

Next, the same area is used to determine future modeled ozone values. The modeled maximum results of the four strategy days are averaged and a reduction factor calculated from the base case to the future case. This reduction factor represents the amount of ozone reduced in this area, as the result of the emission reductions modeled. This reduction factor is used to adjust the average ozone design value for this part of the model domain (*i.e.*, Rhode Island), as monitored between 1985 and 1990. This monitored design value represents both the base case model years of 1987 and 1988 and also the design values used in 1991 to classify one-hour nonattainment areas. The future design value is further reduced when the benefits of EPA's Tier 2/Gasoline Sulfur program are factored in.

This additional analysis also shows that air quality design values in Rhode Island can reasonably be expected to be reduced below 0.124 ppm based on continued additional reductions within the domain and reductions upwind, reflected in the future year boundary conditions, and the benefits of EPA's Tier 2/Gasoline Sulfur program.

7. Summary of the Ozone Modeling

In summary, the ozone modeling submitted for the Rhode Island area is consistent with the CAA and EPA guidance and demonstrates attainment. Other information, which provides additional support for concluding the Rhode Island area will attain in 2007 are the ambient ozone data trends and a trajectory analysis of exceedance days in the area.

D. What Are the Conclusions From the Ozone Trends?

There are three ozone air quality monitors in the Rhode Island nonattainment area that have data from 2000–2002. They are in the Rhode Island cities and towns of West Greenwich, East Providence, and Narragansett. The original serious classification of the nonattainment area was based on data from the 1987 through 1989 time period. Since then and up to and including 2002 ozone data, all 3 sites show a decrease in ozone due to emission reductions, both within Rhode Island and also upwind.

At the three Rhode Island monitors the ozone trend is downward. At the West Greenwich site, the one-hour ozone design value has dropped from 0.162 ppm in 1988 to 0.130 ppm in 2002, a drop of 20 percent. This site is not in attainment, based on 2000–2002 ozone data. At the East Providence site, the one-hour design value has dropped

from 0.138 ppm in 1988 (site moved from Providence to East Providence in 1997) to 0.127 ppm in 2002, for a drop of 8 percent. This site, too, is not in attainment, based on 2000–2002 ozone data. The Narragansett site only has data for the last five years so no trend was calculated. The current design value for the Narragansett site is 0.124 ppm, which is below the standard. To show how close West Greenwich and East Providence are to meeting the NAAQS one can look at the fifth highest value over the same 3-year period 2000–2002. The fifth highest value for West Greenwich is 0.127 ppm and for East Providence it is 0.125 ppm. The sixth highest value is below the one-hour standard at these sites.

The ozone trend is also downward at the Truro, MA ozone monitor, the only monitor in eastern Massachusetts with a design value over the one-hour standard. At the Truro site, the one-hour design value has dropped from 0.146 ppm in 1989 to 0.130 ppm in 2002, for a drop of 11 percent. This site is not in attainment, based on 2000–2002 ozone data. To show how close Truro is to meeting the NAAQS one can look at the fifth highest value over the same 3-year period 2000–2002, the fifth highest value at the Truro site is below the level of the one-hour ozone standard.

Based on the overall downward trend in one-hour ozone concentrations in Rhode Island, and because precursor emissions are projected to keep falling, both within the nonattainment area and upwind from it, there is no reason to believe that the downward trend in ozone concentrations will not continue over the near term. The future emission reductions will be a result of the following: continued benefits from tighter standards on vehicles (National Low Emission Vehicles or CA LEV in upwind areas) due to fleet turnover; the reductions from large point sources due to the OTC NO_x Budget Program and EPA's NO_x SIP call; other federal control measures such as controls on non-road engines; and the Tier 2 vehicle and low sulfur gasoline program.

E. What Do the Ozone Exceedance Day Trajectory Analyses Show?

Trajectory analysis is a tool for assessing atmospheric transport and identifying likely source regions of locally measured air contaminants. The Rhode Island DEM used the HYSPLIT-4 (Hybrid Single-Particle Lagrangian Integrated Trajectory) model, developed by NOAA's Air Resources Lab (ARL), to compute backward trajectories.

To assess airflow patterns on days when any Rhode Island monitor recorded exceedances of the one-hour

ozone NAAQS during the period 1999–2002, 24-hour backward trajectories were computed by the Rhode Island DEM. The surface-based trajectories (start height of 10 meters) for these days, indicators of shorter range transport, follow a general track that crosses near the New York metropolitan area before turning northeastward toward Rhode Island. These trajectories cross no high emission areas in Rhode Island. Upper-level trajectories (500 and 1000 meters elevation), indicators of long-range transport, generally begin farther west over New York State, Pennsylvania or Ohio and follow a more west-to-east track, passing north of the New York metropolitan area. Since the trajectories for the exceedance days strongly resemble one another, the Rhode Island DEM concluded that there is a consistent meteorological pattern and source region for ozone and precursors when monitors in Rhode Island exceed the one-hour ozone NAAQS. Furthermore, the Rhode Island DEM concluded that one-hour exceedance level ozone concentrations will occur at the West Greenwich, East Providence and Narragansett monitors only if the air reaching these monitors had previously crossed nearby high emission areas such as the greater New York metropolitan area. It should be noted, that on all days when there are exceedances at West Greenwich, East Providence and Narragansett, there are also exceedances in Connecticut. EPA concludes that without the influence of the emissions from the greater New York metropolitan area, no one-hour exceedances would have occurred at these monitors. Attainment demonstrations already approved by EPA for Connecticut and the New York city area show attainment will be achieved in 2007, and likewise this attainment demonstration for Rhode Island concludes that attainment will be achieved in 2007.

To corroborate the Rhode Island DEM's results, EPA performed its own trajectory analyses for those days when there were exceedances of the one-hour ozone standard on either Cape Cod, in southeastern Massachusetts, and/or in Rhode Island, over the three year period 1999 through 2001. This area encompasses the ozone monitoring sites in Truro, MA; Fairhaven, MA; Narragansett, RI; East Providence, RI; and West Greenwich, RI. The exceedance days at these sites during 1999–2001 are as follows: June 7, 1999, July 6, 1999, July 16, 1999, June 10, 2000, June 30, 2001, July 25, 2001, August 7, 2001, and August 9, 2001.

EPA's trajectory analyses of the days with ozone exceedances at these sites (Truro, MA, Fairhaven, MA,