ISSUE PAPER:

COLORADO'S REGIONAL HAZE SIP DEVELOPMENT PROCESS

Presentation of Options to the Colorado Department of Public Health and Environment by the Colorado Air Quality Control Commission

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Prepared by the Air Pollution Control Division
Planning and Policy Program

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Colorado Department of Public Health and Environment

1.0 Introduction

The purpose of this document is to provide information to proceed in the development of the Regional Haze State Implementation Plan for Colorado. The options open to the state have been summarized to help policy makers establish a long-term planning strategy.

This report includes a narrative summarizing the Final Regional Haze Rule, a table containing a comparison of key points, an expanded discussion of key points, and options and recommendations. A technical appendix is included containing supporting information for decision makers.

2.0 Background

Amendments to the Clean Air Act in 1977 added Section 169A setting forth the following national visibility goal:

> *Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made air pollution.*

EPA has divided its visibility protection program into two phases. The first phase addressed impairment from existing or proposed major stationary sources. EPA promulgated visibility regulations for the first phase in 1980 (40 CFR 51.300-51.307). The federal regulations require states with Class I areas to prepare a State Implementation Plan (SIP) to include a monitoring strategy, address existing impairment from major stationary facilities, prevent future impairment from proposed facilities, consult with the Federal Land Managers (FLMs) in the development or change to the SIP, develop a long-term strategy to address issues facing the state, and review the SIP every three years.

In 1980, EPA declined to promulgate regulations to address phase two of the visibility program - regional haze. EPA cited the need for additional information in a number of areas in order to be able to construct a regulatory program for regional haze. However, by the late 1980s, it became clear that pollutants transported hundreds of miles are the major component of visibility impairment, and therefore, no one state or tribe can fully protect Class I areas within its boundaries from the emissions transported from other states. When the Clean Air Act was amended in 1990, Congress added Section 169B, authorizing further research and assessment reports to Congress regarding regional haze. Congress also authorized EPA to create visibility transport commissions and mandated creation of the Grand Canyon Visibility Transport Commission (GCVTC) to make recommendations to EPA on Grand Canyon National Park visibility issues. A report is required from any transport commission within four years from the date of its creation. Finally, EPA is required by 169B to carry out its regulatory responsibilities under Section 169A (i.e., issue draft regulations requiring SIPs) within 18 months of receiving such a report.

In late-1991 EPA officially established the GCVTC. EPA defined the region affecting visibility at Grand Canyon to be nine states (Oregon, California, Idaho, Nevada, Utah, Arizona, Wyoming, Colorado and New Mexico), though Idaho chose not to join the GCVTC, and included the 16 Class I areas on the Colorado Plateau as being affected. GCVTC members were the governors of the eight states as well as the leaders of four tribal nations in the West and representatives of Federal Land Management agencies. The GCVTC submitted its report to EPA in June 1996, following four years of research and policy development.

The GCVTC report, as well as the many research reports prepared by the GCVTC, contributed invaluable information to EPA in its development of the federal regional haze rule. The draft rule was issued in 1997 and the final rule on July 1, 1999 (40 CFR 51.308-51.309). The final rule created two planning alternatives known as Section 308 and Section 309. The 308 alternative follows a more traditional SIP planning process, with the requirement that BART be established for existing major stationary sources. Additional control strategies will be selected as determined necessary. Under the 309 process, a regional planning approach is taken, using voluntary controls and market-based approach for reducing stationary source emissions.

Section 308 Overview

Pursuant to the requirements of 51.308, the State of Colorado is to submit to EPA Regional Haze SIP elements for the 12 mandatory federal Class I areas within the State's boundaries as well as for each mandatory federal Class I area located outside the State which may be affected by emissions from Colorado. For each Class I area in Colorado, the SIP must establish a reasonable progress goal for the most impaired days and ensure no degradation in visibility for the least impaired days for the same planning period. For the first planning period, the SIP must also address Best Available Retrofit Technology (BART) requirements of section 51.308(e). Colorado is responsible for the preparation of technical information (regional emission inventories, regional modeling, source attribution and BART determinations for applicable sources, and the determination of background, baseline, and natural visibility conditions in each Class I area within the state) to be utilized in constructing the SIP. Technical information prepared by the Regional Planning Organization as designated by EPA for this section of the country, the Western Regional Air Partnership (WRAP), is planned to be available for Colorado's use in SIP preparation. Colorado is also responsible for preparing a long-term strategy that ensures reasonable progress for regional haze over the planning period for each of Colorado's Class I areas as well as areas its emissions affect.

The SIP elements for each Class I area are due following EPA's designations for the PM2.5 standards. If there are no PM2.5 nonattainment areas in Colorado, then the SIP elements are due 12 months after the designation (probably 2004 or 2005). If there are one or more PM2.5 nonattainment areas, then the SIPs are due within three years of the designations, but no later than December 31, 2008. The implementation of control strategies, including BART, are to be phased in through 2018 in order to meet the reasonable progress goals established for each Class I area.

If it is determined that there is interstate transport of emissions that impact visibility in Colorado's Class I areas, or if emissions from Colorado impact visibility in other states' Class I areas, Colorado may submit its 308 SIP elements utilizing a regional planning process with one or more surrounding states. The Regional Planning process is to address the process, goals, objectives, management and decision-making structure, deadlines for completing significant technical analysis and developing emission management strategies and a regulation implementing the recommendations of the regional group. These SIPs are due within one year of EPA's PM2.5 designations (2004 or 2005). Additionally, Colorado must commit to submit a plan revision addressing the "core" requirements and BART requirements and a commitment to fully address the recommendations of the regional planning body by December 31, 2008.

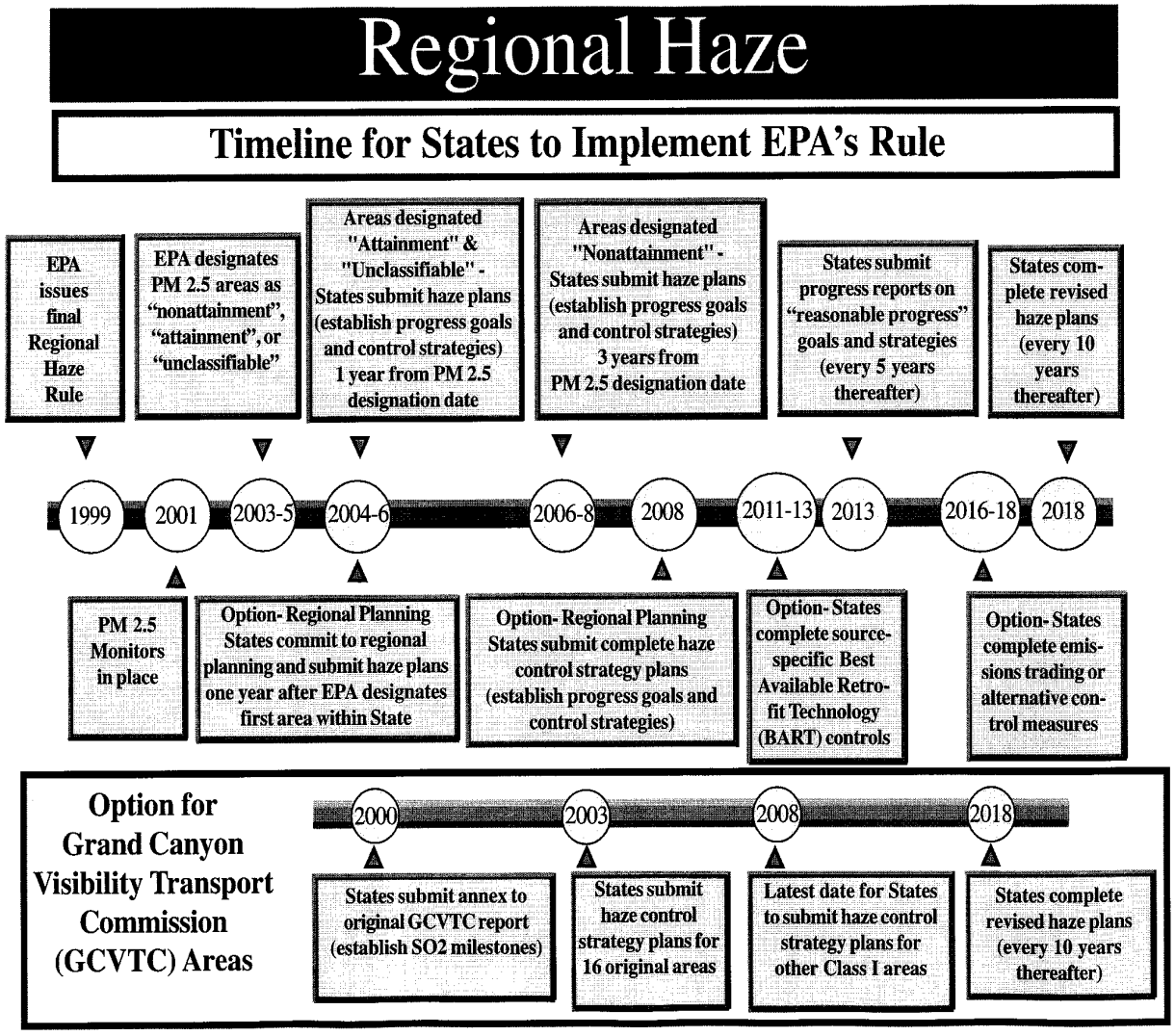
Regardless of which 308 pathway is chosen, the first planning period is to extend to 2018. At that time, a revised SIP, with new reasonable progress goals is required for the next 10-year period. A periodic report on progress is due every five years. The process continues over time and EPA estimates the program will continue through 2064.

Section 309 Overview

Pursuant to the requirements of 51.309, the State of Colorado can elect to submit to EPA a Regional Haze SIP element for six (and possibly more) mandatory federal Class I areas located in the Colorado Plateau in the western portion of the State (see Appendix 2.). This SIP is due to EPA by December 31, 2003 and would be prepared by the State of Colorado to implement the GCVTC's recommendations within the framework of EPA's regional haze rule. States working together within the WRAP are developing the operational and implementation details needed for states to include the GCVTC's recommendations in their SIPs. If any of these strategies are not needed or lack applicability in a state, demonstration of why a strategy is not needed must be contained in the SIP. Apparently, states may only utilize this 309 option during the first planning period out to 2018. All states would then prepare SIPs under the section 308 framework.

The premise of the 309 program is that if multiple states address the visibility problems on the Colorado Plateau using the recommendations in the GCVTC and its supplemental Annex then EPA will presume that this constitutes reasonable progress for each of the Class I areas on the Plateau. The recommendations address mobile sources, fire, and stationary sources. The Annex to the GCVTC report details declining emissions cap for SO_2 between 2004 and 2018 with a back-up market trading program should the cap be exceeded. The Annex was adopted by the WRAP and submitted to EPA for approval on September 29, 2000. While their approaches differ, both the 308 and 309 sections focus a great deal of attention on existing major stationary sources for future emission reductions in the first planning period as both require that BART be addressed.

Timeline for Section 308 and Section 309 SIP Development



3.0 Key Points of Comparison for 308 or 309 Tracks

The following highlights the array of regulatory and technical requirements that are incorporated in the Regional Haze Rule and the work of the WRAP.

Table 1. Key Point Comparison

Area	308 SIP	308 Regional SIP	309 SIP
1.0 Technical			
1.1 Starting point	Monitoring defines baseline and natural conditions	Same as 308	Projected visibility improvement from implementing GCVTC program
1.2 Applicability	12 Class I areas in Colorado	Same as 308	Six plateau areas with options for including others
1.3 2018 Goal	Demonstrated by modeling of control strategies (including BART)	Same as 308	WRAP-developed 2018 emission inventory and modeling
1.4 Determine progress	Visibility monitoring – assessment due every five years	Same as 308	Annual state emission reporting to WRAP and visibility monitoring assessment due every 5 years
1.5 Source impact analyses	Attribution analysis for stationary sources potentially subject to BART as well as analysis of all other anthropogenic sources (i.e., mobile sources, fire, …) to assist in control strategy selection	Same as 308 but could be delayed	WRAP to prepare analysis
2.0 Rulemaking and/or policy			
2.1 Goal	Reasonable progress goals determined by the AQCC for each Class I area	Same as 308 with regionally coordinated plan	Reasonable progress determined by implementation of emission reductions
2.2 Controls	BART (or better-than option), current SIP measures, mobile sources and fire must be addressed and additional measures as needed to demonstrate reasonable progress	Same as 308 with adoption of multi-state agreements	Adoption of SO_2 cap and back-up Market Trading Program, all GCVTC recommendations including Fire programs, and possible mobile source emission budgets
2.3 Plan Revisions	Periodic SIP revisions every five yrs. and comprehensive SIP revision in 2018 and every 10 years thereafter	Same as 308	Same as 308 plus assess stationary source PM and NOx by 2003 and adopt any necessary strategies by 2008

2.4 Other	Possible Colorado-only Market Trading Rule – must consult with other states to develop coordinated emission management strategies if emissions from Colorado contribute to any impairment outside the State. Where other states are shown to contribute to impairment in Colorado's Class I areas, the State must demonstrate it has included in the SIP reductions from other states needed to meet the reasonable progress goals	Develop and adopt a Memorandum of Agreement (MOA) detailing ongoing participation in regional planning process - possible market trading rule	Multi-state WRAP Agreement
4.0 Statutory/Legal			
	Assess authority for adopting controls where needed	Same as 308	Assess whether the AQCC has authority to adopt the SO_2 cap and back-up Market Trading Program and all GCVTC recommendations; if not, seek legislative autority
5.0 Dates for Submittal			
Due one year after PM2.5 attainment status determined, three years after nonattainment designation made, but no later that Dec. 2008		Initial submittal of regional commitments within 12 months of designations; core requirements and BART due no later than Dec. 2008	Initial submittal Dec. 2003 Update for PM and NOx 2008

4.0 Expanded Discussion

This section provides a narrative of key points and weighs the issues against factors identified in either Section 169A of the Act or the Regional Haze Rule.

Topic Summaries of Regional Haze Issues
Regional Haze BART for Stationary Sources -- Under 308 a listing of BART eligible sources, an assessment of whether they may be reasonably attributed to cause or contribute to any visibility impairment in any Class I area, and a comprehensive BART analysis for each such source are required. Under 309 a declining emissions cap for SO_2 is established for the West that must provide greater "reasonable progress" than BART under 308. Market forces and other voluntary actions take the place of mandatory source-by-source BART if the prescribed emission reductions are being met. If the emissions reductions are not being met, a mandatory emissions trading program is triggered until emissions are again under the cap. If in 2018 better-than-BART conditions are not met under the 309 SIP, BART must be applied by 2023.

Baseline, Current, and Natural Conditions and Reasonable Progress -- Under the 308 process for each Class I area, the State must determine baseline conditions (i.e., the starting point) and the rate of progress needed to achieve the 2064 goal for "natural conditions" taking the reasonable progress factors into account (e.g., cost, time). Under the 309 process, reasonable progress is presumed to be successful implementation of all emission reduction elements of the 309 GCVTC program.
Tracking of Progress -- The RH regulation requires that progress be tracked on a prescribed basis (in 2008, 2013, 2018…). In the 308 SIP process, reasonable progress goals must be established in the SIP for each Class I area and progress is measured by comparing current visibility (a five year average) against the long term goal and the interim goal. In the 309 SIP process, the goal is to reduce emissions through the implementation of a number of agreed upon programs including those that affect stationary sources, fire and mobile sources. States must report periodically in SIP revisions that summarize emission reductions and the status of each program. Current visibility conditions for the least and most impaired days at each monitored Class I area must be compared to baseline conditions. The 309 process establishes a total tonnage reduction for sulfur dioxide for the region and progress is tracked by comparing regional emissions against the expected improvement line established in the Annex. It is assumed that these SO_2 emission reductions will result in an improvement in visibility. Emission reductions from PM and NOx sources are to be studied and implemented over time.
NOx and Particulates and Other Pollutants -- Stationary source BART for NOx and particulate matter and other pollutants must be addressed regardless of whether a state chooses 308 or 309. The 308 SIPs must address BART for all pollutants that potentially affect visibility for each facility that is reasonably attributed by the time SIPs are initially adopted. The schedule under which controls or emission reductions occur will depend on whether a source-by-source (sooner) or emission trading option is selected (later). The 309 SIPs require a report assessing emission control strategies to be included in the 2003 submittal for stationary source NOx and PM. The goal is to avoid any net increase from stationary sources in the region and to support future development of a multi-pollutant, multi-source program. A SIP revision with any long-term strategies and BART requirements for PM and NOx, including enforceable limits, compliance schedules and other measures, is required by 12/31/08.
Inclusion of All Class I areas -- Under 308, Colorado must address regional haze in all twelve Class I areas located within the State and in each Class I area located outside the State which may be affected by emissions from within the State. In the 12/31/03 309 SIP, states must declare whether additional Class I areas will be addressed under 51.308 or under 51.309. If the State opts to include additional areas under 309, Colorado would need to provide, in a SIP due no later than 12/31/08, a demonstration that expected visibility conditions for most and least impaired days at these additional Class I areas will be similat to what will be achieved based on emissions projections from the SIP strategies applied to the original 16 Class I areas under the GCVTC.

Attribution of Sources to Impacts -- A demonstration will be required, attributing current source impacts to all Class I areas. The analysis must include consideration of Colorado's sources on all in-and out-of-state Class I areas and the impact of out-of-state sources on Colorado's Class I areas. Colorado may be able to use WRAP resources and modeling results as a starting point. However, Colorado may have to conduct additional analysis for each non-Plateau Class I area.
Control Options (Long-term Strategy) -- Under the 308 SIP process, Colorado must examine and then incorporate sufficient controls to achieve reasonable progress to improve the worst days and protect the best days at each Class I area. For the first planning period out to 2018, the SIP must only demonstrate how that portion of the 60-year improvement in visibility will be attained. Colorado may utilize strategy components developed by the WRAP as part of the overall plan. Under the 309 SIP process, the Colorado Long-term Strategy must include provisions to address a variety of source categories as outlined in 309(d)(4-9) (e.g., Stationary Sources, Mobile Sources, Programs related to Fire, Area sources of dust emissions from paved and unpaved roads, pollution prevention, and other GCVTC measures).
Policy and Other Issues -- There are a number of uncertainties in the Federal Regional Haze Rule. Some items may or may not be significant depending upon later clarifications and explanation. Some of the uncertainties: What are the requirement under the 309 SIP for a 20% renewables goal? To what degree (also under 309) will states be held accountable for implementing the final full set of recommendations from the GCVTC? What will be the threshold for determining whether an urban area must develop a mobile source emissions budget under 309? What is the State's authority to participate in a Market Trading Program under a 309 SIP? Is there time to even try for 309 if there is insufficient authority at the AQCC level? How many resources and time will it take to do BART analyses for the sources that will need such analyses? Will other states be willing to join with Colorado in a regional program under 308?

4.1 Key Point – Regional Haze BART for Stationary Sources

I. INTRODUCTION

The Regional Haze Rule (RHR) contains provisions of general national applicability for all states (§ 308) and alternative provisions (§ 309) by which certain western states can choose to demonstrate compliance. A key element of the RHR is the requirement that states implement "Best Available Retrofit Technology" (BART) reviews for 26 categories of certain existing large stationary sources. The RHR's BART requirement for stationary sources extends to SO_2, NOx and particulate matter, or other pollutants.

II. BART UNDER RHR§ 308

Under the RHR § 308, states are required to identify all stationary sources within the state which meet the statutory BART criteria of not being in operation prior to August 7, 1962 but in existence on August 7, 1977 and which emit 250 tons per year or more of any pollutant "reasonably

anticipated to cause or contribute" to visibility impairment. See, 40 C.F.R. § 51.308(e)(1). Colorado has eighteen SO_2 BART eligible sources (some facilities have multiple sources), most are on the Eastern side of the Continental Divide. All but one of the applicable Colorado twelve Class I areas are on the Western Slope. With the exception of Rocky Mountain National Park, all Colorado Class I areas are on the Western Slope. Rocky Mountain National Park is on both sides of the divide. Such source receptor relationships will be important in developing meaningful control strategies for improving visibility.

BART is a specific two-step process. First, the state determines whether the source "may reasonably be anticipated to cause or contribute to any impairment of visibility in" a Class I area. The pre-amble to the rule describes this as a "low hurdle" demonstration based on monitoring, modeling, or emissions data. Second, attributable sources must undergo a cost-benefit analysis to determine the best available retrofit technology the source must install. In making the Cost-Benefit Determination, a state is required to consider five statutory cost-benefit factors, so that the appropriate level of control technology, if any, is determined (See, CAA § 169A(g)(2)). These five factors are: 1) the costs of compliance, 2) the energy and non-air environmental impacts of compliance, 3) any pollution control equipment in use at the source, 4) the remaining useful life of the source, and 5) the degree of improvement in visibility which may reasonably be anticipated from the use of such technology. The requirements for BART for each BART-eligible source are found in 51.308(e)(1).

III. BART UNDER RHR § 309

RHR § 309 authorizes certain western states to voluntarily set emission reduction milestones and to adopt an emissions trading program in lieu of complying with the § 308 BART provisions described above. The state must demonstrate the program would result in "greater reasonable progress" towards improving visibility than complying with the basic RHR BART provisions. In order to demonstrate greater reasonable progress," the state must calculate the amount of visibility improvement that would result from implementing the basic BART provisions. However, instead of requiring BART-eligible sources to install BART, the RHR authorizes states to establish a cap on emissions from all large stationary sources, as defined in the Annex, at a level that would achieve more emissions reductions than achievable under the basic BART program. Sources subject to the cap would be allowed to trade emissions credits among themselves so that sources with fewer emissions than an assigned baseline could sell "credits" to sources with greater emissions than their assigned baseline. The state must include all of the BART-eligible sources in the trading program.

In order for affected states to opt into the alternative RHR § 309 program, the GCVTC or its successor entity must submit to EPA by October 2000, and EPA must approve by October 2001, an annex to the 1996 GCVTC Report containing quantitative emission reduction milestones for SO_2 emissions for 2003, 2008, 2013 and 2018. These milestones must provide for steady and continuous emission reductions in the 2003-2018 time period consistent with the goal of 50-70% reductions in emissions by 2040 as compared with 1990 levels. Such reductions, however, must be greater than the amount of reductions obtainable by installing BART on all BART-eligible sources in the participating states.

Assumptions:

1. Under § 308, the Division believes there are 18 eligible SO_2 BART sources to be assessed. An analysis to address NOx, PM and other pollutants has not been completed and could expand this list.

2. Under § 309 WRAP Annex only six (of the 12 total) Class I Areas in Colorado are currently covered (see Appendix 2.).

3. Under § 308, all 12 of Colorado's Class I Areas are covered (see Appendix 2.).

4. Adding Class I areas to the § 309 process must be accompanied through the WRAP and subsequent approval by AQCC with legislative involvement.

5. The § 309 WRAP Annex assumes 85% control is better than BART. This is lower than the level established in EPA's recent "BART Guidelines".

6. Application of BART under Section 308 requires sources to be in compliance no later than five years after SIP approval.

7. A two SIP process is highly likely in Colorado even if many areas could be addressed by the 309 process. Thus, triggering of the BART process would be mandatory for the State even under a limited 308 option.

8. An assumption is made in the 309 process that the SO_2 emissions reductions defined in the Annex will result in improvements in visibility.

Issue Matrix:

	308		309	
Determinant Factors*	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	- Compliance costs to sources become specifically delineated in the BART analysis. - All Class I areas of the State addressed with one process. Cost to State: High Cost to Industry: High	- Existing attempts to do BART analysis indicate that a costly tedious process will be expected, which will delay the implementation of controls. - No incentives from market to bring early reductions.	- Analysis completed as part of Annex. - Market focus allowed to create incentives for reductions, trades and sales. - History and experience with pollution credit programs already in place. - All major SO_2 sources included in trading program- not just BART eligible sources. Cost to State: Low Cost to Industry: Low	- Current Annex program based on an assumption that BART is 85% control while draft BART analysis establishes it at 90%. - Costs of additional programs that are expected to be part of the SIP are undefined. - Cost and implications of 20% renewable energy goal undefined. - States must show enforceable "greater than BART" benefit. - No determination has been made that the Cap and Trade provisions of the Annex would provide real visibility improvements.

Time necessary for compliance	- BART must be complete by 2013 for all applicable sources allowing for highest degree of certainty for planning purposes. - Early date ensures maximum AQ benefit at earliest data.	- Artificial date for compliance not tied to planning objectives other than making reasonable progress goals.	- Maximum flexibility for industry to let market forces attain better than BART reductions. If after 2018 goals are not addressed, path is clearly laid out to implement BART by 2023.	Air quality benefits could be delayed if system does not deliver better than BART reductions.
Energy and non-air impacts of compliance	Analysis would define potential pollution prevention and energy benefits or detriments.	No incentive to implement beneficial options earlier than 2013 deadline.	Analysis not required so potential energy and non-air impacts would not be included in program implementation.	No additional analysis could possibly exclude identifying possible benefits for pollution prevention or negative impacts on other environmental segments.
Remaining useful life of any existing source subject to requirements	Characterizes potential for source to help meet short and long term goals.	- Sources opt out based on projected short "useful life" and then continue in operation with minimal or no controls. - Forces State to look for controls in other source arenas if opt out is based on useful life calculation.	- Included in current analysis for SO_2. - Analysis may be needed for NOx and PM analysis during 2003 to 2008 period but BART not required so this provision does not necessarily apply.	- Could fail to be taken into account in the NOx and PM evaluation if added source reductions are deemed necessary for these contaminants. - - Sulfur dioxide not an issue as analysis is already completed.

Existing control technologies in-use at source	Takes advantage of existing controls such as the voluntary agreements on FR power plants and Craig and Hayden settlements.	- Reductions from other sources may be needed to meet reasonable further progress (RFP) if consideration of existing controls eliminates BART level of reduction on a source. - Delays getting 90% from all BART eligible sources if consideration of existing controls prohibits increasing controls.	- Analysis is already completed and Annex and market forces already consider existing and anticipated controls. - Reductions from non-BART sources given credit in overall package.	- Upwind sources could escape BART level of control by using other market trades that provide minimal benefits to Colorado Class I areas. - Process skips the reasonable attribution step so no linkage is made between existing controls or proposed controls and actual improvement in visibility.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	- Answers question of degree of improvement or reduction of impact on Class I areas.	- BART analysis does not define improvements related to the largest sources in Colorado. - Single source focus is not expected to demonstrate Regional benefits on a source-by-source basis which could result in fewer reductions and benefits.	Analysis not required as Group BART equivalent is assumed in this approach and improvement tied to emission reduction, not actual visibility readings.	- Existing GCVTC and Annex analysis does not show humanly perceptible improvements by instituting 85% presumed BART. - A one-half Deciview improvement is projected based on existing modeling. - Pitchford and Malm state that a 1-2 deciview threshold is needed for perceptible change; a 0.5 dv change will not be observed.

Technical and scientific uncertainty	- Technical analysis is defined by following the BART guidance. - By defining uncertainty, a range of potential improvements is defined for decisions makers.	- Establishing uncertainty is an undefined process. - It is unclear how that will be used to make final decisions.	- Not required under 309 for SO_2 as this is already completed. - Between 2003 and 2008 a NOx and PM evaluation is required but not a BART level analysis. - Presumably this would characterize uncertainty and the benefits would be the same as those for 308.	There is no defined process for characterizing uncertainty in these analytical evaluations and it is unclear how any such evaluation would be used in the decision making process.

**The Clean Air Act (sections 169(A)(g)(1), 169(A)(g)(2) and EPA's BART guidance establishes a number of relevant statutory factors that the states should consider in developing its Haze SIP and establishing progress targets and source compliance.*

4.2 Key Point -- Baseline, Current, and Natural Conditions, and Reasonable Progress

Issues: Under the 308 process, each Class I area must establish the 2064 standard for "Natural Conditions", and the current condition to establish the degree of improvement in Deciviews needed. Under the 309 planning process, the 2064 standard has been defined in terms of a sulfur dioxide emission limit for the Western U.S.

Starting point: 51.308(d)(1) For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.

Discussion: The Annex of the 309 rule, if approved, will establish the current conditions and "glide path" for the Colorado Plateau. Under the 308 process, an analysis of existing data needs to be done to establish the 20% worst and best 20% days for each Class I area. In Colorado, monitoring data in or near all the class one areas does not exist. The first step in the 308 process would be to evaluate the existing data and determine if the nearest monitors were sufficient to establish the standards. Under a "unified" 309 process – one where a State would amend non-309 Class I areas" to their 309 process, this step would have to be done to demonstrate how these area relate to each other. Under any planning scenario, it appears that an analysis of at least the 6 non-Colorado Plateau areas would be necessary.

Assumptions:

1. The data that exists in Colorado at the current seven monitoring stations are all that will be available to establish background, baseline and current conditions.

2. A considerable State public process supported by IMPROVE data and additional State analyses will be necessary to adopt the "natural condition" goal and the interim progress goals.

3. Adoption of Background, baseline and natural conditions for areas that do not have close by monitors will require a significant amount of public process and data analysis.

4. Analysis of most of the visibility data will be done by the IMPROVE process and WRAP data contract.

5. By the State defining "natural conditions" and controls as part of a 308 SIP, it will be possible to ensure that emission reductions will be meaningful and result in real visibility improvements.

Issue Matrix:

	308		**309**	
Determinant Factors	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	Establishes a known cost to meet Natural Condition through BART process and other strategy analysis to show RFP. Cost to State: Medium Cost to Industry: Low	Variability of meteorological impacts in a five year period could cause uncertainty in need for controls.	- Utilizes market forces to meet Natural Conditions which may prove to be less costly to industry. - These parameters will not be used to measure success for regulatory adjustments till after 2018. Cost to State: Low Cost to Industry: Low	- May result in an expensive system of trading emissions that does not meet the better than BART requirement and BART would have to be implemented after 2018 at a higher cost. - There is limited analyses that demonstrate that the 309 reduction goals will satisfy the RH regulation.

Time necessary for compliance	SIP tune-up every five years ensuring continued improvements, earlier compliance is a possible outcome.	- Long-term goal is the same under both processes. - Adjustments to meet short term goals may not be needed if meteorological variability is too great to smooth out yearly differences.	- Long-term goal is the same under both processes. - Between 2003 and 2018 (plus a potential 5 years for BART installation of goal is not met) unnecessary adjustments may not be required.	- Eventually, the two processes will result in the same endpoint- "natural visibility" in all Class I areas. - However, the 309 process may lead to delayed short term benefits.
Energy and non-air impacts of compliance	Applicable BART sources get controlled earlier for earlier improvements in visibility.	- If determinations of intermediate goals show a need for additional controls, impacts on the energy sector will be most likely the greatest. - Some older uncontrolled sources may be economically unfeasible to run and removal would have negative energy impacts.	Not all Energy sources would be required to meet the same set of standards and source reductions could be spread over a larger base.	Regionally adopted policies may not be the best for Colorado interests and could have impacts on our energy production options.
Remaining useful life of any existing source subject to requirements	Provides certainty to industry for planning purposes.	May decrease remaining useful life of existing facilities if cost for control makes operating profit marginal.	- BART not mandatory unless 309 planning process fails to meet goals. - If goals are met, remaining useful life would be extended for most sources.	If market system does not work, BART is forced in 2018-2023 which delays improvements in air quality compared to the 308 process.

Existing control technologies in-use at source	Forces consideration of existing controls with respect to the visibility problem.	May require replacement of existing controls calling for added control technology.	Can use existing and planned controls to count toward improvements needed without necessarily meeting BART standards at a specific source.	Lesser controlled facilities may not see added reductions delaying visibility improvements.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	Gains assurance of maximum early reductions for greatest visibility improvements.	May institute controls and not see perceptible improvements.	Measure of visibility improvement does not apply and improvements are tracked using actual emissions.	Improvements in visibility may not be apparent while emissions reductions targets are being met.
Technical and scientific uncertainty	Provides certainty of what control package looks like.	Has mandatory BART when other package of controls might work better.	Target control package has maximum flexibility and takes advantage of market forces.	Unproven technologies and reliance on market forces may not provide needed reductions.

4.3 Key Point -- Tracking of Progress

Issues: The RH regulation requires that progress be tracked on a prescribed basis (2008, 2013, 2018…). In the 308 SIP process, reasonable progress goals must be established in the SIP for each Class I area and progress is measured by comparing current visibility (a five year average) against the long term goal and the interim goal. In the 309 SIP process, the goal has already been established in terms of a total tonnage reduction for sulfur dioxide for the region and progress is tracked by comparing regional emissions against the expected improvement line established in the Annex. Under both processes, reporting of visibility conditions and emissions are required.

Starting point: 51.308(d)(1) For each mandatory Class I Federal area located within the State, the State must establish goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the least impaired days over the same period.

51.309(d)(2) For each of the 16 Class I areas, the requirements include a projection of improvement in visibility expected through December 31, 2018, for the most and least impaired days. The analysis is based on the implementation of required measures in the GCVTC report and provisions in 309.

Discussion: The key difference between the two SIP processes is establishing goals and measurable progress increments. Under the 308 process, the goal is in terms of the reduction in the concentration of individual chemical components in ambient air which are converted to visual range and expressed in terms of deciview improvements. While the interim goals are not Federally enforceable, an analysis of why the goal is not met and what is being done to move toward improving visibility is required. Conceivably, failure to meet the goals under 308 could result in re-opening of the plan and adoption of additional strategies. Under the 309 process, failure to meet the emissions reduction scenario results in the institution of the market trading program in the Annex. Under the 309 process, an analysis must take place between 2003 and 2008 to consider NOx and particulate impacts. The process and requirements for tracking progress for these emissions has not been defined since it is not known if they are appreciable contributors to the problem.

Assumptions:

1. Failure to meet the interim goals will lead to re-evaluation of plans and possible adoption of additional strategies under the 308 process

2. Failure to meet the emissions "glide path" under the 309 process results in the institution of the Market Trading (Annex) program.

3. The adoption of goals under the 308 approach will involve public processes and stakeholder input.

4. In 2018 progress will be tracked using the Deciview measure and both processes become the same after that timeframe.

5. Failure to meet the emissions reduction progress goal in 2018 for the 309 process results in adoption of BART on all eligible sources by 2023.

6. Additional strategies will have to be considered if progress is not demonstrated under the 308 process.

Issue Matrix:

	308		309	
Determinant Factors	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	Monitoring sites in place and no additional costs foreseen. Cost to State: Low Cost to Industry: Low	Monitoring may be inadequate for all Class I areas – additional sites may be needed. Cost to State: Low Cost to Industry: Low	Monitoring sites in place and no additional costs foreseen.	- Monitoring may be inadequate for all Class I areas – additional sites may be needed. - NOx and Particulate impacts must be evaluated and possible controls put in place.
Time necessary for compliance	BART presumed to meet goals.	Additional strategies must be considered if goals not achieved.	309 process presumes progress due to GCVTC control programs.	Market trading program to go into place if goals not achieved.
Energy and non-air impacts of compliance	N/A	N/A	Establishes an implementation framework for a 20% renewable energy goal.	Goal may be unattainable and industry perceives the goal as a regulatory mandate.
Remaining useful life of any existing source subject to requirements	-Clearly defines expectations for existing source shutdowns, tracking. -Ties emissions and ambient data to source-specific action.	Could establish shutdown schedule assumed in SIP analysis as an enforceable item.	Assumptions built into trading program and market forces allow for greater flexibility.	Applies multi-state pressure to adhere to planning assumptions in the ANNEX and GCVTC work.

Existing control technologies in-use at source	Defines existing universe of controls related to baseline.	Creates a burdensome administrative and technical tracking scheme.	Existing controls are defined in the ANNEX for SO_2; PM and NOx issues may be similar to 308.	Because progress to be tracked for SO_2 reductions at major stationary sources, the tracking may be too narrow to relate to real progress from emission reductions from other sources/pollutants.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	N/A	N/A	N/A	N/A
Technical and scientific uncertainty	5-year monitoring assessments provide systematic approach even though scientific uncertainty is difficult to characterize.	5-year assessments may be too short a period to discern meteorological fluctuations.	- Emissions/reports form basis of progress tracking, characterizing emissions trends. - Tracking of emissions is one of the more well characterized sciences based on actual measured data.	Relationships between emissions and visibility improvements are not necessarily a well characterized science, so the relationships between emissions tracking and visibility improvements can be highly uncertain.

4.4 Key Point – NOx, Particulates and Other Pollutants

Issues: Best Available Retrofit Technology for NOx, Particulates and other pollutants must be addressed in either of the 308 SIPs or the 309 SIP. BART must be addressed in 308 SIPs and implemented on different schedules. For 309, a report assessing emission control strategies must be included in the 2003 submittal for NOx and PM. A SIP revision to address these strategies and necessary BART is due in 2008 (see Section 4.1.II.). The two processes do not establish NOx and PM caps but establish a process for addressing PM and NOx by 2008.

Starting point: The 308 stand-alone or regional options must address BART for NOx and particulates and other pollutants such as volatile organic compounds (VOCs) (*see 308(e*) and, source-specific BART must be implemented within 5 years of SIP approval *(see 308(e)(1)(v)*. For the 308 regional approach, a list of sources must be identified in the 308R SIP submittal

(308(c)(1)(v) and these sources addressed by 2008. In the 309 process, a report assessing emission control strategies for NOx and PM is required in 2003. A SIP revision to address these strategies and possibly BART is required to be submitted to EPA in 2008 *(see 309(D)(4)(v))* and implemented by 2013 *(see 308(e)(1)(v))*.

For any option, a market trading program may be used if greater reasonable progress than achieved by applying BART can be shown by the end of the SIP planning period *(see both 308(e)(2) and 309(g)(4)(iii).*

Discussion: Very little information is available on this topic. The WRAP Stationary Sources Forum (SSF) is developing the required report under 309(d)(4)(v) to assess the emission control strategies for NOx and PM and the amount of visibility improvement under the strategies. The potential visibility benefits from NOx and PM controls are not well understood at this time. The report will also address a Backstop Trading Program which will assess the need to establish milestones for NOx and PM to avoid any net increase in these pollutants and to support future development of a multi-pollutant, and possibly multi-source market-based program. This report will be available in Spring 2003.

Assumptions:

1. PM controls will not likely be identified as an additional need in the 308 or 309 process.

2. NOx controls may be required for some existing BART eligible sources but would be the same for 308 and 309.

3. Timing for completion under 308 is likely to be shorter than 309.

4. The WRAP will develop the 309 NOx and PM analyses in time to meet a 2003 SIP deadline.

5. Addressing other pollutants under 308 must include anthropogenic and biogenic sources.

Issue Matrix:

	308		309	
Determinant Factors	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	- Applies to PM, NOx and other pollutants. - Produces the most comprehensive evaluation of source controls and environmental benefits at earliest possible date. Cost to State: Medium Cost to Industry: Medium	Least amount of regulatory flexibility and most costly to State and industry to perform analyses.	- Only addresses PM and NOx. - Provides a lower cost, flexible analytical path for performing analyses and for the tailoring of controls. Cost to State: Low Cost to Industry: Low	- Analysis requirements are vague, increasing the uncertainties of control options and timing. - Doesn't require "other pollutants". - Multi-step process that sends us down the 309 path in 2003 may change by 2008.
Time necessary for compliance	- Must be addressed in 2005 SIP. - Emission reductions occur by 2010 to 2012.	Sources have less time to comply but could take advantage of trading program.	- Must be assessed in 2003 SIP. - Must be addressed in 2008 SIP. - Sources have a little more time to comply but could take advantage of trading program.	- Emission reductions occur by 2013 or 2018 if market trading program in place. - Timing for addressing NOx/PM doesn't provide for actual emission reductions for a longer period of time.
Energy and non-air impacts of compliance	Could result in more use of renewables.	- Could increase energy needed to run facilities due to controls. - PM controls could increase waste disposal.	20% renewable goal could reduce PM/NOx.	Decreases emphasis on the need for renewables as 309 process may not result in controls.

Remaining useful life of any existing source subject to requirements	Could expand useful life as a result of retrofits and modernization.	- BART process is prescriptive in 308 and may not result in controls. - Provides an off-ramp for the most inefficient sources due to great costs and little benefits.	- Maximizes regulatory flexibility. - Flexible process could result in reductions from some older sources where not possible in 308.	Has potential of excluding many sources from additional controls that in the aggregate could improve visual air quality.
Existing control technologies in-use at source	Forces consideration of existing controls with respect to the visibility problem.	- Most existing controls have not focused on achieving NOx and other pollutant emissions (exclusive of PM). - Required BART analysis going into unchartered territory due to limited knowledge of potential BARTable sources.	Not held to BART requirements for all major sources, only those necessary to achieve visibility improvements.	Because progress to be tracked for SO_2 reductions at major stationary sources, the tracking may be too narrow to relate to real progress from emission reductions from other sources/pollutants.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	Directly links BART level of control with presumed benefit and maximizes visibility improvement benefit.	Single source focus is not expected to demonstrate Regional benefits on a source-by-source basis which could result in fewer reductions and benefits.	Focuses not only on BARTable sources but all sources to achieve reductions and visibility improvements.	- Adoption of market trading could delay real emission reductions past 2018. - Focus on analysis only on PM and NOx may exclude consideration of more critical emissions analyzed under 308 (i.e., VOCs, carbon).
Technical and scientific uncertainty	Provides certainty of what control package looks like.	Has mandatory BART when other package of controls might work better.	Target control package has maximum flexibility and takes advantage of market forces.	Unproven technologies and reliance on market forces may not provide needed reductions.

4.5 Key Point -- Inclusion of All Class I Areas

Issues: Other non-Plateau Class I areas may be included in the 2003 309 SIP if a State opts into this process. In 2008, a comprehensive SIP update must address all of the requirements of a 308 process with some potential exceptions. This process would allow the State to more broadly apply the GCVTC strategies to all areas. It would also require all of the 308 provisions to be addressed in the 2008 update, or provide a demonstration why this plan is better than adopting the BART control strategy. Adopting this approach provides the most elongated planning time for addressing non-Plateau areas without declaring any alternative group of regional partners. Adopting this process may be viewed as a delaying tactic to address non-GTVTC Class I areas.

Starting point: In the December 2003 309 SIP, states may declare whether additional Class I areas will be addressed under 51.308 or under 51.309. Under 309, in a SIP due no later than 12/31/08, Colorado will provide a demonstration of expected visibility conditions for the most and least impaired days at these Class I areas based on emissions projections from the SIP strategies applied to the 16 GCVTC Class I areas.

Discussion: Under 309, if the State can develop (by 2008) the necessary demonstration for the 6 Colorado Class I areas not on the Colorado Plateau, and the State can meet the test of showing no impacts on areas outside Colorado, then we could submit one implementation plan for all 12 Colorado Class I areas. If the state cannot demonstrate that the 309 program addresses all problems, additional strategies to cover the least and most impaired days in the 6 non-Plateau areas must be made. However, the plan can take full credit for the strategies adopted for the 16 Plateau in the 309 SIPs.

Assumptions: All 6 of the non-Plateau Class I areas in Colorado are eligible to be included in the 309 process.

Issue Matrix:

	308		309	
Determinant Factors	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	Defines control package and benefits at the earliest possible date and ensures earliest improvements to visibility. Cost to State: High Cost to Industry: High	Prescriptive and reduces flexibility of 309 options.	Provides greatest flexibility in controls and presumes lower costs. Cost to State: Low Cost to Industry: Low	Costs are ill-defined and the costs of implementing additional control packages may produce few real emission reductions.
Time necessary for compliance	Potentially earliest implementation of controls.	Insufficient time to complete analyses and adopt strategies.	Provides for the most protracted implementation timeline.	May delay real visibility improvements.
Energy and non-air impacts of compliance	Allows for a tailored evaluation of control strategies, giving consideration to energy and non-air impacts.	No renewables encouraged.	Takes full advantage of any progress in the 20% renewable goal.	Doesn't allow for an area-by-area evaluation of benefits of the elements of the control package.
Remaining useful life of any existing source subject to requirements	Allows this element to be considered for BART-eligible sources; does not apply to other control strategies.	Could result in delay of controls that are ultimately needed.	Market forces allow sources to maximize choices of controls and timelines.	Localized impacts from older sources may not be mitigated, delaying visibility improvements.

Existing control technologies in-use at source	Allows for the taking of credits for existing controls while addressing each area and the specific sources impacting it.	Existing controls may not be sufficient to meet long-term goals, requiring incremental changes that have smaller improvements on a regional scale.	Market allows existing controls to persist as long as emission goals are met.	Allows older, dirtier sources to continue operations which may have localized impacts that are ignored under the 309 tracking process.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	Creates most direct relationship between each Class I area and the relevant sources; controls are selected to improve visibility at those areas.	Creates the most complex analysis which not due until 2008.	Simpler approach – all areas will be addressed with 309 strategies until 2018 and direct visibility improvements not mandated for progress demonstration.	Air quality improvements realized under 308 may be delayed past 2018.
Technical and scientific uncertainty	Improvements are tracked by monitoring ambient air, which has less uncertainty than tracking progress using emissions data.	Difficult to demonstrate that all 6 non-Plateau Class I areas in Colorado could be addressed by the 309 process.	No BART analysis required and only one SIP clock in effect.	Allows progress tracking to be done using emissions, which has a more uncertain and complex relationship to actual visibility.

4.6 Key Point -- Attribution of Sources to Impacts

Issues: Under the 308 process, a modeling demonstration will be required, attributing current source impacts to all Class I areas. The analysis must include consideration of Colorado's sources on all in-and out-of-state Class I areas and the impact of out-of-state sources on Colorado's Class I areas. Colorado may be able to use WRAP resources and modeling results as a starting point. However, Colorado must conduct its own analysis for each non-Plateau Class I area. Under 309, this analysis has been done and will be improved by the WRAP. The 308 process will require a greater level of technical analyses and source/receptor modeling than does the 309 process, and 308 may result in a more focused program.

Starting point: The WRAP has conducted and is updating the modeling demonstration for the areas on the Colorado Plateau. This modeling includes all stationary sources of 100 TPY or more. Current modeling has only addressed SO_2 for BART-eligible sources and the Annex. This modeling will satisfy the needs for the 16 GCVTC Class-I Areas. An additional and consistent analysis will be needed for the other Class I areas in Colorado and all other Class I areas affected by sources in Colorado. Under both the 308 and 309 processes, an analysis of NOx and PM sources must be done. For 308, an analysis of other species is also required.

Discussion: A modeling demonstration will be required, attributing current source impacts to all Class I areas and for all sources inside and outside the state. Colorado may be able to use WRAP resources and modeling results as a starting point. However, Colorado will have to do an analysis for the non-Plateau Class I areas.

Assumptions:

1. The modeling done for the WRAP assumes 85% control of SO_2 emissions.

2. A more complex analysis will be required under 308 and the WRAP will not perform all the necessary work.

3. Under 309, the WRAP will complete the regional level analysis necessary to evaluate PM and NOx impacts and to define control options if needed.

4. The 309 process requires consideration of a mobile source emissions budget for VOC, NOx, SO_2, carbon, and fine particulate matter. This is not required under 308.

Issue Matrix:

	308		309	
Determinant Factors	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	- Modeling analysis would establish degree of impact on all Class I areas from all sources and would frame cost analyses. - Costs to industry would be tailored to fit the scope of RH problem. - Potentially less costly in long run if sources can apply less than 309 assumed levels or are exempted. Cost to State: Medium Cost to Industry: Low	- Analysis may show no impacts or may be inconsistent with WRAP analysis due to the fact that 309 assumes 85% control for BART and current EPA guidance assumes 90% control. - Different models, inventories, or other assumptions may be used for a 308 analysis.	WRAP modeling would show degree of impacts on a source-by-source basis and would disclose assumptions made for sources and time for compliance. Cost to State: Low Cost to Industry: Low	States would incur additional analysis costs not covered by the WRAP process.

Time necessary for compliance	SIP would be proposed in 2007 and would allow time for development of effective compliance schedules that ensure that compliance with BART permit be met by no later than 2013.	- Establishes artificial date for BART sources in achieving overall goals which may or may not be necessary. - Timing will be potentially affected by the complexities of the attribution process.	The WRAP modeling addressed only the SO_2 emissions only from BART sources greater that 100 TPY.	- Additional analysis would be needed for all other un-modeled stationary sources for SO_2, NOx and PM. Implies a undefined process where these sources could be looked at for additional reductions i.e. "a second bite of the apple". - Adds a degree of uncertainty in source reduction until 2008 deadline.
Energy and non-air impacts of compliance	*ENERGY* Output of analyses will be a state-wide energy cost scenarios for sources subject to BART.	Higher than anticipated energy costs could delay implementation of control options.	The WRAP modeling addressed only the SO_2 emissions only from BART sources greater that 100 TPY.	Additional analysis would be required for all non-Plateau Class I areas impacted by Colorado and other sources.
	NON-AIR Scope of analysis could support other goals.	Each analysis may need to be source category or site-specific.	The WRAP modeling addressed only the SO_2 emissions only from BART sources greater that 100 TPY.	Additional analysis would be required for all non-Plateau Class I areas impacted by Colorado and other sources.
Remaining useful life of any existing source subject to requirements	Help clarify reduction goals if source life is known.	Assumptions used in analysis may be used to establish an artificial closure process.	Useful life assumptions for BART sources greater that 100 TPY were incorporated in WRAP modeling.	Additional analysis would be required for all non-Plateau Class I areas impacted by Colorado and other sources.

Existing control technologies in-use at source	Source-by-source category analysis would be necessary and current level of control would on all sources would be developed.	Flexibility in identifying potential reductions from source categories may be limited if analysis is extremely complex.	Only the useful life assumptions for BART sources greater that 100 TPY were incorporated in WRAP modeling.	WRAP analysis is only partial. Additional analysis would be required for all non-Plateau Class I areas impacted by Colorado and other sources.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	Attribution and improvement will linked through analysis.	- State resource commitments to this attribution analysis may be high. - If attribution of various sources is difficult to establish or is insignificant, developing control options to meet goals will be difficult to achieve.	The WRAP modeling addressed only the SO_2 emissions only from BART sources greater that 100 TPY.	Additional analysis would be required for all non-Plateau Class I areas impacted by Colorado and other sources.
Technical and scientific uncertainty	Modeling performance capabilities continues to improve.	Time and technical resources required to complete the study not identified at state level.	WRAP is redoing the initial modeling.	- Additional analysis would be needed for all other un-modeled stationary sources for SO_2, NOx and PM. - Implies a undefined process where many of these source categories could be looked at for additional reductions.

4.7 Key Point -- Control Options (Long-term Strategy)

Issues: Under 308 SIP process, Colorado must examine and then incorporate sufficient controls to achieve 60-year glide path improvement for all source categories. Colorado may utilize strategy components developed by WRAP as part of the overall plan. The BART analysis is a mandatory control strategy under 308. Under the 309 SIP process, the Colorado Long-term Strategy must include provisions to address variety of source categories as outlined in 309(d)(4-9) (e.g., stationary sources, mobile sources, programs related to fire, area sources of dust emissions from paved and unpaved roads, pollution prevention, and other GCVTC measures). Under 309, if the RFP goals have not been met, mandatory BART kicks in. Under 309, mandatory emissions budgets will be

established if mobile sources are demonstrated to contribute significantly to visibility impairment in any of the 16 Colorado Plateau Class I areas.

Starting point: Under 309, the SO_2 control program has been established as a market-based, non-mandatory approach. No program has been established to address NOx and PM from stationary sources under 309, which must be done by 2008. Under 308, no BART or other strategy analysis has been performed.

Discussion: The 308 process only has one mandatory element – the BART control evaluation for all eligible sources of any pollutant. Beyond that, an evaluation of all other source categories and pollutants must proceed to identify the sources and controls that will achieve the necessary visibility improvements for each Class I area. Under the 309 process, a control package to address major sources of SO_2 has been developed – known as "The ANNEX". An analysis of PM and NOx from all stationary sources must occur between 2003 and 2008, and BART for NOx and PM must be adopted if emissions increases are identified in the emissions trends. An analysis of mobile source impacts would be necessary under 308 or 309. However, under 309, a mandatory emissions budget must be adopted for pollutants shown to significantly contribute to visibility impairment. Also under 309, a list of additional strategies identified in the GCVTC recommendations must be adopted or shown to not apply.

Assumptions:

1. The 309 ANNEX is approved by EPA.

2. 308 requires BART for all eligible sources (all pollutants) and other strategies as needed.

3. 309 provides for SO2 reductions through the ANNEX, NOx and PM BART, mobile source emissions budgets if necessary, and other GCVTC recommendations.

Issue Matrix:

	308		309	
Determinant Factors	**Pro**	**Con**	**Pro**	**Con**
Costs of compliance	- Cost advantage to industry to complete a full pollutant assessment in the SIP development process. - Process demands the development of a cost/benefit analysis and selection of the most cost effective strategies. Cost to State: High Cost to Industry: High	- Cost of BART analysis is a major expense to the State and industry. - Funding of BART analysis would be required.	- No mandatory BART. - Market forces establish least-cost path to meet requirements. Cost to State: Medium Cost to Industry: Low	- All GCVTC measures must be adopted and implemented unless a showing is made that they're not needed. - Cost and benefits remain undefined.
Time necessary for compliance	- BART by 2013. - Other controls phased in to show RFP every 5 years.	Time to complete BART analysis by 2005 SIP due date is very tight.	Controls to be phased in to meet GCVTC goals.	Elongates BART-level of compliance to 2023 (if 2018 milestones are not met), potentially delaying visibility improvements.
Energy and non-air impacts of compliance	Threat of BART could stimulate other energy alternatives.	- BART controls may have negative non-air impacts. - Other controls currently undefined.	- Establishes 20% renewables goal. - Forces consideration of alternative markets for forest products in lieu of burning.	Alternative to burning could have negative energy and environmental impacts.

Remaining useful life of any existing source subject to requirements	Doesn't force the adoption of additional controls for older sources.	Could delay improved visibility if older sources are not phased out according to BART schedules.	- Emission reduction credits are shared by the pool of western sources. - Remaining useful life not a forcing factor in meeting milestones.	Continued operation of older sources may have localized impacts.
Existing control technologies in-use at source	Existing controls may exempt facilities from additional emission reductions.	- Existing controls may exempt sources from further controls, resulting in localized impacts. - Additional controls may be needed at facilities with marginal controls installed, increasing cost factors for that source.	- Additional source-by-source not mandated as long as emission milestones are being met. - Market allows existing controls to continue at less controlled sources.	Localized impacts may not be mitigated, delaying over-all visibility improvements.
Degree of improvement in visibility which may be reasonably attributed to result from use of such technology	Builds the most direct source/receptor relationships, requiring the implementation of appropriate controls.	Individual strategies by themselves are expected to show small visibility improvements, which makes implementation difficult.	- GCVTC recommendations and WRAP will determine which source categories selected for controls at what time – flexibility is built in to the process. - Visibility improvements tracked by emission reductions, eliminating uncertainties in source/receptor relationships.	Presumption of improvements in visibility due to emission reductions, ignoring the tracking of actual visibility improvements.

Technical and scientific uncertainty	- Provides the most direct source/receptor relationship for all sources, and controls are selected to address a specific problem. - Modeling process for 308 and 309 approaches are identical, but under 308, source-by-source decisions are made.	Meteorology and other variables may have significant impacts on RFP determinations, leading to more uncertain control decisions.	Without source/receptor modeling requirements, uncertainties are fewer as only emission changes are tracked.	Ill-defined relationships between control packages and real visibility improvements may delay meeting visibility goals.

4.8 Key Point -- Policy and Other Issues

Issues: There are a number of uncertainties in the Federal Regional Haze Rule. Some items may or may not be significant depending upon later clarifications and explanation. Currently some of the uncertainties are; the requirement under the 309 SIP for a certain percentage of electricity generation to come from alternative energy sources; and, to what degree (also under 309) the states will be held accountable implementing the final full set of recommendations from the GCVTC. The following presents some of the major policy issues not discussed above.

Legal Authority for Market Trading: The Colorado AQCC would have to establish a multi-state market trading program. This would require legislative authorization and approval. Colorado has an existing trading rule – a multi-pollutant program that has not received EPA approval. It is the APCD's understanding that the Regional Haze rule appears to preclude inter-pollutant trading. The existing Colorado regulation is inconsistent with the needs of a multi-state trading rule. The current State legislation may preclude multi-state trading and additional legislative authority would be needed.

Consultation and Coordination with Other States, Regional Planning Organizations, and Federal Land Managers: Participation in the WRAP may establish/constitute sufficient evidence of participation in a regional planning process. The Regional Haze SIP will have to document continued and future participation in a regional planning process. It is unclear whether the AQCC has the authority to adopt a SIP containing commitments to participate in a multi-state regional planning process to meet 51.308(c)(1)(i).

Implementation of all GCVTC Recommendations: In 2003, a SIP must be submitted to EPA that provides for the implementation of those recommendations that can be practically implemented as enforceable control measures. Section 51.309(d)(9) requires that every five years, the State provide a report on the implementation of these recommendations. It is unclear what kind of commitment by the State is required for prescribed fire, pollution prevention, mobile source controls, clean air corridors, area sources, and fugitive dust.

Mobile Source Emission Budgets and Conformity Under 309: Section 51.309(d)(5)(iii) may require an emission budget for each Class I area. It is uncertain whether conformity will apply for these areas and if so, how will conformity be implemented. Another issue is how do these budgets over-lap with emission budgets developed for nonattainment and attainment/maintenance areas (i.e., Aspen (Maroon Bells Wilderness), Denver (Rocky Mountain National Park), and Steamboat Springs (Mt. Zirkel Wilderness)).

Responsible Parties for BART Analyses: Clearly, there are not resources at the present time for the State to prepare BART analyses for the 18 BART-able sources in Colorado. The Clean Air Act and Colorado law generally give the State the authority to require sources to prepare analyses necessary to meet state/federal requirements. A determination will be necessary as to the State's authority to require the effected sources to prepare the BART analyses.

5.0 Options Summary and Analysis

There are three reasonable directions the State of Colorado could pursue to develop a Regional Haze Implementation Plan for our twelve Class I areas. While a fourth option exists, for Colorado to develop a SIP covering all twelve Class I areas with no Regional Partnerships, this option is not viable or technically feasible and is being ignored for the purposes of the White Paper. It is unreasonable to assume that interstate sources can be ignored in our SIP development process. Thus, all of the options for developing a comprehensive Regional Haze SIP consider partnership with surrounding states. The following discussion summarizes the three options and takes into consideration information presented in the earlier sections of this document and material also provided to the Air Quality Control Commission in past informational sessions.

Section 5.A- Option 1- A Regional SIP developed under Section 308 Requirements

Timeline: This SIP would be submitted in two parts. The first part would be due within 12 months of the designation of attainment for PM2.5. Given current projections of designations, it is likely the SIP would be due in 2004 or 2005. The second part of the SIP, addressing the Core and BART requirements, would be due no later than December 2008.

Form of the SIP: Under this option Colorado would address all Class I areas by developing one coordinated SIP. The SIP would have sub-elements targeted at either individual Class I areas, or small clusters of areas, to be addressed by a common set of strategies. The master SIP would contain any overall strategies applying to all source categories in the State. Sub-elements of the SIP would address each of the Class I areas with any unique strategies that apply only to that area. This type of SIP would be quite similar to the multi-state ozone SIPs developed in the Northeast U.S.

which contain state specific controls related to metropolitan areas, Statewide regulations to cover applicable sources and interstate agreements to deal with emissions from neighboring States.

Discussion: To opt into this planning process, the State, in partnership with EPA, a Regional Planning Body (such as the WRAP) and other States, would have to determine what constitutes participation in a Regional Partnership. Because Colorado currently participates in the WRAP it is reasonable to consider we currently meet the requirement for "participation" and that WRAP administrative and organizational processes substantially meet the requirements to develop a 308 Regional Haze SIP. The requirement in the Regional Haze Rule is:

"…if at the time the SIP for regional haze would otherwise be due, a State is working with other States to develop a coordinated approach to regional haze by participating in a regional planning process, the State may choose to defer addressing the core requirements …and for BART…" (§51.308 (c))

The requirement goes on to define five commitments that would have to be submitted in the first phase SIP. These are:

1. Demonstration of ongoing participation in a regional planning process. *This element is most likely being met by Colorado's participation in the WRAP and with other regional planning bodies. However, formalization of such a partnership in a SIP may create some policy questions or legislative approval questions that will be difficult to deal with.*

2. Showing that emissions are causing interstate impacts. *This is most likely being met by existing and planned modeling done by the WRAP but may involve significantly more work to achieve consensus by sources, other states, Federal Land Managers, environmental groups, the public, and other interested parties.*

3. A description of the regional planning process. *In part this would most likely be met by the WRAP participation but may need some enhancements with the sub-group of States.*
4. A commitment to submit a plan revision addressing the BART and Core requirements. *This should not be a significant issue.*

5. A list of the BART-eligible sources within the State. *This has already been completed for SO_2 sources but would have to be evaluated for "all other pollutants" which will most likely focus on NOx and PM but would also look at VOCs, and organic carbon.*

While there are elements of this approach that appear to be just another form of the 309 SIP process, it would be distinctly different on the points listed below:

- It would require the BART process (evaluate controls and establish a framework for implementation of such controls) to be addressed for all eighteen of Colorado's BART eligible SO_2 sources and additional sources that met the BART criteria for other pollutants.

- It would require a Committal SIP in twelve months from the designation of attainment addressing the five specific elements listed above. Thus, a one or more year delay in the start of the SIP schedule would be built into the process but the final SIP would be due at the same time the 309 one is required, December 31, 2008.

- It would require establishment of Baseline, Current, and Natural Conditions for each of the Class I areas. This equates to establishing through monitoring what the current visibility conditions are in each area, and what the 2064 goal (or standard) would be. This will require a comprehensive technical analysis. Because monitoring data does not exist for each of the Class I areas in Colorado, extrapolating existing data to these other areas could be controversial. While the 309 portion of the RH rule requires (309 (d)(2)) "a projection of visibility improvements from 2003 to 2018 due to the 309 SIP strategies", it does not require this extensive of an approach or the establishment of these in the same manner as required under the 308 processes.

- It would require a more complex modeling evaluation of all contributing sources and control options compared to the 309 modeling which assumes BART for sulfur dioxide sources, some subsequent analysis for PM and NOx, adoption of elements of a "control package", and the mobile source emissions budget.

- It would require all applicable BART sources have controls adopted no later than 2013.

- It would require tracking of progress and mid-course corrections based on actual observations of the trend in Regional Haze.

- It would not require the adoption of a package of control measures that, to date, has no defined benefit for reducing Regional Haze.

Under this option, the BART requirement would be triggered and one of the starting points of the SIP process would be to begin the BART analysis. It is reasonable to assume that this effort will be a major undertaking by both the State and affected industries. Also, the State would need to establish the Background, Baseline and Natural Conditions for each of the twelve Class I areas, based on existing monitoring data. A third major element of this approach would be for the State to determine if existing sources in the State had an impact on Class I areas outside the State or visa-versa.

Summary of arguments for Option 1

- Colorado would be in control of determining the best suite of strategies addressing the problems in each Class I area. Thus, a pre-determined control scenario is avoided except for the BART requirement.

- The BART analysis would clearly define a path for the 18 major sources in terms of their requirement for all pollutants at the earliest possible date. This avoids the possibility that could be experienced under the 309 process where NOx and PM BART may kick in at the 2008 SIP update and SO_2 could be addressed in 2018 if, "better than BART" is not demonstrated by that point.

- Establishment of Background, Baseline and Natural Conditions for each Class I area puts into context a measurable standard and existing condition that people can more readily relate to than an emissions budget for the entire West.

- Establishment of BART controls on all applicable sources would occur no later than 2013 giving assurance of the earliest compliance with this provision and the maximum benefit for the environment.

- Appears to ensure the earliest compliance with real visibility improvements.

Summary of arguments against Option 1

- A BART strategy for eighteen of Colorado's sources makes the assumption this approach would produce some benefit. However, if no benefit is demonstrated, a source can petition that BART is not applicable. Demonstration that a source should not apply BART may be very difficult since EPA believes the demonstration of impact is a very low-hurdle effort. From an industry perspective, demonstration that a source should apply BART will be difficult and some believe that most sources would escape applying BART. Under these diametrically opposed views, controversy over the BART process will likely cause a significant amount of posturing during the SIP development process.

- Developing a partnership with other states to write a joint SIP, and to resolve BART and other control issues, will most likely be a very difficult task.

- The time to complete the SIP under this scenario is tied to the demonstration PM2.5 attainment. Colorado will not have any nonattainment areas for PM2.5 and thus must submit a SIP within a year of designation as an attainment area.

Summary: For Option 1, timing, the BART determination, selection of other controls and establishment of standards are the main differences between this approach and a pure 309 SIP.

Section 5.B- Option 2- Section 308 Regional combined with Section 309 (Assuming the 309 Process for Colorado Plateau Areas and the 308 Process for Non-Plateau Areas)

Timeline: A 309 Regional Haze SIP would have to be developed in 2002 for submission to the Colorado legislature in the 2003 legislative session. If this were approved, the 309 SIP could be submitted to EPA by the December 31, 2003 deadline. The remaining six areas would be addressed in accordance with the 308 schedule; i.e. "within 12 months of the State being designated as attainment for PM2.5" (see above discussion).

Form of the SIP: The SIP would appear in two parts. The 309 SIP would be a comprehensive adoption of the elements of the 309 plan requirement, including adoption of the list of "additional strategies" and commitments to address nitrogen oxides and particulate matter by December 2008 as well as a Mobile Source emissions budget if mobile sources are demonstrated to be a significant contributor to visibility impairment in any of the sixteen applicable Class I areas. The second element of the SIP, that which addresses the non-Colorado Plateau Class I areas, would be a compendium of plans addressing each of the remaining Class I area in the state. These elements could take on the form of independent SIPs addressing only local or regional strategies or inter-state plans that would be some other form of a regional process other than the 309 SIP.

Discussion: Under this option, the State could address the six Colorado Plateau Class I areas by opting into the WRAP 309 process and then address all of the remaining six Class I areas by a separate 308 Regional or even 308 stand alone processes. As with the first option, this would trigger BART for all Colorado's BART eligible sources. Option 2 would require a full buy-in to the WRAP and multi-state planning approach, as it exists for those opting into the 309 planning process. It requires implementation of a package of other strategies defined in the Grand Canyon Visibility Transport Commission report including such things as a statewide pollution prevention program, adopting a 20% renewable energy production goal, possible establishment of mobile source emission budgets and a host of other programs targeted at voluntarily reducing emissions beyond existing regulatory requirements.

This option is distinctly different from Option 1 for the following reasons:

- It incorporates the 309 Planning options that would address the SIP for six of Colorado's Class I areas with the least amount of additional work.

- It would require establishing standards at only those Class I areas not in the Colorado Plateau.

- It affords some flexibility in the 308 side of the plan to pick and choose through the list of 309 strategies and to apply those as needed to the other areas. This would allow getting SIP credit for voluntary reduction programs and the 20% renewable energy goal.

- It produces the most complex planning option as six of the areas would be addressed through the WRAP and partnership with other 309 planning states while the remaining six areas would be addressed either at the local level or possibly with some other interstate process.

Summary of arguments for Option 2:

- The 309 control package has already been designed and takes advantage of a number of programs to move toward the, "better than BART" presumed level of control. Thus, the sum of the emissions reductions from the list of strategies would only need to make up the difference between the assumed 85% control for BART in the Annex and the 90% control assumed for the EPA.

- The number of areas that would have to have individual SIPs would be reduced to six or less.

- While more complex, both the 309 and 308 SIPs could take credit for applicable programs adopted under those SIP elements.

Summary of arguments against Option 2:

- The bi-furcated process is the most complex of the options requiring multiple planning processes, possible layering of out-of-state organizations, and a more complex process for the public to understand.

- Forces use of BART even if just one area were to have to follow the 308 process. Thus, the BART process and addressing the "Core Requirements" would be identical to Option 1.

- Tracking of progress would be tied to two different processes. Under the 308 element, tracking would relate to ambient measurements and failure to make progress would trigger tuning up the SIP. The 309 areas would track progress by following regional emissions even though ambient data would need to be submitted as part of the periodic reports. Enforceable requirements would be triggered for failing to meet some milestones while others would not be enforceable. Thus, a much more complex tracking system would be required.

- Two different processes would judge compliance. Under the 308 areas, compliance would be first be met by the completion of BART for all applicable sources by 2013. For 309 areas, compliance would be based on meeting enforceable emission control programs identified as the GCVTC strategies. Under 309, if the Mobile Source Emission Budget was required, tracking and compliance would be complicated by that additional element. Under the 308 areas, all other strategies that were adopted would include their own compliance processes. Thus, a very complex compliance tracking system would be required.

Summary: Option 2 is a complicated process involving balancing both of the planning requirements of the 308 and 309 approaches and accepting needing to deal with all of the favorable and unfavorable elements of each section of the regulation.

Section 5.C- Option 3- Section 309 Regional Process

Timeline: The initial six Colorado Plateau Class I areas would have to be addressed in a December 31, 2003 submittal. This would contain commitments to adopt the GCVTC list of additional strategies, and other required elements like the mobile source emission budget, fire program, etc. This SIP would then contain a declaration that the additional six Class I areas are to be considered as part of the Colorado Plateau package. In 2008, an amendment to the SIP would be made that addressed NOx and PM. If NOx or PM were considered to be important, strategies to deal with these emissions would have to be added to the SIP.

Form of the SIP: Under this form of the SIP, Colorado would add all of the twelve Class I areas into the 309 Regional Planning option and the SIP would be adopted in two phases. The first phase would be due in 2003 and then a subsequent analysis of NOx and PM impacts would follow between 2003 and 2008 and a second element of the SIP would address these requirements.

Discussion: Under this option, the State could address all of the six Colorado Plateau Class I areas by joining with other states in a Regional Process. To do this, Colorado would have to demonstrate that the strategies in Section 309 would carry their weight far enough that the other non-Plateau Class I areas problems would be addressed.

One major goal of the 309 process is for the Region (and presumably each State) is to have a 20% renewable energy goal to be met in increasing stages up to 2020. While Colorado leads the country in consumer adopted renewable energy programs, all current efforts result in less than 5% of the power generated in Colorado.

This option is distinctly different from Option 1 in for the following reasons:

- It takes full advantage of all the 309 elements and does not require the adoption of the BART process unless, after 2018, the State fails to meet targeted improvements.

- It requires the adoption of a mobile sources emissions budget that would apply to all areas of the State that have mobile sources as part of the problem.

- The timeline is specified by the regulation for all planning dates.

- It does not require BART to be adopted by 2013 for all applicable sources.

Summary of arguments for Option 3:

- Simplest process since the SO_2 portion of the control package is pre-defined.
- Allows the same planning time for addressing NOx and PM emissions as the 308 process does.
- Does not force addressing, "all other pollutants" that the 308 process dictates.
- Allows market forces to be most effective in reducing emissions rather than forcing adoption of BART.
- Tracking emissions from stationary sources a more exact science than relating atmospheric particulate measurements to visibility improvements.

Summary of arguments against Option 3:

- Demonstration that all of the other 6 areas will be addressed by 309 control package may be difficult.
- Timeline for development of initial SIP will be very difficult to meet.
- Currently, the sum of the emissions improvements from all GCVTC strategies is not defined and development of enforceable controls may be difficult.
- Adoption of a mobile source emissions budget would be a complex process and may be unmanageable.
- Provides the most elongated process for actually demonstrating and enforcing real visibility improvements.
- It mandates the most complex Interstate planning process to be adopted by the State.
- There is no demonstration at this point that the SO_2 emission reductions will meet visibility goals for the additional non-Plateau Class I areas.

Summary: Option 3 is the simplest program to adopt with the earliest SIP requirement. This option could stretch true visibility improvements out ten years or more past what would have to be demonstrated under the other options and it carries some of the more difficult policy calls.

APPENDIX 1.

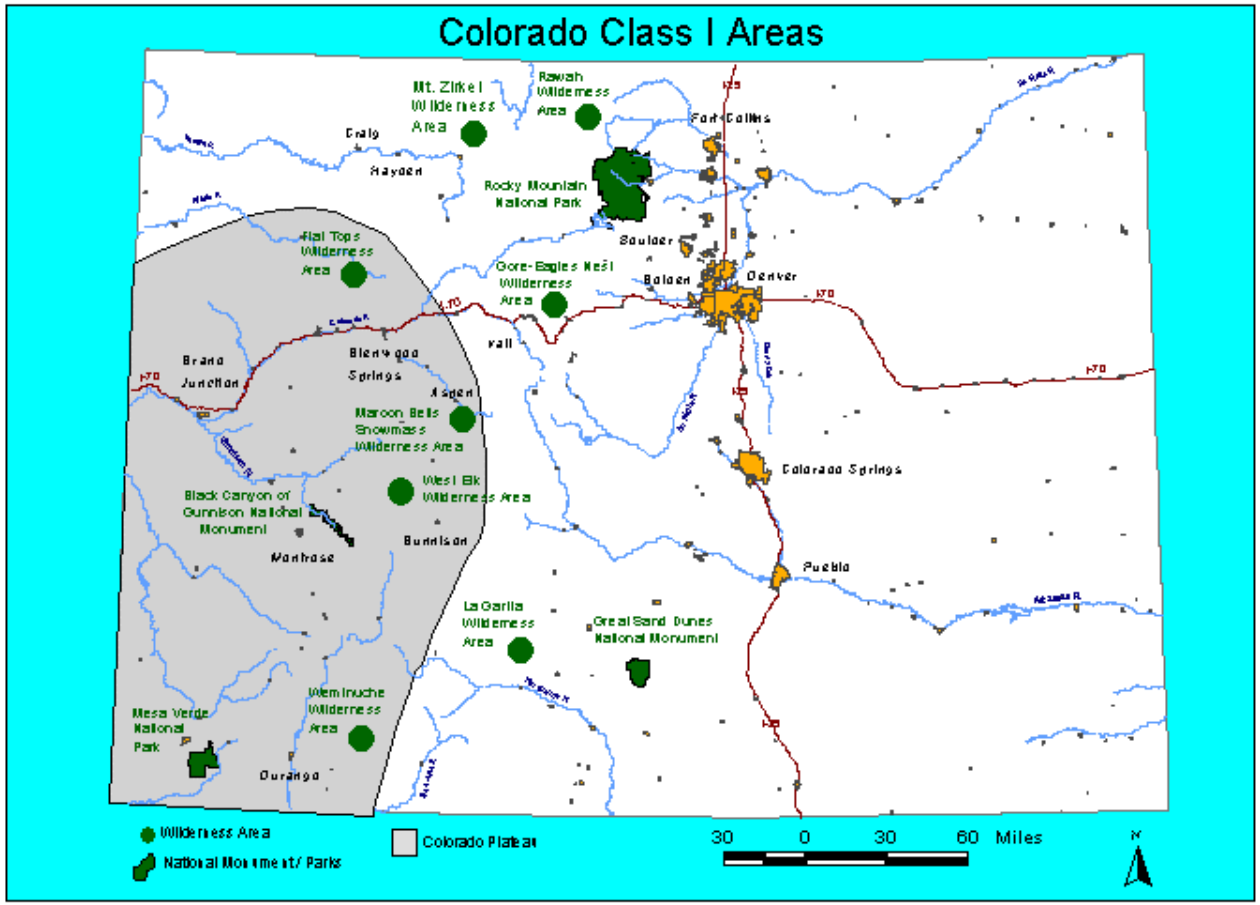
SO_2 Emission (tons/year) from Major Stationary Sources in Colorado with Section 309 Control Assumptions

Plant Name	Unit ID	Capacity Nameplate (MW)	1999 Control Level	Known Future Controls	Assumed Control for ANNEX	1999 SO_2 Uncontrol-led	2018 SO_2 Uncontrol-led	1999 SO_2	2018 SO_2	2018 SO_2 w/ 309 BART Assumption
Pawnee	1	500				16,666	16,666	16,666	16,666	16,666
Craig*	C1	446	66%	90%	85%	13,913	14,708	4,730	5,001	2,206
Craig*	C2	446	66%	90%	85%	13,193	13,844	4,486	4,707	2,077
Craig	C3	446	85%			9,642	13,838	1,446	2,076	2,076
Cherokee	1	100		50%		3,309	3,309	3,309	1,655	1,655
Cherokee	2	110		50%		3,515	3,663	3,515	1,831	1,831
Cherokee	3	150		80%		4,800	5,010	4,800	1,002	1,002
Cherokee*	4	350	26%	80%		9,347	12,678	6,917	2,536	2,536
Comanche*	1	350			85%	6,492	7,408	6,492	7,408	1,111
Comanche*	2	350			85%	7,208	8,264	7,208	8,264	1,240
Rawhide	101	285	80%			5,586	5,597	1,117	1,119	1,119
Hayden*	H1	190	82%			8,631	8,631	1,554	1,554	1,554
Hayden*	H2	257	25%	83%		6,833	8,474	5,125	1,441	1,441
Ray D Nixon*	1	230			85%	4,601	6,949	4,601	6,949	1,042
Valmont*	5	166		80%		2,835	4,829	2,835	966	966
Martin Drake*	5	59			85%	1,155	2,005	1,155	2,005	301
Martin Drake*	6	88			85%	2,395	2,996	2,395	2,996	449
Martin Drake*	7	147			85%	3,047	5,029	3,047	5,029	754
Nucla	1	79				1,476	1,476	1,476	1,476	1,476
Arapahoe	1	44		100%		716	0	716	0	0
Arapahoe	2	44		100%		520	0	520	0	0
Arapahoe	3	44		50%		1,070	1,359	1,070	680	680
Arapahoe	4	100	20%	50%		2,323	3,048	1,858	1,524	1,524
Cameo	2	44				2,046	2,046	2,046	2,046	2,046
Cameo	1	22				585	2,396	585	2,396	2,396
WN Clark	2	22				349	450	349	450	450
WN Clark	1	17				253	325	253	325	325
Conoco*	FCC				90%	912	912	912	912	91
Conoco*	SRU		90%		98%	1,037	1,037	1,037	1,037	207
SW Portland	Dryer					32	32	32	32	32
SW Portland*	Kiln					128	128	128	128	128
Holnan Port*	3					1,693	1,693	1,693	1,693	1,693
Tri-Gen Golden*	4				85%	877	877	877	877	132
Tri-Gen Golden*	5				85%	2,683	2,683	2,683	2,683	403
Colo. Refining	FCC					634	634	634	634	634
Colo. Refining	SRU					478	478	478	478	478
Holnan Port. FC						623	623	623	623	623
CF&I						353	353	353	353	353
Totals		**5087**				**141,958**	**164,448**	**99,723**	**91,551**	**53,696**

*** "18 BARTable" Sources under the Section 308 Program**

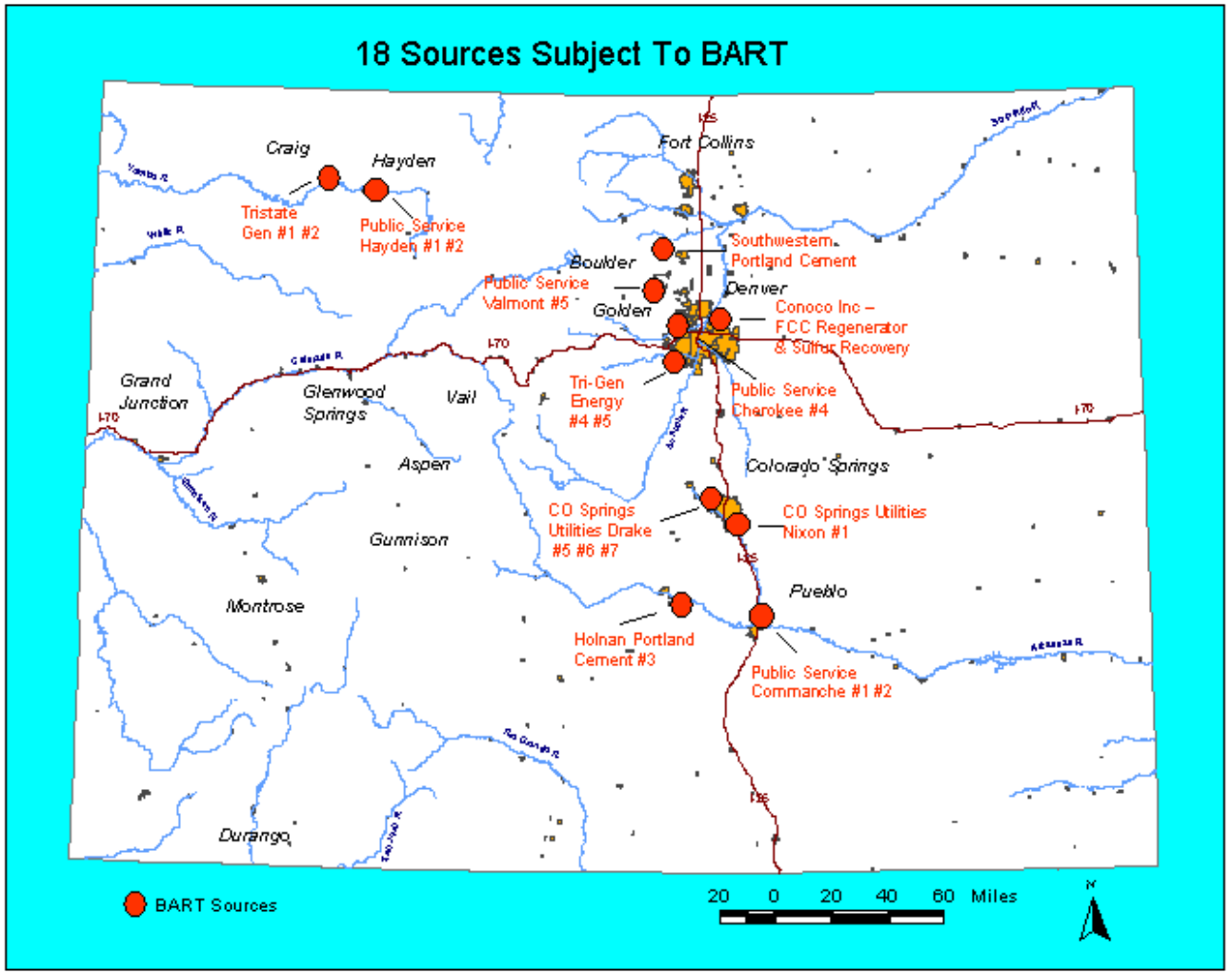
APPENDIX 2.

Map of 12 Mandatory Federal Class I Areas in Colorado



APPENDIX 3.

Location of 18 Major Stationary Sources Subject to BART in Colorado



APPENDIX 4.

Location of IMPROVE Visibility Monitoring Sites in Colorado