Chemical)	9 Units	Y	N	WY DEQ	10
WY	FMC CORP – GREEN RIVER SODA ASH PLANT	3 Units	Y	Y	WY DEQ	22
WY	FMC WYOMING CORP – GRANGER SODA ASH PLANT	2 Units	Y	N	WY DEQ	22
WY	GENERAL CHEMICAL – GREEN RIVER SODA ASH PLANT	2 Units	Y	Y	WY DEQ	22
WY	P4 PRODUCTION – ROCK SPRINGS COKING PLANT	1 Unit	Y	N	WY DEQ	22
WY	PACIFICORP – DAVE JOHNSTON	Units 3-4	Y	Y	WY DEQ	01
WY	PACIFICORP – JIM BRIDGER	Units 1-4	Y	Y	WY DEQ	01
WY	PACIFICORP – NAUGHTON	Units 1-3	Y	Y	WY DEQ	01
WY	PACIFICORP – WYODAK	Unit 1 (335 MW)	Y	Y	WY DEQ	01
WY	SINCLAIR OIL CORP-SINCLAIR REFINERY	16 units	Y	N	WY DEQ	11
WY	SINCLAIR REFINERY – CASPER	1 unit	Y	N	WY DEQ	11

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## ***D. BART Control Technology***

Emission estimates for 2018, assuming the application of BART for SO<sub>2</sub> on all subject-to-BART sources in the four states, were prepared and are compiled in a spreadsheet named “2009-04\_18 four state EGU & Other SO<sub>2</sub> rates V27.xls” (see technical support documentation). The 2018 estimates for these sources are estimates of actual emissions and therefore reflect greater emission reductions than would be enforceable in a case-by-case BART permit. The methodology that was used to estimate these emission reductions is described below.

### **1. Case-by-Case BART Estimates were completed for a number of sources.**

Utah: Pacificorp initiated pollution control projects at the Huntington and Hunter Power Plants to reduce SO<sub>2</sub>, NO<sub>x</sub>, PM and mercury. Upgraded controls were installed on Huntington Unit 2 in 2007, a permit authorizing the project at the Hunter Power Plant is expected to be issued in December 2007, and the permit for Huntington Unit 1 is expected to be issued in 2008. The State of Utah evaluated the proposed projects, and determined that they exceeded the presumptive BART levels for SO<sub>2</sub> in EPA’s BART guidelines. Therefore, the permitted emission rates (or expected permitted rates) were used to estimate actual emissions in 2018.

Wyoming: Wyoming Air Quality Division, Standards and Regulations, Chapter 6, Section 9, required each source subject to BART to submit a BART permit application to the Division. The applications were required to include a proposal and justification for BART emission limits and control technology that reflect the BART guidelines established in 40 CFR Part 51, Appendix Y. The emission rates contained in those applications for utilities smaller 750 MW and non-utilities were used to estimate 2018 emissions for the affected sources in Wyoming for the purpose of establishing the regional milestone. Emission rates from utilities greater than 750 MW were assumed to be at the presumptive BART level as described below.

### **2. Copper smelters.**

Arizona DEQ notified two copper smelters (Asarco Hayden and Phelps Dodge Miami) that the facilities were potentially subject to BART and required these sources to either submit a BART analysis or a demonstration that the source was not subject to BART. Arizona has not yet completed its review of the analyses submitted by these sources. Therefore, the previous determination that had been made during the development of the Annex is used as a placeholder until a final determination can be made.

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As described in the Annex, the smelters in Arizona were not considered BART-eligible for SO<sub>2</sub> emissions because the smelters installed acid plants to meet the requirements of Arizona's SO<sub>2</sub> SIP during the 15-year BART window. This was determined to be consistent with 40 CFR Part 51, Appendix Y, Section II.A.2, subsection 2 that states, "Sources are not BART-eligible if the only change at the plant during the relevant time period was the addition of pollution controls." The Annex also concluded that copper smelters in the region were already operating at a BART level of control for SO<sub>2</sub>. This placeholder will be re-evaluated when Arizona completes its review of the analyses that were submitted by the smelters, if there are significant changes.

### **3. Presumptive BART Levels.**

All other utilities that were determined to be subject to BART were assumed to be operating at the presumptive emission rate established in 40 CFR Part 51, Appendix Y (0.15 lb/MMBtu). Actual emissions at this presumptive emission rate were estimated for 2018.

### **4. Other sources.**

There are several other small non-utility sources that are potentially subject to BART. The total emissions from these sources are negligible (1%) when compared to the regional total and are therefore not considered in this analysis.

### **5. Alternate approach.**

The analysis described above represents the best efforts of the four participating states to estimate actual emissions reductions that would occur due to BART. The total estimated emission reductions from all subject-to-BART sources is 91,760 tons SO<sub>2</sub>. If a simpler methodology is used where all electric generating units that are subject to BART (including plants below 750 MW and units that are already achieving greater than 50% control of SO<sub>2</sub>) are assumed to be operating at the presumptive minimum emission rate of 0.15 lbs/MMBtu, the estimated emission reductions from all subject to BART sources is almost the same, 91,872 tons SO<sub>2</sub>. The analysis in this document is based on the more detailed approach where emission rates ranged from 0.12 to 0.21 lbs/MMBtu for individual sources, but similar results are achieved by using a presumptive minimum BART approach because the overall average emission rate from the more detailed approach is 0.15 lbs/MMBtu.

## ***E. Baseline Inventory for 2018***

The Stationary Sources Joint Forum of the WRAP coordinated the development of a baseline inventory for 2018 that was used to update the SO<sub>2</sub> milestones for the 4-state region. The inventory was estimated as described below.

### **1. Electric Generating Units (EGU's)**

The methodology for projecting existing EGU's into the future involves the following steps:  
a) the electricity production (MW's) for each individual unit at a plant was determined

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- from the Energy Information Administration [EIA] (data available for 2002-05)
- b) the electricity generation design maximum capacity (MW's) was determined for each individual unit from EIA data
  - c) an operating Capacity Factor was determined by dividing the year specific production by the design maximum capacity of the each individual plant unit
  - d) all individual units were assumed to be operating at 85% capacity in 2018 (unless they were already operating above this level in 2002)
  - e) the Growth Ratio necessary to achieve 85% capacity was determined by dividing 0.85 by the Capacity Factor for each individual plant unit (averaged over four years)
  - f) a Current Year Emission Factor (lb SO<sub>2</sub>/MM Btu) was calculated for the latest year of available EIA data (2006), using the actual reported emissions (tons SO<sub>2</sub>) for each individual plant unit divided by the actual reported annual heat generation (MM Btu)
  - g) the 2018 Emission Factor was assumed to be the same as the current emission factor, except for a few sources that had submitted a source-specific emission rate.
  - h) the 2018 Emission Rate (tons SO<sub>2</sub>) was calculated by multiplying current year emissions by the ratio of the 2018 to current year Emission Factors
  - i) the Adjusted 2018 Emission Rate (tons SO<sub>2</sub>) was "grown" to 85% capacity by multiplying the 2018 Emission Rate by the Growth Ratio from Step 5 (emissions from units already operating at or higher than the 85% capacity in the 2002 data year, were not grown, but accepted at face value).

## 2. Permitted/Future EGU's

The Methodology for projecting emissions from Permitted/Future EGU's is described in the ERG's June 18, 2007 (PRP18a) Technical Memorandum, *WRAP 2018 Preliminary Reasonable Progress Emissions Inventory – Final*. The memorandum is posted at <http://www.wrapair.org/forums/ssjf/documents/eictts/projections.html>.

The emission projections were not calculated to capture an amount of anticipated renewable energy that would arise from a state's renewable energy portfolio standard. The Renewable Portfolio Standard (RPS) is a policy that promotes renewable energy in a way that is compatible with the competitive electricity markets. A state's RPS does not have a direct relationship to emissions within the four participating §309 states because the RPS could be met by renewable resources outside of the state. For the actual impact of a portfolio standard on reasonable progress for states that have an RPS, please see the Pollution Prevention chapter of the SIP.

## 3. Non-EGU's

The Methodology for projecting emissions from "Other Industrial Sources" is described in E.H. Pechan's October 2006 Report, *2018 SO<sub>2</sub> Emissions Evaluation for Non-Utility Sources- Final*. The report is posted online at <http://www.wrapair.org/forums/ssjf/documents/eictts/projections.html>.

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- a) The SO<sub>2</sub> emissions for 19 Natural Gas Processing Plants were updated by Environ in April 2007, with additional research into future O&G Operations. The September 2007 Final report with results of that update is posted at <http://www.wrapair.org/forums/ssjf/documents/eictts/oilgas.html>.
- b) The 2005 SO<sub>2</sub> Milestone Report had some sources which were not picked up in the Pechan report. In those cases, the 2005 emissions were used as a placeholder for the 2018 emission values.
- c) The projections do not specifically break out emissions from existing sources vs. new sources. For purposes of establishing a new source set-aside, current (2006 for most sources, and 2007 for two copper smelters in AZ) emissions were assumed to be the baseline emissions for existing sources, and the projected increase in emissions between 2005 and 2018 is attributed to new source growth.

**Table 2. 2018 Baseline**

	Projected 2018 SO <sub>2</sub> Emissions Baseline
Utility	207,249
Non-Utility	76,635
New Source Growth	34,000
Total 2018 Baseline	317,884

## ***F. Calculation of Milestone for Alternative Program***

The SO<sub>2</sub> milestones are based on the GCVTC recommendations that were designed to remedy existing and prevent future visibility impairment in the 16 Class I areas on the Colorado Plateau. When EPA adopted the Regional Haze rule in 1999, section 309 of the rule was included that incorporates the GCVTC's recommendations and determines that the strategies developed by the GCVTC meet reasonable progress for the first planning period. An analysis of BART was included as an additional requirement, but at its heart the SO<sub>2</sub> milestones are designed to achieve reasonable progress by reducing SO<sub>2</sub> emissions by 50% - 70% from 1990 emissions by 2040. All sources that are subject to BART for SO<sub>2</sub> are included in the program as required by 40 CFR 51.308(e)(2)(i)(B) because the program applies to all sources with actual emissions of 100 tons of SO<sub>2</sub> per year. The following calculation methodology was used to support the additional BART requirement in the establishment of the 2018 milestone.

The 2018 milestone was derived from the 2018 baseline. First, the estimated actual emission reduction from all sources that are subject to BART in the participating states (see section D of this analysis) was subtracted from the baseline. Then, a tribal set-aside was added to the

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baseline.

## 1. Tribal Set-Aside.

### *a) Recognition of Early Reductions.*

The GCVTC agreements and recommendations contain two tenets that have uniquely informed the establishment of the tribal set-aside under the market trading program. First, the Commission recommended that the market trading program "contain specific provisions to encourage and reward early emission reductions, including reductions achieved before 2000."<sup>2</sup> The GCVTC committed to achieve a 13% reduction in SO<sub>2</sub> emissions from stationary sources by the year 2000. The GCVTC also recognized that there was a good possibility that actual emission reductions would be greater than this 13% goal. A general plan was derived to give some early reductions credit to the region and some to the environment. The emission reductions that were greater than 13% were to be split, with ½ going to the environment (through the establishment of milestones) and the other ½ providing headroom.<sup>3</sup>

Sulfur dioxide emissions decreased by 25% in the 9-state GCVTC between 1990 and 2000, while SO<sub>2</sub> emissions in the four participating §309 states decreased 29% in that same time period. Emissions decreased an additional 10% between 2000 and 2005.<sup>4</sup>

### *b) Allocation to Tribes.*

Second, the Commission recommended allocations to tribes that are of practical benefit.<sup>5</sup> This recognized the concern that "tribes, by and large, have not contributed to the visibility problem in the region" and that "[t]ribal economies are much less developed than those of states, and tribes must have the opportunity to progress to reach some degree of parity with states in this regard."<sup>6</sup> The tribes specifically recommended that if an emission trading strategy is adopted to achieve SO<sub>2</sub> reductions from stationary sources that allocations be based on considerations of equity rather than historical emissions:

Credits should not be based on historical emissions, but should be based on equitable

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<sup>2</sup> *Recommendations for Improving Western Vistas* at 33 (June 1996) (emphasis added).

<sup>3</sup> *Id.* at 34.

<sup>4</sup> *WRAP 2005 Regional Emissions and Milestone Report*, March 29, 2007. Emissions calculations from Oregon are included in this report but are not included in the calculated emission reductions for the participating states.

<sup>5</sup> *Recommendations for Improving Western Vistas* (June 1996). at 35.

<sup>6</sup> *Id.* at 66-67.

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factors, including the need to preserve opportunities for economic development on tribal lands. In general, these lands are currently lacking in economic bases and have not contributed to the visibility problems.<sup>7</sup>

Accordingly, the backstop trading program contains an 8,500 allocation to tribes.

These two considerations – to reward emission reductions occurring between 1990 and 2000, and to provide an equitable allocation to the tribes – originate from the GCVTC recommendations. They reflect distinct policy concerns of the Commission that are unique to the program under section 309 of the regional haze rule incorporating the Commission's recommendations.

*c) Uncertainty.*

In addition, because the baseline emissions inventory is a projection of actual emissions, uncertainty exists in the projection method including, for example, fluctuations in weather and changing economic conditions.

There are inherent uncertainties in the inventory calculation that need to be recognized.

- Inherent measurement uncertainties. CEMs are calibrated daily to a relative accuracy of 20% using calibration gases. Fluctuations in measurements can occur due to the measurement techniques that are not indicative of actual changes in emissions. Pluses and minuses will cancel out to a certain degree, but some consideration of these fluctuations is needed.
- Projections. Projections of future “actual” emissions are based on the best information available, but are inherently uncertain. This uncertainty increases further out in time. Growth rates may be underestimated, impacts of new technologies or regulatory requirements may have unexpected effects, etc.

The participating §309 States recognize that there are some competing uncertainties that the future “actual” emissions may be over-predicted. However, in light of the Commission's specific recommendation to reward early reductions occurring between 1990 and 2000, the participating §309 States specifically set aside 8,500 tons in 2018 to account for the allocation described above for tribes as well as the uncertainty in the calculation and projection of actual emissions. The 8,500 tons represents 2.7% of the projected 2018 baseline SO<sub>2</sub> emissions (317,884 tons) encompassed within the trading program.

The participating §309 States also believe the likelihood exists that the full complement of emissions in the set aside will not be utilized. All sources in the region operate below their

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<sup>7</sup>*Id.* at 71.

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allowable emissions to ensure that they are in compliance with emission limits. The regional milestones are comparable to allowable emissions because an exceedance of the milestone will trigger regulatory consequences. Individual sources will be tracking their emissions, as well as the overall regional emissions, and the possibility of avoiding a regulatory program will provide a powerful incentive for sources to keep emissions below the cap. This will also provide a disincentive for keeping regional emissions close to the cap, because that will increase the risk that an unexpected event (such as increased production from one sector) will trigger the regulatory program. The incentive to operate below the cap should be especially powerful in 2018 when individual sources will face penalties if the cap is exceeded and a source has emitted SO<sub>2</sub> in excess of its allowances.

## 2. 2018 SO<sub>2</sub> Milestone Calculation

2018 Baseline	317,884
Estimated BART Reductions	-91,760
Tribal Set-Aside	<u>+ 8,500</u>
<b>Total</b>	<b>234,624</b>

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## **G. Other Considerations**

There are a number of other considerations that must be taken into account in the overall determination as to whether or not the 2018 milestone developed by the participating §309 States achieves greater reasonable progress than would be have resulted from the installation and operation of BART at all sources subject to BART.

### **1. Remedy and Prevention.**

When Congress established the visibility program in 1977 it declared as a national goal "the prevention of any future, and the remedying of any existing" anthropogenic visibility impairment in mandatory class I federal areas.<sup>8</sup> BART is an emission limitation established at a specific source and is designed as a remedy to impairment at specific mandatory Class I areas. By contrast, the SO<sub>2</sub> milestones developed by the participating §309 States serve the dual purpose of remedying existing impairment and preventing future impairment by requiring regional SO<sub>2</sub> emissions reductions and capping emissions for stationary sources. Future impairment is prevented by capping emissions growth from sources not eligible under the BART requirements, from sources subject to BART that are expected to significantly increase utilization, and from entirely new sources in the region.

### **2. Additional Sources Included.**

The SO<sub>2</sub> milestones developed by the participating §309 States will include all stationary sources with emissions higher than 100 tons/year of SO<sub>2</sub>. The participating §309 States designed this program as part of an overall strategy to address all sources of visibility impairing pollutants, rather than focusing on a subset of stationary sources.

	2005	
	Number of Sources	Emissions
Subject to BART	19	184,981
Other Stationary Sources	71	90,733

The inclusion of all major SO<sub>2</sub> sources in the program is necessary to create a viable trading program, and also serves a broader purpose to ensure that growth in emissions from sources that are not subject to BART does not undermine the progress that has been achieved. BART applied on a case-by-case basis would not affect these sources, and there would be no limitation on their future operations under their existing permit conditions. Because the milestones will cap these sources at actual emissions (which are less than current allowable emissions), the overall effect of their inclusion is to provide greater reasonable progress than would have been achieved if only sources that are subject to BART were included in the program.

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<sup>8</sup> CAA § 169A(a)(1).

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### **3. Cap on New Source Growth.**

The milestones developed by the participating §309 States will cap the growth of SO<sub>2</sub> emissions in the west. These milestones include estimates for growth, but then lock these estimates in as an enforceable emission cap. The milestone approach is consistent with the statutory goal of preventing any future visibility impairment that results from man-made air pollution. The entire region is experiencing rapid growth which could erode the progress that has been achieved in the last two decades towards improving visibility. BART applied on a case-by-case basis would have no impact on future growth, and in the long run would not achieve the regional emission reductions that are guaranteed by the program.

### **4. Actual vs. Allowable Emissions.**

The baseline emission projections and assumed reductions due to the assumption of BART-level emission rates on all sources subject to BART are all based on actual emissions, using 2006 as the baseline. The use of actual emissions has an effect in several ways. If the BART process was applied on a case-by-case basis to individual sources, emission limitations would be established based on the maximum level of operation of the unit. The “allowable emissions” are typically higher than actual emissions, because sources do not always run under full load conditions, over the full year's available time. In addition, the allowable emissions would account for variations in the sulfur content of fuel and alternative operating scenarios. The difference between actual emissions and allowable emissions is particularly large when a source is permitted to burn two different fuel types, such as oil and natural gas, or when the source is part of a cyclical industry where production varies from year to year due to the changing demand for their product.

The emission projections used in the development of the SO<sub>2</sub> milestones allows for some increase in capacity for the electric utility industry which will partially address this difference between actual and allowable emissions. Even in this case, the utilities are assumed to operate at an average of 85% of nameplate capacity, even though they are permitted to operate at 100% capacity.

In addition to the cap on growth of actual emissions, the difference between an emission projection for future years, and a regional emission cap must also be considered. The milestones will act as a regulatory trigger that will be converted into an enforceable emission cap if the milestones are not met. This essentially creates a regional “allowable” emission level. When sources are managing their operations they have a large incentive to maintain headroom under any enforceable limit to ensure that they stay in compliance. This process is expected to happen on a voluntary basis prior to the program trigger, and will be strengthened if the milestones become enforceable emission caps. The net effect is that compliance with the milestones should lead to actual emissions that are below the milestone. The difference between actual emissions and allowable emissions is commonly referred to as headroom.

### **5. Mass-based Cap vs. Rate-Based Emission Limits for BART.**

Emission limitations for stationary sources (including BART limits) are typically expressed as emission rates (lbs/hour or lbs/MMBtu), while the SO<sub>2</sub> milestones are expressed as total mass

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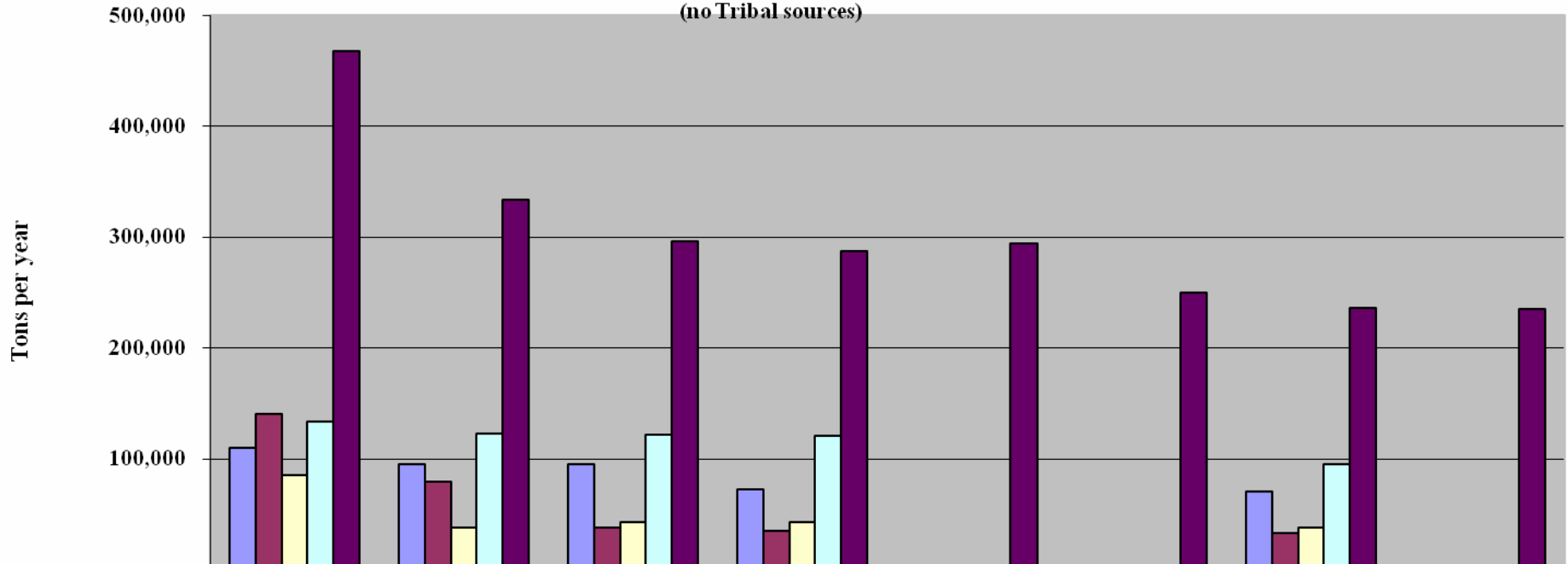
during a given year (tons/year). One effect of this difference is that rate-based limits can lead to higher emissions when production is increased or when higher sulfur fuel is used, as explained in the discussion of actual vs. allowable emissions above. Another difference is that mass-based limits will include excess emissions that may occur due to malfunctions or during the start-up or shut-down of emission units. A good example of this difference is the requirement in the acid rain program that emissions must be assumed to be the highest value recorded from the past year during the time period that continuous emission monitors are not functioning on a stack. These higher emissions are calculated as part of the overall tons/year, and must be accounted for under the mass-based cap for the acid rain program.

## **6. 1990 as a baseline for Section 309 Regional Haze Plans.**

The regional haze rule recognized the significant work that had been completed by the Grand Canyon Commission, and section 309 of the rule was therefore designed to incorporate the Commission recommendations. A key element of this section of the rule is the use of 1990 as a baseline for measuring progress. There have been significant emission reductions in the west since 1990, and this improvement needs to be considered when measuring the overall effects of the Commission's strategies. The Commission established a goal of a 13% reduction from 1990 emissions. The actual emission reductions in the region were 25%. Figure 1 shows the emission reductions from 1990 baseline emissions in the participating §309 states that will have been achieved by 2018. This 51% reduction is well on the way to the GCVTC goal of reducing SO<sub>2</sub> emissions by 50% - 70% by the year 2040.

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**§309 SO<sub>2</sub> Backstop Cap and Trade Program -  
Emissions, Modeling EI, and Milestone Program Data  
(no Tribal sources)**



	1990	2000	2002 (Plan02d)	2005 milestone report	2008 milestone	2013 milestone	2018 (PRP18a)	2018 milestone
■ AZ	109,180	94,296	94,835	72,157			70,337	
■ NM	140,177	79,011	37,918	34,138			32,380	
■ UT	84,983	37,483	42,183	42,233			37,939	
■ WY	133,204	122,373	120,991	119,834			95,144	
■ 4-state Total	467,544	333,163	295,927	286,877	293,921	249,114	235,800	234,624

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## **7. Commission Strategies are a Total Package.**

The GCVTC recommendations go well beyond stationary sources, and include strategies to address mobile sources, prescribed fire, pollution prevention, and emissions in and near Mandatory Class I areas. The stationary source strategies need to be viewed as part of this overall package. Visibility impairment in the west is caused by multiple sources and pollutants, and a narrow focus on stationary sources may not achieve the same results as a broad-based program.

## ***H. Comparison of Trading vs Command and Control BART Requirements***

During the development of the Annex, the WRAP conducted modeling to determine whether the distribution of emissions under the backstop trading program would differ substantially from the distribution of emissions assuming installation of BART or would disproportionately impact any Class I area due to a geographic concentration of emissions. The results of this modeling are included in Tables 2 and 3 of Attachment C to the Annex<sup>9</sup>. Attachment C, Section G concludes, “The results of this analysis showed that the maximum difference between the two scenarios at any of the Class I areas was only 0.1 deciviews.<sup>10</sup>”

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<sup>9</sup> *Voluntary Emissions Reduction Program for Major Industrial Sources of Sulfur Dioxide in Nine Western States and A Backstop Market Trading Program, an Annex to the Report of the Grand Canyon Visibility Transport Commission* (September 2000) at C-15 and 16.

<sup>10</sup> *Id.* at C-21.