I. BACKGROUND

"Historically, visibility has been defined as *the greatest distance at which an observer can just see a black object viewed against the horizon sky*. ...Nevertheless, visibility is more than being able to see a black object at a distance." (William C. Malm, *Introduction to Visibility,* CIRA, May 1999) The observer of the spectacular vistas in the Class I areas on the Colorado Plateau will notice the colors of the scenery, the complexity of the geologic features, the shadows of overhead clouds, and the inherent beauty of the landscape features. Particles in the atmosphere interfere with the observer's ability to see and appreciate the landscape. Some particles scatter light so that the observer sees a gray-white glare; other particles absorb light so that the scene appears gray and definition of the features is lost. *In the Western United States average visual range is about 100 - 150 kilometers, about one-half to two-thirds of the visual range that would exist without manmade air pollution.* (Preamble, Regional Haze rule, 64 FR 35715)

Particles come from a variety of sources ranging from desert dust and forest fires to the gaseous emissions of cars and industrial sources that combine with other substances in the atmosphere to form particles. The specific pollutants affecting visibility are sulfates, nitrates, organic carbon, elemental carbon, and soil dust.

A. 1977 Clean Air Act

In 1977, Congress amended the Clean Air Act to include provisions to protect the scenic vistas of the nation's National Parks and Wilderness Areas. In these amendments, Congress declared as a national visibility 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.

To address this goal, the Environmental Protection Agency (EPA) developed regulations to reduce the impact of large industrial sources on nearby Class I areas. It was recognized at the time that regional haze, which comes from a wide variety of sources that may be located far from a Class I area, was also a part of the visibility problem. However, monitoring networks and visibility models were not yet developed to the degree that was necessary to understand the causes of regional haze.

B. Grand Canyon Visibility Transport Commission

In 1990, Congress amended the Clean Air Act, and as part of these amendments created the Grand Canyon Visibility Transport Commission (GCVTC). The Commission was given the charge to assess the currently available scientific information pertaining to adverse impacts on visibility from potential growth in the region, identify clean air corridors, and recommend long-range strategies for addressing regional haze.

The GCVTC completed significant technical analysis and developed recommendations to improve visibility in the 16 mandatory federal Class I areas on the Colorado Plateau. The Commission found that visibility impairment in the Colorado Plateau was caused by a wide variety of sources and pollutants. A comprehensive strategy was needed to address all of the causes of regional haze. The GCVTC submitted these recommendations to EPA in a report dated June 1996 for consideration in rule development. These recommendations were:

- **Air Pollution Prevention.** Air pollution prevention and reduction of per capita pollution is a high priority for the Commission. The Commission recommends policies based on energy conservation, increased energy efficiency and promotion of the use of renewable resources for energy production.

- **Clean Air Corridors.** Clean air corridors are key sources of clear air at Class I areas, and the Commission recommends careful tracking of emissions growth that may affect air quality in these corridors.

- **Stationary Sources.** For stationary sources, the Commission recommends closely monitoring the impacts of current requirements under the Clean Air Act and ongoing source attribution studies. Regional targets for SO_2 emissions from stationary sources will be set, starting in 2000. If these targets are exceeded, this would trigger a regulatory program, probably including a regional cap and market-based trading. During the next year, participants in the Commission's process will develop a detailed plan for an emissions cap and market trading program.

- **Areas In And Near Parks.** The Commission's research and modeling show that a host of identified sources adjacent to parks and wilderness areas, including large urban areas, have significant visibility impacts. However, the Commission lacks sufficient data regarding the visibility impacts of emissions from some areas in and near parks and wilderness areas. In general, the models used by the Commission are not readily applicable to such areas. Pending further studies of these areas, the Commission recommends that local, state, tribal, federal, and private parties cooperatively develop strategies, expand data collection, and improve modeling for reducing or preventing visibility impairment in areas within and adjacent to parks and wilderness areas.

- **Mobile Sources.** The Commission recognizes that mobile source emissions are projected to decrease through about 2005 due to improved control technologies. The Commission recommends capping emissions at the lowest level achieved and establishing a regional emissions budget, and also endorses national strategies aimed at further reducing tailpipe emissions, including the so-called 49-state low emission vehicle, or 49-state LEV.

- **Road Dust.** The Commission's technical assessment indicates that road dust is a large contributor to visibility impairment on the Colorado Plateau. As such, it requires urgent attention. However, due to considerable skepticism regarding the modeled contribution of road dust to visibility impairment, the Commission recommends further study in order to resolve the uncertainties regarding both near-field and distant effects of road dust, prior to taking remedial action. Since this emissions source is potentially such a significant contributor, the Commission feels that it deserves high priority attention and, if warranted,

additional emissions management actions.

- **Emissions from Mexico.** Mexican sources are also shown to be significant contributors, particularly of SO_2 emissions. However, data gaps and jurisdictional issues make this a difficult issue for the Commission to address directly. The Commission recommendations call for continued binational collaboration to work on this problem, as well as additional efforts to complete emissions inventories and increase monitoring capacities. These matters should receive high priority for regional and national action.

- **Fire.** The Commission recognizes that fire plays a significant role in visibility on the Plateau. In fact, land managers propose aggressive prescribed fire programs aimed at correcting the buildup of biomass due to decades of fire suppression. Therefore, prescribed fire and wildfire levels are projected to increase significantly during the studied period. The Commission recommends the implementation of programs to minimize emissions and visibility impacts from prescribed fire, as well as to educate the public.

- **Future Regional Coordinating Entity.** Finally, the Commission believes there is a need for an entity like the Commission to oversee, promote, and support many of the recommendations in this report. To support that entity, the Commission has developed a set of recommendations addressing the future administrative, technical and funding needs of the Commission or a new regional entity and has asked the Operations Committee to complete detailed plans by September, 1996. The Commission strongly urges the EPA and Congress to provide funding for these vital functions and give them a priority reflective of the national importance of the Class I areas on the Colorado Plateau.

The stationary source recommendations were a key part of the overall Commission recommendations because they established a backstop trading program that would be implemented if the Commission goals were not met through voluntary measures. The projections and analyses undertaken by the GCVTC indicated that existing requirements under the Clean Air Act, coupled with voluntary measures undertaken by sources, would result in sufficient reductions to address visibility concerns. The purpose of the backstop trading program is to ensure that the emission reduction goals necessary to demonstrate reasonable progress in accordance with the regional haze rule do indeed occur – if sufficient reductions as defined by the milestones are not achieved, the backstop trading program will be activated to ensure further regional reductions. The backstop program would begin within one year after emissions are determined to exceed the relevant milestone, and compliance is required within five years after this determination. Program design elements such as rigorous monitoring and reporting, public availability of emissions and allowance data, as well as compliance information, would ensure confidence of the regulators and the public that requisite reductions are achieved under this backstop program. The GCVTC encouraged states and tribes to review the visibility impacts of uncontrolled pollution sources at Class I sites on the Colorado Plateau and make expeditious determination regarding the need for additional pollution controls pursuant to the Clean Air Act (CAA) to address reasonably attributable impairment. Until such time the trading program is triggered, however, all stationary source reductions for the widespread issue of regional haze will be of a voluntary nature.

The stationary source goals are described in greater detail below.

1. Implement existing Clean Air Act requirements through the year 2000.

Implementation of existing Clean Air Act requirements is expected to result in a significant decrease in sulfur dioxide emissions and their contribution to light extinction in the short term (1990-2000). ... States and tribes are encouraged to review the visibility impacts at Class I sites on the Colorado Plateau of uncontrolled pollution sources and make expeditious determinations regarding the need for additional pollution controls pursuant to the Clean Air Act. To the extent decisions are made to require additional emission reductions at existing facilities, the Commission supports the adoption of the best, most cost-effective strategies.

2. Establish stationary source emission targets as regulatory triggers.

a) An SO2 emissions target for stationary sources will be established effective in the year 2000. The level of the target would be calculated by (1) determining the amount of emission reductions that has actually been achieved (or legally committed to) between 1990 and 2000; (2) comparing the actual reduction to the 13% reduction from 1990 actual emission levels that was projected by the Baseline Forecast Scenario; (3) assuming the actual reduction is higher than the projected reduction, set the emissions target at a level midway between the projected and actual, unless any affected party convinces the Commission or its successor that a different distribution is needed (e.g., emissions growth in undeveloped areas, operational flexibility needs, deteriorating visibility). As part of this calculation, the 1990 emissions inventory will be compared to the reported emissions to 1995/1996 data now available from sources (all utilities and many stationary sources have Continuous Emission Monitors).

b) An ultimate SO2 emissions target for the visibility Transport Region will be established for the year 2040 that locks in the 50-70% reduction in SO2 emissions projected by the Baseline Forecast Scenario. Interim targets may also be needed to ensure steady and continuing emission reductions and to promote investment in pollution prevention (in accordance with five year review periods as described in #4 below).

c) Various emissions management options for stationary source NOx and PM will be explored, including considering the establishment of emission targets, in order to avoid any net increase in these pollutants from stationary sources within the region as a whole and to provide a foundation for future incorporation into a multi-pollutant and possibly multi-source market-based program.

3. Develop a plan for allocating trading credits under a regulatory program emissions cap.

a) Development of an equitable plan for allocating the trading credits among existing and future sources will be accelerated. The Commission expects that the targets will be met based on existing commitments and other actions that are likely to be required because of ongoing source attribution studies. However, in order to create economic incentives for early reductions as well as to provide flexibility and certainty to sources in planning future actions, participants in the Commission's process are committed to designing the plan before the EPA takes final action on the Commission s recommendations so that the elements of that program can be incorporated into the federal regulatory program. (The estimated date for completing development of the program is June, 1997). A number of factors will be considered in developing the program, including measures to:

- prevent new sources from causing the target to be exceeded;

- account for sources which achieve emission reductions early or have achieved maximum control efficiency;

- ensure that all allocations to tribal lands, rural areas and relatively undeveloped areas (e.g., clean air corridors) are of practical benefit; and

- account for the effects of increases or decreases of emissions on visibility.

b) In order to generate information for development and implementation of the incentive-based program, owners and operators of existing facilities located within the Transport Region should: (1) by 1997, notify states and tribes of existing or planned pollution control or prevention measures; and (2) report biannually on efforts that are being made to manage their emissions or engage in other transactions to voluntarily meet their emissions reductions responsibility per the trading credit allocation scheme. These plans would not be incorporated as enforceable permit conditions or SIP revisions except as noted below.

4. Review compliance with targets and establish incentives.

Progress in complying with the emissions target(s) would be assessed in the year 2000 and at five-year intervals thereafter.

a) In 2000, or any subsequent five-year review period, if the regional target in effect at that period has not been exceeded no additional regulatory program will be required. Any source that has contributed significantly to achieving the needed reductions by going beyond compliance or achieving early reductions will be rewarded. For instance, the following rewards could be included:

- an exemption from any interim target requirements that might be established;

- streamlined treatment in the permitting process;

- ability to bank emissions; or

- bonus allowances if credits are used to achieve development on tribal lands or other areas that are relatively undeveloped.

Incentives will be further developed and included in the design of the program.

b) In 2000, or at any subsequent five-year review period, if the regional emissions target has been exceeded, a regulatory program (most likely an emissions cap and incentive-based market trading program) will be implemented. Any source that is exceeding the emission allocation presented in the plan will have no more than five years to come into compliance and any reductions achieved will be discounted. Other disincentives will be developed and included in the design of the program.

5. Complete source attribution studies.

The Commission strongly encourages the EPA to complete, within one year, the source attribution study currently underway at the Mohave Power Project. Further, the Commission strongly encourages the EPA to take action consistent with the results of that study within twelve months of its completion. The Commission supports the commitment by the Mohave Power Project to maintain voluntarily its emissions at or below current levels (e.g., an average of the past two year's emission levels).

6. Develop an improved monitoring and accounting system.

A major deficiency in the technical analysis associated with the GCVTC activities has been the lack of adequate and reliable monitoring data. In order for any visibility policy to be effective, there must be an adequate benchmark of existing conditions against which to measure progress. To obtain a better understanding of visibility throughout the Colorado Plateau, Class I areas other than Hopi Point in the Grand Canyon need to be included as receptors in visibility modeling and additional monitoring sites should be established.

Emissions in the Transport Region provide another benchmark against which to measure progress. An accurate and credible emissions accounting method will be essential in determining compliance with the emissions targets or caps. Shortcomings in the emissions inventory need to be remedied, and a method for routinely tracking emissions needs to be developed.

It is critical that the emissions monitoring and tracking system be developed quickly so that emission reductions achieved between now and the year 2000 can be recorded and so that those areas that are presently lower-emitting can receive appropriate credit. If an incentive-based regulatory program is implemented after the year 2000, early emission reductions achieved before the year 2000 should be awarded credit, provided established criteria are satisfied."

C. Regional Haze Rule

On April 22, 1999, the EPA issued regulations to improve visibility in 156 national parks and wilderness areas across the country by addressing regional haze. These regulations were published in the Federal Register on July 1, 1999 (64 FR 35714). The regional haze regulations require states to establish goals for improving visibility and to develop long-term strategies for reducing emissions of pollutants that cause visibility impairment.

The regional haze rule establishes in §309 specific SIP requirements which may be used by the nine "transport region states" included in the GCVTC analysis (Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming) and the 211 tribes in the same geographic area to satisfy the national regional haze rule requirements for the period from 2003 to 2018. These states and tribes also have the option to submit SIPs and TIPs under the nationally applicable §308 provisions. Because of the substantial work that has already been completed by the GCVTC, the §309 plans will be submitted by 2003 as opposed to as late as 2008 under §308.

In order for any of the transport region states to pursue compliance with the regional haze rule through §309, these states must submit an Annex to the Commission Report to EPA by October 1, 2000. The Annex is required to include quantitative emission reduction milestones for stationary source sulfur dioxide (SO2) emissions for the reporting years 2003, 2008, 2013, and 2018. These milestones must reflect "steady and continuing emissions reductions for the 2003-2018 time period...to provide for greater reasonable progress than would have been achieved by application of Best Achievable Retrofit Technology (BART)." The Annex is also required to include documentation of a backstop market trading program to be implemented if current programs and voluntary measures are not sufficient to meet these emission reduction milestones.

While transport region states are also provided the option of complying with the rule through the provisions designed for the remainder of the states impacted by the regional haze rule, pursuit of §309 allows these states to capitalize on the work completed in the GCVTC, and therefore rely on previous modeling, inventories, and analyses for the 16 Class I areas on the Colorado Plateau. Additionally, sources in states pursuing a regional trading program will benefit from the cost effectiveness associated with the use of a trading program to achieve emission reductions. Though a regional trading program is also a compliance option under the alternative provisions of the rule, pursuit of the trading program under §309 allows incorporation of the work of the GCVTC and capitalizes on already existing regional relationships.

D. Western Regional Air Partnership

The Western Regional Air Partnership (WRAP) was established in 1997 as the successor organization of the Grand Canyon Visibility Transport Commission. The WRAP is charged with implementing the Commission recommendations, as well as addressing broader air quality issues that affect all western states. The WRAP is designed as a stakeholder-based organization. States, Tribes, Federal Agencies, environmental groups, and industry representatives work in a cooperative process to develop recommendations that meet the environmental goals in the most effective way. The Committees and Forums of the WRAP have worked diligently over the last three years to develop the details of the Annex to the Commission recommendations.

It should be noted that the work of the WRAP with stationary sources is only one part of a complete package to address regional haze. Other forums established by the WRAP are working on control strategies for other contributors to haze, such as fire, road dust and mobile sources. The overall impacts of these programs on visibility will not be apparent until all the forums have completed their work and the results have been modeled.