

implemented in many areas throughout the United States.

This commenter took issue with each of the six factors that EPA referenced in the proposal.

**Response**—Before responding to the comments on each of the six factors individually, EPA notes that, as indicated in the proposal, it was the combination of factors—not necessarily any particular factor standing alone—that supports EPA's determination that the modeling provides an adequate demonstration that the ozone NAAQS will be maintained in the absence of the adoption of additional control measures. Furthermore, as explained below, the Comments made with respect to each of the factors individually fail to undermine the validity of EPA's conclusion that the modeling provides an adequate demonstration of maintenance. Although the commenter made relevant points, EPA believes that when considered together, on balance the factors support the conclusion that North Carolina has adequately demonstrated that the Charlotte-Gastonia area will maintain the standard.

(1) North Carolina has five years of air quality data showing attainment of the standard.

With three years of air quality showing attainment an area can request redesignation. North Carolina's request is strengthened by the fact that it has five years of air quality data showing no violations of the O<sub>3</sub> NAAQS.

Based upon a trend analysis performed by EPA, meteorologically adjusted O<sub>3</sub> trends in Charlotte (and surrounding areas) have shown a modest but consistent improvement of approximately 1 percent per year between 1983 and 1993. However, the most recent five years analyzed (1988–1993) have shown an accelerated rate of improvement of approximately 2 to 3 percent per year (10 percent over the five year period) suggesting that recent ozone air quality is improving when meteorological conditions are eliminated.

Moreover, EPA has conducted an analysis of the O<sub>3</sub> potential in the major urban areas, including Charlotte, using available meteorological data collected over the past 41 years. The study (currently undergoing review for publication in *Atmospheric Environment*), indicates that meteorological conditions favoring high O<sub>3</sub> ranked the summer of 1993 as the 2nd most severe O<sub>3</sub> year in the past 41 years. The two years, 1988 and 1987 were ranked 7th and 4th, respectively. The meteorology for all three years was very conducive to producing high O<sub>3</sub>

concentrations. Since North Carolina did not have a violation in 1993 under meteorological conditions of comparable severity to the 1988 and 1987 modeling analyses, this supports the redesignation demonstration.

Although NO<sub>x</sub> emissions are projected to increase over the maintenance period, i.e. from the 1990 base line inventory, the State of North Carolina's experience in other similar areas (Raleigh/Durham and Greensboro/Winston-Salem) suggests that total NO<sub>x</sub> emissions in 1999 will be less than 1993. Specifically, the projected emissions from the three area power plants in 1999 that are the area's primary NO<sub>x</sub> sources are less than the actual emissions from those plants in 1993. Since the area was able to maintain the standard despite the higher NO<sub>x</sub> emissions and adverse meteorological conditions in 1993, it would be expected that the projected decrease in power plant emissions would support the ability for the area to continue to maintain the O<sub>3</sub> NAAQS.

(2) The maintenance plan contains pre-adopted measures and a violation would trigger reduction in emissions by the following ozone season. While it is true that the presence of pre-adopted measures in the maintenance plan triggered by a violation does not make the modeling analysis conservative, it does add strength to the package as a whole and will allow the State to implement new controls to quickly address any future nonattainment problem. The State has done preliminary modeling analysis on both the pre-adopted and the other contingency measures listed in the plan which will assist the State in timely implementation of the most effective measures.

Additionally, the contingency plan contains a secondary trigger which is an exceedance of the ozone standard that would indicate a violation could be imminent. This trigger will be activated within 30 days of the State finding the exceedance. Once the secondary trigger is activated, the State Air Quality Section will commence analysis, including updated modeling as necessary, to determine what control measures will be required to keep the area in attainment, with the regulatory adoption process for any necessary measures beginning by May 1 of the following year. As the contingency measures based on the secondary trigger should help the area stay in attainment, those measures should also help the area maintain the standard and do provide an additional level of assurance that the area will maintain the standard.

(3) The O<sub>3</sub> standard is a statistically based NAAQS that allows one exceedance per year.

Developing an attainment test using gridded concentrations for a few selected days to match a NAAQS determination which uses sparsely located monitors for a complete hourly O<sub>3</sub> season is not simple. Recognizing the severity of O<sub>3</sub> forming potential for selected episodes, as well as the NAAQS allowing one exceedance at each monitor location over a three year period, led EPA to consider how stringent the model test of requiring every grid cell modeled across the domain to be below 124 ppb for all hours might be. Again, based on the severity of the years modeled, EPA believes the modeling demonstration indicates that a few grid cells would exceed 124 ppb by a slight amount (less than 1% with a maximum value of 129 ppb) is within a margin of safety that the NAAQS will be maintained provided the contingency measures in the plan are identified and implemented, if the need is indicated by monitored data. As indicated previously, the State's plan contains a secondary trigger for contingency measures based on an exceedance of the O<sub>3</sub> NAAQS that would indicate a violation is imminent.

(4) North Carolina has done extensive modeling to gain an understanding of the creation of O<sub>3</sub> in the Charlotte area and has generally made conservative assumptions in selecting modeling inputs.

EPA recognizes and allows for uncertainty in model estimates as part of the model performance evaluation conducted prior to use in strategy development. EPA guidance includes recommended ranges for statistical performance measures. For the North Carolina application, although model estimates were sometimes below the observed highest concentrations (base case), overall the performance results suggest that UAM is unbiased and is therefore expected to produce unbiased estimates of future air quality assuming unbiased (non-conservative) estimates of future emissions and boundary conditions are used.

In fact, North Carolina was conservative in its choice of model, years to simulate, boundary conditions and emissions growth factors. Although, North Carolina was not required to do so, it chose to use UAM so as to better understand and quantify the effect of ozone precursors in the area and thus identify the most cost effective strategy for maintaining the NAAQS. EPA believes North Carolina did select years that are conducive to high levels of O<sub>3</sub> (also see discussion above) and chose