



# Conforming to the New Air Quality Standards

## *Tips for Transportation Agencies*

JONATHAN MAKLER AND ARNOLD M. HOWITT

*Makler is Project Manager and Howitt is Executive Director, Taubman Center for State and Local Government, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts.*

The U.S. Environmental Protection Agency (EPA) promulgated new National Ambient Air Quality Standards (NAAQS) for ground-level ozone and particulate matter in July 1997, but litigation that reached the U.S. Supreme Court delayed judicial approval of the standards until March 2002. As implementation proceeds, the new NAAQS pose several challenges for transportation agencies in nonattainment areas—that is, areas with air quality that does not meet the standards.

These challenges may prove especially problematic for areas that have no experience in developing state implementation plans (SIPs) or in managing the transportation conformity process—demonstrating that transportation plans and programs will keep emissions within required limits. As many transportation agencies learned in the 1990s, developing SIPs and making conformity determinations are critical to effective transportation planning and investment under the requirements of the Clean Air Act (CAA).

A decade of experience provides clues to resolving the difficulties that loom for new nonattainment areas. Examining how three states—Georgia, North Carolina, and Oklahoma—have prepared for implementation of the new NAAQS illuminates the benefits of experience, as well as the challenges that remain.

### **Transportation Conformity**

The CAA Amendments (CAAA) of 1990 and the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 tied the nation's air pollution regulation and transportation planning together more tightly than ever before, particularly through the revised SIP and transportation conformity requirements. The SIP includes a legally enforceable schedule of emission reductions to meet the NAAQS and

establishes a motor vehicle emissions budget, setting a maximum permissible amount of transportation-related pollution.

A conformity determination is required for every regional transportation plan (RTP) and transportation improvement program (TIP) adopted by a metropolitan planning organization (MPO) in a nonattainment area. Other triggers for conformity determinations include a designation of nonattainment, approval of new motor vehicle emissions budgets, and the release of a new mobile-source emissions model.

Conformity procedures are complex, but the core analytic process involves a 20-year, computer-simulated forecast of emissions from the transportation system. The predicted levels of pollutants must fall within the budgets established in the SIP. Alternative tests are available in the absence of motor vehicle emission budgets. In addition, an MPO must demonstrate timely implementation of transportation control measures in SIPs and must fulfill ISTEA's fiscal constraint requirement that transportation plans and programs have sufficient financial resources.

To ensure accountability, the CAAA mandates the withholding of federal transportation funds if conformity between the RTP or TIP and the SIP cannot be demonstrated. During a conformity lapse, only transportation control measures from the SIP and exempt emissions-neutral projects may proceed.

### **Conformity Lessons**

When the conformity regulations went into effect in the early 1990s, transportation agencies—particularly MPOs and state departments of transportation (DOTs)—faced difficulties not only in meeting the requirements but also in coping with other changes in the newly enacted CAAA and ISTEA. Several lessons are apparent:

**1. Mastering the conformity process and requirements requires a significant start-up period.**

Even without the conformity requirements, transportation and air quality agencies in the 1990s faced substantial increases in workloads, as well as the need to develop new skills and to build interagency relationships. For conformity, MPOs usually had to expand technical and human resources, learn the requirements of a complex federal regulatory procedure, and figure out applications to specific situations.

MPOs also had to develop approaches to

- ◆ Complete the work in a timely fashion,
- ◆ Secure inputs from—and gain the confidence of—institutional partners, and
- ◆ Obtain federal approval for the conformity determination.

State air quality agencies also were endeavoring to learn conformity while adjusting to the abundant new requirements of the CAAA.

**2. Transportation and air quality professionals must be involved across disciplines in critical planning activities.**

Air quality planning staff had to be involved in framing transportation plans. Similarly, MPOs and state DOTs had to participate in developing the mandatory SIP, a process typically led by the state air quality agency.

Most MPOs and state transportation departments recognized that the CAAA had profound implications for policies, operations, and funding. As a result, more attention was devoted to air quality issues, to understanding the technical issues and workings of the regulatory system, and to participating in policy debates over how to reduce pollution.

**3. Strong interagency and interpersonal relationships among the regional, state, and federal transportation and air quality agencies are vital to managing the conformity requirements.**

Formal consultation and informal day-to-day working contacts among agencies were a necessity. Despite strong interagency and interpersonal ties, agencies frequently had differing objectives and stakeholder considerations; moreover, satisfying the conformity requirement could be substantively difficult.

Ties did not eliminate political contention among agencies and various stakeholder groups. Strong interagency working relationships, however, did make the conformity process work more effectively by reducing suspicion, facilitating jointly developed solutions and step-by-step compliance with the regulations, and solving some potential

problems early. Strong interagency ties facilitated otherwise difficult tradeoffs, because the participants had established a foundation of understanding, trust, and credibility.

**4. Inviting nongovernmental stakeholders, such as environmental advocacy groups, to participate in the full range of conformity discussions, not only in the formal public hearing and comment process, can be effective.**

Transportation agencies frequently were wary of advocacy groups as possible sources of contention, delay, and subsequent litigation. When advocacy groups did have opportunities to observe and express concerns about data and modeling practices early in the conformity determination process, however, transportation and air quality agencies sometimes were able to make adjustments to avoid later disputes. A more transparent process made advocacy groups more likely to trust the technical analysis. Despite these efforts, a few areas experienced chronic conflict between planners and advocates.

**5. The technical complexities of the conformity process and the regulations are difficult for senior policy and elected officials, as well as the general public, to understand.**

Typically only a core group of agency participants and stakeholder representatives mastered the regulatory details. When conformity problems were encountered, the core group frequently had difficulty explaining the problems and helping senior officials to focus on workable solutions. Too often, only a crisis that threatened federal transportation funding provided the impetus to understand the issues.

Some nonattainment areas continue to have difficulty meeting the requirements of the conformity regulations. Nevertheless, after a decade of experience, nearly all have established regular procedures for conducting the analysis, holding interagency consultations, improving cross-professional understanding, and increasing awareness by policy officials and, in some cases, the public.

## **The New NAAQS**

The designation of new nonattainment areas under the new NAAQS, intended for the summer of 2000, was delayed for years by a legal challenge led by the American Trucking Associations. Ultimately, a consent decree between EPA and the American Lung Association (ALA), November 13, 2002, established the timeline for implementation of the 8-hour ozone standard (measurements averaged over an 8-hour period), which in turn determines the schedule for PM<sub>2.5</sub> (fine particulate matter 2.5 micrometers in diameter or smaller).



As Figure 1 illustrates, a complicated process leads to determination of the new nonattainment areas in 2004, and sets the SIP deadlines in 2007 and subsequent attainment deadlines. Under the ALA consent decree, the deadline for designating nonattainment areas for ozone is April 15, 2004. In April 2003, EPA established a comparable timeline for PM<sub>2.5</sub> nonattainment areas, with final designations due December 15, 2004.

The conformity regulation goes into effect for the new NAAQS at the end of a 1-year grace period after a nonattainment designation and is the focal

point of preparations by the affected areas. EPA's Office of Transportation and Air Quality administers the conformity requirement and is currently determining which elements need to be revised to meet the new air quality standards.

## Nonattainment Areas

The CAA requires designations of new nonattainment areas to be based on the most recent three years of monitoring data for each pollutant. A national monitoring infrastructure was established in 1999 for PM<sub>2.5</sub>, and the first 3-year set of data

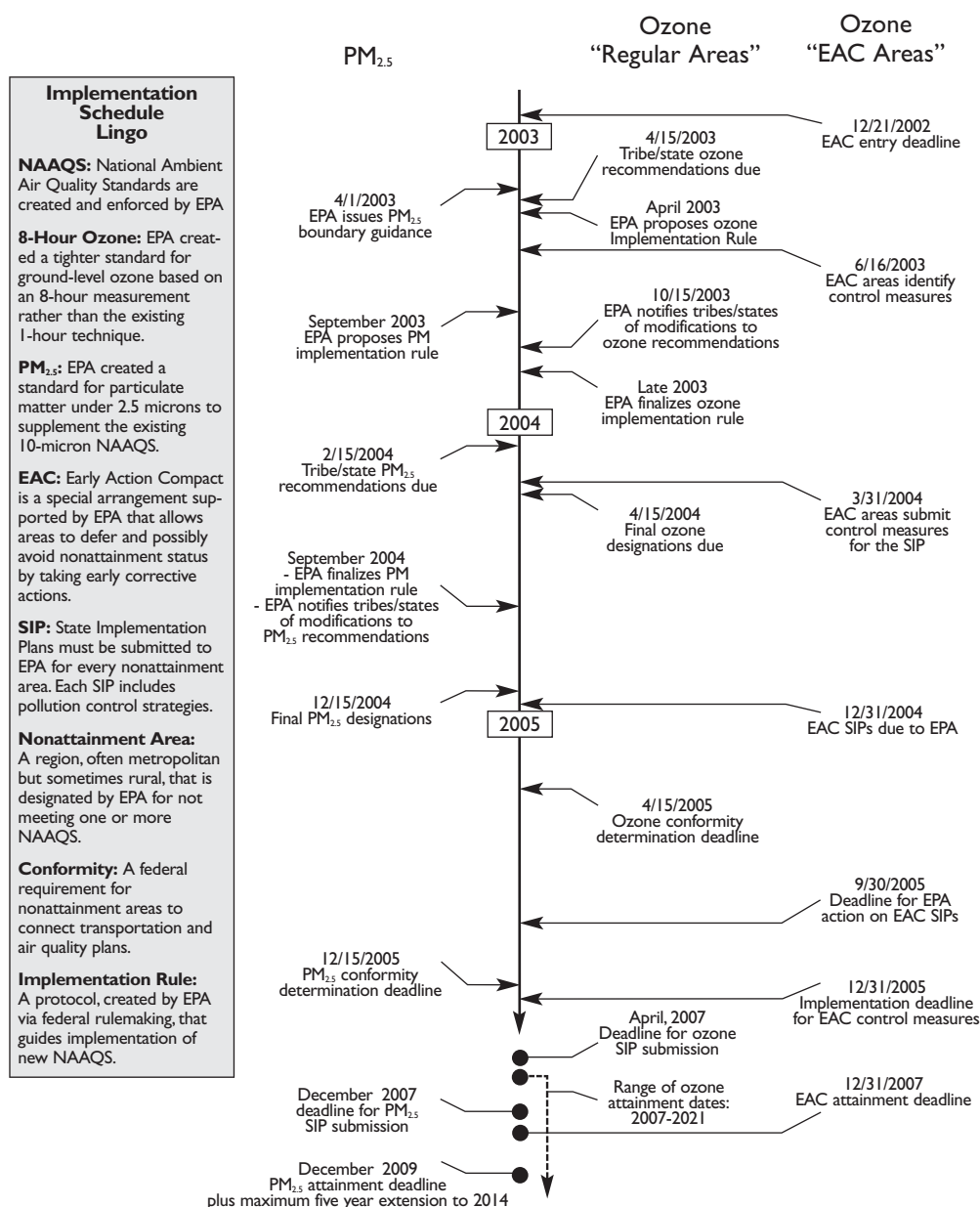


FIGURE 1 Implementation schedule: new NAAQS for ozone and PM<sub>2.5</sub>.

became available in 2001. Because ozone monitors were already in place, 8-hour ozone data were available immediately, so that prospective nonattainment areas were identified earlier.

Figures 2 and 3 illustrate prospective nonattainment areas for 8-hour ozone and  $PM_{2.5}$ , respectively. The maps show nonattainment or maintenance areas for 1-hour ozone and  $PM_{10}$ , as well as new areas.

The designations indicated on these maps are provisional, but the maps suggest that the 8-hour ozone and  $PM_{2.5}$  data will reinforce nonattainment patterns (ozone in the Northeast, for example) and simultaneously will create new ones, primarily in the Southeast. The maps also indicate a significant overlap between 8-hour ozone and  $PM_{2.5}$  nonattainment areas. Prospective nonattainment areas can be divided into two categories: those that have experience with nonattainment status and with meeting the requirements, and those that do not.

Because the new designations may expand the boundaries of nonattainment or maintenance areas, these may be subdivided into unchanged areas and expanded areas. In contrast to the 1-hour ozone standard, the new standards will create nonattainment areas in rural as well as metropolitan settings. Therefore, the inexperienced group may be subdivided into new urban areas and new rural or isolated areas.

This categorization highlights each area's experience with or ability to perform transportation and air quality planning functions. Nonattainment areas, for example, have been subject to CAA regulation and have an institutional infrastructure for the planning requirements, as well as experience with the transportation conformity process. The new portions of expanded areas and the entirely new areas, in contrast, have little or no air quality experience, and the rural and isolated areas are unlikely to have any exposure to the CAA or to the requirements of ISTEA and the Transportation Equity Act for the 21st Century (TEA-21).

Double designation of areas for both  $PM_{2.5}$  and 8-hour ozone is a likely scenario in many states, as the maps indicate. The Southeast has almost no previous experience with particulate matter, making a second designation a potentially substantial burden. Experience dealing with one pollutant, however, can apply to another in terms of both SIP development and conformity determinations.

### Anticipating the Challenges

The past decade's experience with transportation conformity in nonattainment areas can aid regions dealing with the regulation for the first time. Experience is easily applicable to ozone, but less useful for particulate matter, because differences between  $PM_{10}$

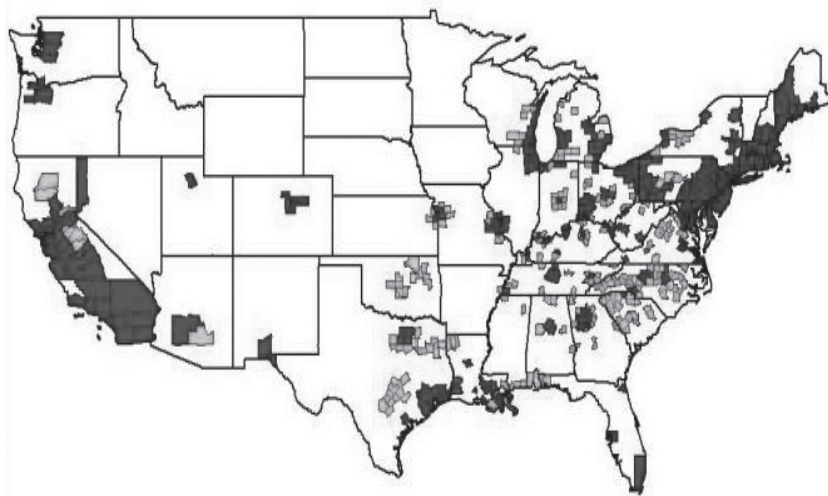


FIGURE 2 Prospective nonattainment areas for ozone (light areas are new).

and  $PM_{2.5}$  hamper extrapolation of experience with  $PM_{10}$  to preparations for  $PM_{2.5}$ .

#### Unchanged Areas

For the unchanged areas, the new designations are only one of several major technical changes in the next few years. Others include a new version of the emissions factors model, MOBILE6, used in the conformity analysis; incorporation of the 2000 census data into transportation planning models; and the reauthorization of TEA-21, including any changes in the transportation planning regulations.

Furthermore, these areas have been coping with new and evolving regulatory requirements since the enactment of the CAA. Therefore, implementation

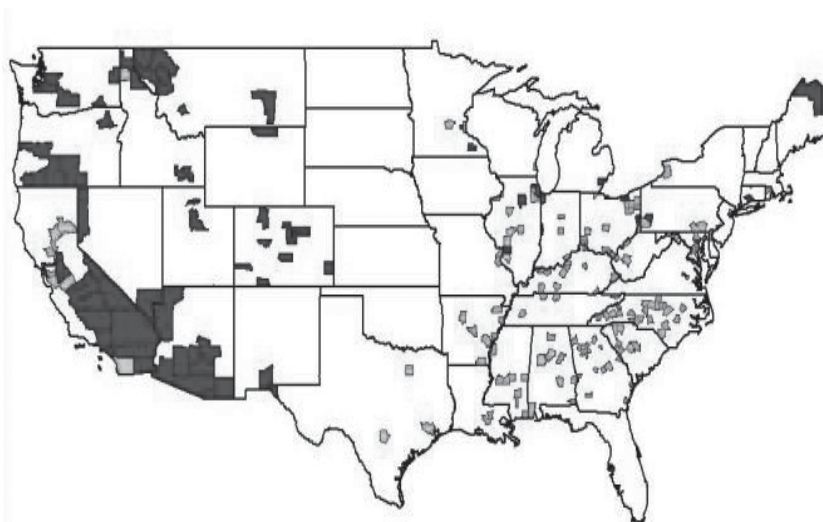


FIGURE 3 Prospective nonattainment areas for  $PM_{2.5}$  (light areas are new).





of the 8-hour standard can be addressed with available tools and interorganizational relationships. With minor differences, this also applies to areas that have attained the 1-hour ozone standard in the last 10 years but that will return to nonattainment under the 8-hour standard.

### **Expanded Areas**

For expanded areas, the primary challenge will be integrating new stakeholder interests into the air quality, transportation planning, and conformity processes. Well-established relationships among planning partners will have to be open to new participants, and veteran stakeholders will need to exercise patience with and accommodate novice counterparts.

The staff of the MPO, state, and federal agencies will need to introduce planners and elected officials from new counties and municipalities to conformity and the SIP process. Obtaining buy-in from county elected officials is likely to increase staff willingness to participate openly. Political support also will be critical for the expansion of air quality control measures, especially if county or state legislative action is needed.

### **New Urban Areas**

New urban areas face challenges similar to those of the nonattainment areas in the early 1990s. Perhaps the most significant difference is that most of these states have had experience with other nonattainment areas.

For example, although MPOs will have to develop the necessary technical capacities and protocols for performing conformity determinations, their partners in the state transportation and air quality agencies, as well as in EPA, the Federal Highway Administration (FHWA), and the Federal Transit Administration, can provide assistance. State agencies, however, are facing budget cuts and resource constraints, so MPO staff in nonattainment areas may not receive adequate attention.

Because the state agencies have more experience than MPO planners from new nonattainment areas, the MPO representatives will need to assert themselves in the SIP development process. MPOs have found direct involvement in this process valuable, whether to influence emissions budgets and controls or to increase awareness of upcoming responsibilities and deadlines. In addition, involvement engages the MPO's data and modeling resources, such as travel time and vehicle mix information, although this may vary.

Because these new nonattainment areas have a decade of experience with ISTEA, they may have relationships with some of the planning partners

and advocacy groups crucial for achieving conformity. Nonetheless, these areas will go through a regulatory learning period similar to that experienced by nonattainment areas in the early 1990s and will need to connect with EPA and state or local air agencies, as well as adjust to a 3-year, instead of a 5-year, planning cycle.

### **New Rural Areas**

New rural and isolated areas face all the challenges of their urban counterparts but with additional obstacles. Some of these areas exceed the limits because of sources beyond control—for example, high biogenic emissions—and generally lack the institutional infrastructure of urban areas. Moreover, many of the laws and regulations, including the CAA, were framed for urban instead of rural applications, creating mismatches in requirements and capabilities.

Without an MPO to perform technical tasks such as emissions analyses, rural areas will have to rely on technical assistance from state transportation agencies. Nonetheless, local officials and staff will want to monitor how their interests are being represented, especially in the SIP and emission budget development for rural areas with limited options for controlling man-made emissions.

### **Concurrent Designation**

Concurrent designation for PM<sub>2.5</sub> and 8-hour ozone intensifies the issues for each of the four types of nonattainment areas. As the maps indicate, the Southeast includes many new PM<sub>2.5</sub> areas, urban and rural, often overlapping the 8-hour ozone nonattainment areas, some of which are also new.

## **Adapting to the New Standards**

To find out how states are preparing for designation and for changes in transportation planning, the authors conducted interviews during 2002 and 2003 with local, state, and federal officials, as well as with other stakeholders in three states likely to be affected by the new ozone standard: Georgia, North Carolina, and Oklahoma. The case studies dealt only with the 8-hour ozone standard, but many of the issues apply as well to PM<sub>2.5</sub>.

Under the 8-hour ozone standard, Georgia is likely to have three new urban nonattainment areas and an expanded nonattainment area for Atlanta. Atlanta's 2-year conformity lapse (1998–2000) made the state acutely aware of the transportation planning difficulties that may arise, so that state, local, and federal officials have prepared aggressively for implementation of the 8-hour ozone standard. A common concern is the strain of the additional workload on state—as well as federal—agencies.



## Roundtable Clearing North Carolina's Air

DAVID HYDER

**A**fter the U.S. Environmental Protection Agency (EPA) set the 8-hour ozone and fine particulate matter (PM<sub>2.5</sub>) standards, North Carolina faced the formidable prospects of tripling nonattainment areas, adding a new pollutant—PM<sub>2.5</sub>—to the air quality mix, and introducing many inexperienced partners to the rigors of transportation conformity.

The anticipated nonattainment areas are mostly rural, although adjacent to regions with metropolitan planning organizations (MPOs). However, most do not have well-defined transportation planning processes. At the same time, adding staff to either the North Carolina Department of Transportation (DOT) or to the Department of Environment and Natural Resources was not likely. The state needed to leverage its air quality expertise to meet the new standards.

In response, the state DOT, the Department of Environment and Natural Resources, North Carolina State University's Center for Transportation and the Environment, the Federal Highway Administration, and EPA cosponsored the North Carolina Air Quality Roundtable. The Roundtable's ongoing workshops convene representatives of 30 stakeholder groups to cooperate on improving state air quality. Stakeholders have identified three areas for emphasis: educating decision makers and the media, educating the public, and assuring agencies' technical capacity.

The Roundtable's immediate focus is on educating decision makers about their role in meeting federal air quality requirements and improving air quality. A train-the-trainer program, called the Air Quality Gold Circle, has recruited policy staff from such organizations as the North Carolina Rural Center, the League of Municipalities, the Association of MPOs, and the Association of County Commissioners.

The Gold Circle members serve as local experts on air quality, briefing local-level decision makers on the relationship between air quality, land use, and transportation. They also place experts on meeting agendas for more detailed briefings.

An introductory meeting acquainted the Gold Circle members with air quality issues in North Carolina. Future meetings will examine the designation process, state implementation plan development, early action plans, and transportation conformity.

The Center for Transportation and the Environment at North Carolina State University has provided much of the administrative support for the Roundtable. More information is available on the Roundtable website, <http://itre.ncsu.edu/cte/NCAirQuality/index.html>.

*The author is Transportation Engineer, Office of Human Environment, North Carolina Department of Transportation, Raleigh.*



PHOTO: GEORGIA DOT

Traffic outside of Atlanta, Georgia. Local, state, and federal officials have been preparing to implement the new air quality standards.

North Carolina's three 1-hour ozone maintenance areas—Charlotte–Gastonia, Greensboro–Winston-Salem–High Point, and Raleigh–Durham—will return to nonattainment status under the 8-hour standard, joined by four new urban nonattainment areas, many new ozone areas in rural counties, and isolated areas at high elevations. Prompted by Charlotte's 20-month lapse and Atlanta's experience, state and local agencies formed an Air Quality Roundtable in 2001 (see sidebar, page 15). The Roundtable has dealt with the challenges posed by the state's rural 8-hour ozone nonattainment areas, among other issues.

With Tulsa violating the 8-hour ozone standard and Oklahoma City on the borderline of attainment, Oklahoma has pursued early action compacts (EAC), which allow the state to avoid nonattainment by making an early commitment to accelerating reductions in emissions. Shortages of monetary and technical resources, however, have threatened the state's ability to perform some of the mandatory tasks.

Other considerations also may have limited the interest in the EAC approach: the state has not had a nonattainment problem since before the 1990 CAAA; the air quality problem in nearby Dallas, Texas, has not constrained transportation investments; and the legal wrangling and regulatory uncertainty in Washington, D.C., have made politicians cautious about acting prematurely.

### Preparing for Conformity

Georgia and North Carolina have used the more than 4 years of litigation-caused delay to prepare for the 8-hour ozone nonattainment designations and

the transportation conformity requirements. Both states have worked to create institutional infrastructure in areas with no experience in conformity, establishing interagency committees and providing training and technical assistance to planners and stakeholders who will be involved.

The two states also have gathered more information about the extent and nature of the air quality problems, to help in developing control strategies to reduce pollution. In contrast, Oklahoma has focused on the EAC strategy and may be underprepared if conformity is required. Nonetheless, the delay in implementation made many of these preparatory actions possible.

On the other hand, the implementation delays also have had some harmful effects on preparations for transportation conformity. The lack of firm deadlines—EPA announced and then abandoned deadlines—has made it difficult to motivate the reluctant or skeptical.

The lack of urgency also may have bred complacency. One official noted that decision makers in some of the areas likely to be affected were satisfied with a general awareness of the issues but as yet had no impetus for a deeper understanding of the complexities of conformity.

Preparation, however, also entails risks. Observers in North Carolina, for example, pointed out that diligent preparation of procedures and possible pollution control strategies sometimes became moot when the federal policy shifted.

Finally, almost every interview subject noted that the implementation schedule calls for a conformity determination before the SIPs are due, obliging each nonattainment area to use an emission reduction test (ERT) in the absence of a motor vehicle emissions budget. Some have described one ERT, the "build/no-build" test, as "a disaster waiting to happen," because of the difficulties that most fast-growing metropolitan areas experienced when the test was used for 1-hour ozone in the 1990s.

The feasibility of the alternative "less-than-baseline" test depends on updating the baseline, possibly by 2002. Although this would apply to both the 8-hour ozone and PM<sub>2.5</sub> standards, the lack of experience and precedent with PM<sub>2.5</sub> has created anxieties for transportation and air quality planners.

### Sharpening Focus

Despite recommendations for early involvement and proactive scrutiny, planners must await federal guidance on many complex issues and many contingencies. What, then, should be the focus of state, regional, and federal agencies now and after the rules are final and the designations are made?

### **1. Aim at two moving targets: conformity and SIP development.**

MPO and state DOT planners who focus on the conformity determinations of transportation plans, which will follow the 1-year grace period after designation, may miss the opportunity to participate in SIP development. This participation involves creating motor vehicle emission budgets, selecting transportation control measures, and forming strong interagency relationships—all of which will be critical in the years ahead.

Air quality planners have a similar opportunity to participate actively in the first conformity determination. Particularly if emission reduction tests are necessary initially, involvement of air quality officials will help assure that the results are regarded as legitimate.

### **2. Approach conformity as a management issue, emphasizing participation.**

In preparing new nonattainment areas for designation, the emphasis on technical skill development and boundary setting can distract from establishing interagency relationships and procedures. Building on embryonic coalitions, regions can develop conformity protocols to get a head start on some of the required tasks, such as forming interagency working groups and identifying data and technical resource needs for conformity determinations. As many 1-hour nonattainment areas have learned, good management of the conformity process can reduce the likelihood of problems and can improve the quality of the outcome.

Outreach and education to engage local elected officials and environmental advocacy groups should begin early, cultivating stakeholder relationships for the conformity process. In some 1-hour ozone nonattainment areas, advocates have sued to increase leverage in the planning process. Early engagement in constructive dialogue can avert antagonism and lessen the likelihood of litigation by offering opportunities for meaningful participation.

Involving elected officials and other key decision makers, however, is difficult, because conformity measures are highly technical and hard to understand. Nonetheless, conformity problems often end up before the same decision makers, who should have some conception of what is involved and how the process can generate problems. There are many approaches to educating stakeholders about conformity; North Carolina, for example, is reaching elected officials through several agencies' planners.

### **3. Learn to navigate the federal regulatory procedures.**

One-hour ozone nonattainment areas have indi-

cated that one of the greatest challenges was mastering the maze of regulatory requirements for conformity, along with the procedures and requirements for SIP development, adoption, and federal approval. New nonattainment areas may benefit from help on these matters.

For example, in dealing with EPA, MPOs can seek advice from other nonattainment areas under the same regional EPA office, to avoid any barriers to resources, information, and technical assistance, and to ease compliance with the conformity requirements. The same is true for state agencies and FHWA division offices.

### **4. Handling 8-hour ozone and PM<sub>2.5</sub> standards together will require interdisciplinary collaboration.**

Experience with ground-level ozone varies among regions and states, but fine particulates put transportation and air quality professionals alike at square one. Moreover, the combined effect of documenting both pollutants adds substantially to the preparation of SIPs and RTPs.

The interagency and interpersonal relationships that aid collaboration in good times are especially valuable in difficult episodes, which many states will encounter in the next few years. The signs of preparation in many areas are encouraging. Continued collaboration will benefit both disciplines as implementation proceeds.

## **Websites**

Environmental Protection Agency:

Air Quality Planning and Standards  
[www.epa.gov/air/oaqps/index.html](http://www.epa.gov/air/oaqps/index.html)

Environmental Protection Agency:

Memoranda on new standards  
[www.epa.gov/ttn/oarpg/t1pgm.html](http://www.epa.gov/ttn/oarpg/t1pgm.html)

Environmental Protection Agency:

New NAAQS on ozone  
[www.epa.gov/ttn/naaqs/ozone/o3imp8hr/](http://www.epa.gov/ttn/naaqs/ozone/o3imp8hr/)

Environmental Protection Agency:

New NAAQS on PM<sub>2.5</sub>  
[www.epa.gov/ttn/naaqs/pm/pm25\\_index.html](http://www.epa.gov/ttn/naaqs/pm/pm25_index.html)

Environmental Protection Agency:

Office of Transportation and Air Quality  
[www.epa.gov/otaq/](http://www.epa.gov/otaq/)

Federal Highway Administration:

Transportation conformity  
[www.fhwa.dot.gov/environment/conform.htm](http://www.fhwa.dot.gov/environment/conform.htm)

Kennedy School of Government, Harvard University:

Transportation and air quality research  
[www.ksg.harvard.edu/taubmancenter/research/trenv.html](http://www.ksg.harvard.edu/taubmancenter/research/trenv.html)

North Carolina Air Quality Roundtable

<http://itre.ncsu.edu/cte/NCAirQuality/index.html>