

## **Texas' Regional Haze State Implementation Plan Summary of Major Issues**

### Background

The Federal Clean Air Act (FCAA) requires the United States Environmental Protection Agency (EPA) to adopt regulations to reduce visibility impairment resulting “from man-made air pollution” in 156 Class I Federal areas. The regulations require each state SIP to include control measures to make reasonable progress toward the national goal of natural visibility conditions at all Class I areas. The two Class I areas in Texas are Big Bend and Guadalupe Mountains National Parks. Each state bordering Texas has one or more Class I Federal areas designated for visibility protection. Where Texas’ emissions impact visibility at Class I Federal areas in other states, Texas’ SIP must include plans to reduce Texas’ visibility impacts in those areas too.

The FCAA and EPA regulations require states to submit SIPs to make “reasonable progress” in reducing visibility impairment at Class I Federal areas resulting from anthropogenic pollution. These SIPs must “contain such emission limits, schedules of compliance and other measures as may be necessary to make reasonable progress toward meeting the national goal” including requiring installation, operation, and maintenance of Best Available Retrofit Technology (BART), “as determined by the State” on certain existing stationary sources.

### Natural Conditions

The period of the first regional haze SIP is from its adoption to 2018. The base period for the SIP is 2000 through 2004. The uniform rate of progress line is a straight line from the base period impairment for the worst 20% of monitored days plotted from 2004 to natural conditions plotted for 2064. Another name for this line is the glide path. Since the natural conditions value anchors the right end of the line, it is important to estimate natural conditions accurately.

EPA set default natural visibility targets based on work by J. C. Trijonis. Our analysis of the Trijonis method and EPA’s use of that work indicates that EPA has significantly underestimated the natural visibility impairment at Texas’ Class 1 areas.

The EPA default estimates set the natural condition target at Class 1 areas by using the Trijonis average condition for large areas of the continent without adequately considering local conditions at the individual Class 1 areas. That is kind of like assuming that because the median house price in a growing city is \$197,000 that the average house price in one of the most desirable neighborhoods is \$197,000. You would likely not be able to buy a vacant lot in such a neighborhood for less than \$300,000. The analysis we have used to seeks to avoid this kind of statistical error.

The staff analysis works within the Trojonis conceptual framework and uses the monitored data at each Class 1 area to develop more accurate and statistically valid estimates of natural visibility conditions for that area.

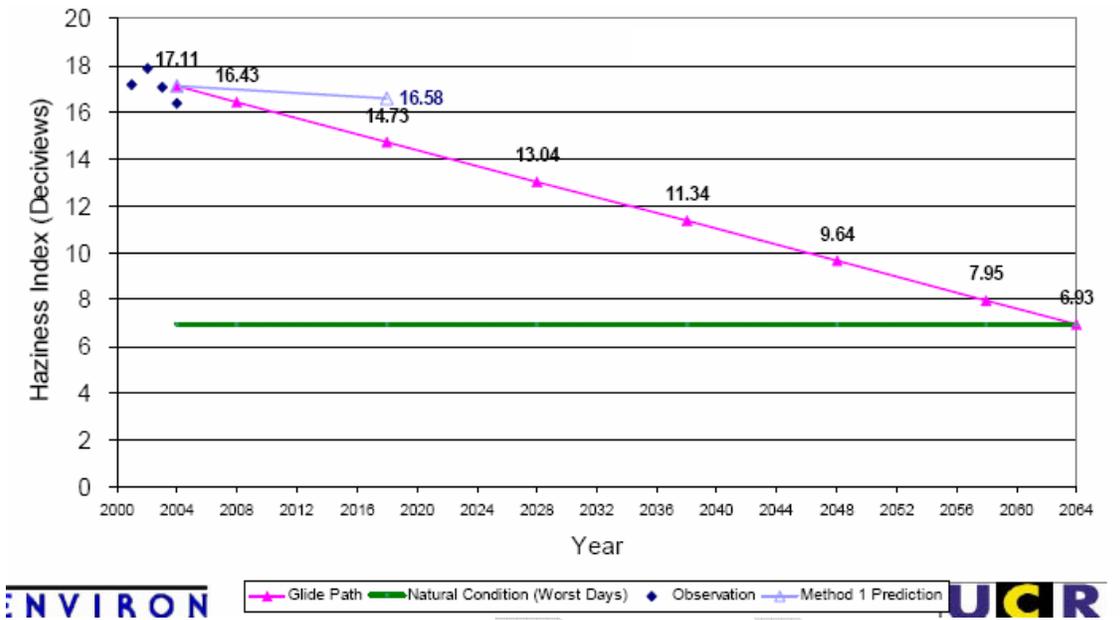


Figure 1: Glide Path for Big Bend Using EPA Default Natural Conditions

Using the EPA default natural conditions target for Big Bend of about 7 deciviews, many stakeholders would expect the agency to be working toward about 14.7 deciviews by 2018, the end of this first SIP period.

Our refined estimate of natural conditions at Big Bend is 12 deciviews; this includes natural dust storm events that comprise a significant portion of the low visibility days at Big Bend. This new estimate creates a much different glide slope. Under our estimates, we would be on the uniform rate of progress if projecting 15.4 deciviews by 2018. Enclosed in this packet is a paper regarding the proposed method to produce a more refined estimate of natural conditions. The estimates are more statistically valid than EPA's, but there is still a great deal of uncertainty. A related paper regarding the natural dust storms that affect Big Bend and Guadalupe Mountains is also in this packet. Please refer to these documents for more detailed information.

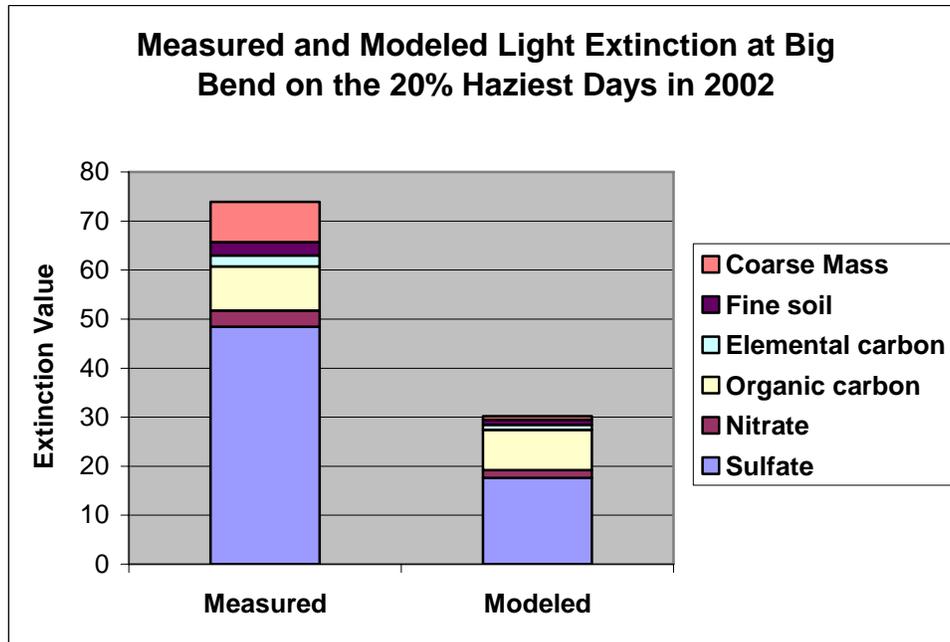
Both papers are on our regional haze web site. We invite review and comment on these papers and the conclusions in them.

### 2018 Projections

The chart on the previous page shows a projected visibility impairment of 16.6 deciviews at Big Bend in 2018. That projection relies on CENRAP modeling, but we believe a more refined projection will be lower than this value. It does not include all planned reductions

in emissions and it incorrectly handles the contributions of coarse mass and soil, assuming that substantial portions of both are anthropogenic and growing. Some of these problems can be corrected; others need to be minimized. The “control strategy” portion of this paper covers the planned reductions in more detail. The other issues will be briefly discussed here.

The following chart compares measured components of visibility impairment to the results of the base case modeling for Big Bend.



Based on staff analysis of dust storm events and the lack of significant human activity disturbing the soil in these two areas, staff recommends that we consider the coarse mass and fine soil contributions to be natural. Therefore, they should be held constant when projecting to 2018.

In addition, when projecting 2018 levels of human-caused impairment using the CENRAP modeling, we must recognize the limits of the model performance in these areas. As seen above, the model is significantly underestimating the level of sulfate and nitrate pollution in Big Bend. This is also true for Guadalupe Mountains. The model performance in these areas is the least accurate in the CENRAP domain. The performance is much better in areas such as Caney Creek in Arkansas. Unfortunately, there is insufficient time to improve model performance for this SIP.

These issues are covered in more detail in the paper on 2018 projections and uniform rate of progress.

**Recommendation:** Because of the dominance of natural dust storms in producing the worst 20 percent of days, hold coarse mass and fine soil levels constant in the 2018

projections for the Texas Class 1 areas. Use ratio methods (the relative response factor (RRF) method specified by EPA) to project 2018 levels of other PM<sub>2.5</sub> components including sulfates and nitrates, but recognize the limitations of the model. Conduct research over the next few years to improve model performance at Big Bend and Guadalupe Mountains so that better science is available when the agency updates the SIP in five years.

#### Non-US Contributions to Visibility Impairment

According to the CENRAP modeling, nearly half of the visibility impairment at Texas Class 1 areas is either from Mexican emissions or from global emissions showing up in the model's boundary conditions. The preamble to the regional haze rule states, "The EPA does not expect States to restrict emissions from domestic sources to offset the impacts of international transport of pollution." Texas will identify the impacts of international transport of visible pollution on its Class I areas. It is appropriate for the federal government to work with Mexico to reduce international transport of visibility impairing pollution.

Recommendation: Present two glide slopes in the SIP. The first would be a standard glide slope with a target of natural visibility conditions at the Class 1 areas. The second glide slope would have a target of zero U.S. anthropogenic contribution by 2064. That would show the progress Texas and the other states are making with those emissions under our control.

#### The Long-Term Strategy

The statute and EPA rules and guidance set criteria for determining whether additional reductions beyond CAIR, BART, and other on-the-books reduction requirements are reasonable. These criteria are based on the cost of control and other related factors. The rule does not require the state to make a uniform rate of progress toward natural conditions. That is, it does not require us to be on the glide path. The SIP can propose a 2018 condition that is above, on, or below the uniform rate of progress line. The state must determine, based on the factors laid out in the rule, what controls are appropriate and reasonable. The key U.S. anthropogenic pollutants of concern for regional haze at Texas' Class I areas are NO<sub>x</sub> and SO<sub>2</sub>. Most of the direct PM impacts on Texas Class 1 areas are from natural sources, so this pollutant is less a concern.

Reductions in visibility impairing emissions are expected from several sources: (1) the Clean Air Interstate Rule (CAIR), (2) Texas' and other states' ozone SIPs, the (3) EPA refinery consent decree, and, in some states, (4) additional reductions.

(1) The CAIR program allows a source either to install controls or to purchase emission credits from another source that puts on controls. Therefore, it is not possible to know what levels of NO<sub>x</sub> and SO<sub>2</sub> electric generating units will emit in 2018. The EPA has developed a model that takes into account emission trading, electric demand, fuel transportation infrastructure and other factors in projecting emissions from EGUs.

CENRAP used this model in its modeling of 2018 visibility conditions. A senior TCEQ emission inventory analyst has conducted an extensive analysis of the model and of the versions available. Based on that analysis, we believe that the data available from CENRAP on this issue is the best available estimate of emission reductions due to CAIR. Please refer to that paper for more details.

(2) The reductions expected from ozone SIPs are fairly well understood and are being included in CENRAP's 2018 modeling.

(3) The EPA refinery consent decree has resulted in federally enforceable agreements from several refineries in Texas for SO<sub>2</sub> and NO<sub>x</sub> reductions. The SO<sub>2</sub> reductions are specific to particular refinery process units. The NO<sub>x</sub> reductions tend to be emissions reductions across several refineries and so are not possible to include in modeling at this time.

(4) If the Texas Commission on Environmental Quality determines that any additional controls are reasonable, they will be included in recalculated reasonable progress goals; however, since the major emission reductions result from CAIR and other on-the-books rules including NO<sub>x</sub> reduction in ozone state implementation plan (SIP) requirements, the impact of any additional controls on the reasonable progress goals would be relatively minor.

#### Non-Degradation

The Regional Haze Rule requires that the state move toward restoring visibility to natural conditions on the worst 20% of the days. It also requires that the state to ensure that visibility does not get worse on the best 20% of the days. For Texas' two Class I areas the modeling projects that the long-term strategy meets this requirement. The key to preventing degradation of visibility is to address regional haze issues properly when new sources are permitted.