

PROGRESS IN ACHIEVING CONSISTENCY BETWEEN TRANSPORTATION AND AIR QUALITY PLANS

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ABSTRACT

This paper summarizes the progress in implementing a statutory requirement for consistency between federal-aid highways and state plans for implementing national ambient air quality standards. In response to this requirement the Federal Highway Administration (FHWA) developed interim regulations in 1973 and final regulations in 1974. Under the regulations, the highway agency responsible for "initiating and carrying forward the action" on federally funded highways requests the policy boards of metropolitan planning organizations (MPOs) to annually determine the consistency of current transportation plans and programs with the relevant state air quality plan. The FHWA may withhold or condition planning certification for an MPO if sufficient inconsistencies exist. Planning certification is a prerequisite to approval of federally funded highway and public transit projects.

To determine the effectiveness of the consistency determination and review process, a survey was made of the results of the process for 1976. The survey focused on three basic questions: (1) Is the consistency process being completed for all 237 MPO areas? If not, is the process being completed for all those MPOs which should be given priority because of the severity of their air pollution problems? (2) Under the FHWA regulations the Environmental Protection Agency (EPA) regional offices have a consultive role. What have been the recommendations of the EPA regional offices in their consultation with the FHWA? (3) What has been the FHWA response to EPA recommendations?

This paper describes and analyzes the results of the survey and identifies the resultant policy issues.

Introduction

Section 136(b) of the Federal-Aid Highway Act of 1970 (P.L. 91-605) added section 109(j) to Title 23, U.S.C., requiring that:

. . . the Secretary (of Transportation), after consultation with the Administrator of the Environmental Protection Agency, shall develop and promulgate guidelines to assure that highways constructed pursuant to this title are consistent with any approved plan for the implementation of any ambient air quality standard for any air quality control region designated pursuant to the Clean Air Act, as amended.

The Secretary of Transportation gave the Federal Highway Administration (FHWA) the responsibility for implementing the requirements of section 109(j). After considering several alternatives [1], the FHWA on November 24, 1974, issued regulations [2] that include three general sets of requirements:

1. Establishment of continuing review procedures that will allow air pollution control agencies to comment on metropolitan area transportation plans and programs. As part of the review procedure, metropolitan planning organizations (MPOs) annually determine the consistency between MPO transportation plans and state implementation plans (SIPs) for achieving and maintaining national ambient air quality standards (NAAQSSs). These determinations, which must be based on area-wide air quality analyses, are reviewed by air pollution control agencies.
2. Determination by FHWA regional administrators of the consistency of individual proposed highways or highway modifications and SIPs.
3. Establishment of a continuous process for assuring that highway construction practices are consistent with the SIP.

The focus of this paper is on progress in the implementation of the consistency determinations contained in the first set of requirements. Under the procedures established by the FHWA regulations, the highway agency responsible for "initiating and carrying forward the action" on federally funded highways requests the policy boards of MPOs to annually determine the consistency of current transportation plans and programs with the relevant SIPs.

MPOs are agencies, designated by the governors of states, responsible for carrying out transportation planning processes in urbanized areas or in groups of contiguous urbanized areas [3]. Elected officials of local governments within the jurisdiction of the MPO must have representation in the organization. At the time of the survey described in this paper there were 213 agencies with the responsibility for maintaining a continuing transportation planning process for 237 urbanized areas or combinations of urbanized areas.

Table 1. Number and Population of MPO Planning Areas

<i>Federal Region</i>	<i>States in Region</i>	<i>Population category</i>			<i>Total in Region</i>
		<i>Over 1,000,000</i>	<i>250,000-1,000,000</i>	<i>50,000-250,000</i>	
I	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	1	4	12	17
II	New Jersey, New York, Puerto Rico	2	4	6	12
III	Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia	4	6	15	25
IV	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee	2	12	39	53
V	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	6	9	30	45
VI	Arkansas, Louisiana, New Mexico, Oklahoma, Texas	2	7	28	37
VII	Iowa, Kansas, Missouri, Nebraska	2	4	9	15
VIII	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming	1	1	7	9
IX	Arizona, California, Hawaii, Nevada	3	5	7	15
X	Alaska, Idaho, Oregon, Washington	1	1	7	9
Total		24	53	160	237
Per cent of total		10.1	22.4	67.5	100.0

All states, with the exception of Wyoming, contain at least one MPO. Puerto Rico also has a MPO. The number of MPOs in each of three population categories and the distribution of the MPOs within the ten standard federal regions are presented in Table 1.

State Implementation Plans

CLEAN AIR ACT REQUIREMENTS

The SIPs with which MPO transportation plans and programs must be consistent result from requirements of amendments to the Clean Air Act that were passed by the Congress in 1970 and subsequent years (P.L. 91-604, P.L. 93-319, and P.L. 95-95). The Act places primary responsibility for the prevention and control of air pollution with state and local governments. Section 109 of the Act directs the Administrator of the EPA to establish primary and secondary NAAQSs. Establishment of a NAAQS brings into effect

section 110 of the Act, which requires the development by states of SIPs to attain and maintain the NAAQSs.

Primary NAAQSs must be set at levels sufficient, with a margin of safety, to protect public health. Secondary standards must provide for protection against other air pollution effects (damage to materials, vegetation, etc.) detrimental to the public welfare. In April 1971 the EPA promulgated NAAQSs for six pollutants: sulfur oxides, particulate matter, carbon monoxide (CO), photochemical oxidants (O_x), hydrocarbons (HC), and nitrogen dioxide (NO_2). NAAQSs have not been established for any additional pollutants, although litigation currently in progress may result in NAAQSs for other pollutants including lead.

In accordance with the requirements of section 110, all states and territories developed SIPs and submitted them for EPA review. In those cases where portions of SIPs are found by the EPA to be inadequate for the attainment and maintenance of NAAQSs, the EPA must promulgate regulations that replace or supplement those of the state. The federally promulgated regulations become part of the SIP and must be included in determining the consistency of MPO transportation plans and programs.

SPECIFIC PORTIONS OF THE SIP AGAINST WHICH TO ASSESS CONSISTENCY

States have included a variety of control measures in their SIPs to achieve the air pollutant emission levels necessary to meet or maintain the NAAQSs. In developing their plans, states generally have looked first to emission reductions from control of stationary sources (industries, fossil-fuel power plants, spaceheating equipment, etc.) and from the federal motor vehicle control program (FMVCP). The FMVCP includes the promulgation and enforcement by the EPA of emission standards for new highway vehicles (automobiles, trucks, buses, and motorcycles).

In a number of areas the potential emission reductions from stationary source controls and from the FMVCP are insufficient to attain and maintain the NAAQSs for CO and O_x . As a result, measures that will further reduce CO and HC emissions resulting from highway vehicle operation are necessary parts of the SIPs. (HC emission reductions are necessary to reduce O_x concentrations [4].) The measures are the primary elements of the SIPs that must be considered in determination of the consistency of MPO transportation plans.

Transportation control measures—The portions of the SIPs designed to assist in the attainment of CO and O_x standards through reducing CO and HC emissions from highway vehicles are termed transportation control plans (TCPs). The TCPs include two basic types of measures. The first type of measure reduces emissions from individual highway vehicles. An example is the inspection of vehicles to assure that they are properly maintained and that factory installed control systems remain in effective operating condition. The objective of the second type of TCP measure is the reduction of vehicle miles of travel or of vehicle trips in an area. Examples of this type of measure include programs to increase transit ridership and carpooling [5]. Because the MPOs normally have responsibility for planning these programs, such measures are the focus of the consistency determinations when included in a SIP.

Air quality maintenance measures—The initial SIPs submitted to the EPA in 1972 were directed primarily at the attainment of the NAAQs by the deadlines required by the 1970 amendments to the Clean Air Act. The Act required that a standard be attained by 1975, with extensions of this deadline to 1977 under certain conditions. (New attainment dates for NAAQs have been established by the 1977 amendments to the Clean Air Act.) The absence of measures in the SIPs to assure maintenance of the NAAQs, once attained, prompted a suit by the National Resources Defense Council (NRDC) [6]. As a result of the NRDC action, the courts ordered the EPA to require that states include air quality maintenance measures in their SIPs. The EPA regulations describing the requirements states must meet in developing the air quality maintenance plans (AQMPs) were published on May 3, 1976 [7]. The NAAQS maintenance measures relevant to consistency determinations will be based on the same general objectives as the TCP measures, i.e., on reductions in vehicle miles of travel and in vehicle trips.

CRITERIA FOR ESTABLISHING CONSISTENCY

FHWA regulations (23 CFR 770) require that determinations of consistency between MPO transportation plans and SIPs be made annually by the policy boards of MPOs. The policy board determinations are evaluated by FHWA division and regional offices in consultation with the EPA. A FHWA regional administrator may withhold or condition the annual planning certification for a MPO if sufficient inconsistencies exist. Planning certification is a prerequisite to approval of federally funded highway and public mass transportation projects.

The FHWA regulations establish general procedures and agency responsibilities for making and evaluating consistency determinations. However, the regulations do not provide definitions of consistency from which criteria for making the determinations may be derived, nor do the regulations specify the types of air quality analysis on which the determinations should be based. As a result, uniform performance criteria and evaluation methods have not been used by policy boards in determining consistency. The EPA and FHWA offices in each region also have tended to establish their own requirements and procedures for evaluating the policy board determinations.

In order to assist the MPO policy boards, other involved state and local agencies, and EPA and FHWA regional offices in implementing the FHWA regulations, and to provide some uniformity in the interpretation of the regulations, the FHWA and EPA national offices jointly prepared guidelines [8] containing basic criteria for consistency and for technical evaluation. Briefly, the criteria provide that MPO transportation plans and programs must not:

1. exacerbate existing violations of NAAQSSs,
2. contribute to new violations of NAAQSSs,
3. delay the attainment of NAAQSSs, or
4. interfere with the maintenance of NAAQSSs, once attained.

In addition, the MPO transportation plans and programs must include all appropriate portions of SIPs, including TCP measures for reducing vehicle miles of travel and vehicle trips.

Use of the joint guidelines is currently at the discretion of FHWA and EPA regional offices. Some regional offices have developed comprehensive procedures for implementing the consistency determination regulations, including technical analysis requirements more stringent than those in the joint guidelines. Other regional offices are handling the consistency determination evaluations on more of an *ad hoc* basis.

Status of Air Quality and SIPs in MPO Planning Areas

AIR QUALITY MEASUREMENTS

The nature of the air quality problems in the MPO planning areas varies widely, as do the SIP measures developed to achieve or maintain NAAQSSs. The most accurate measures of the nature and extent of the air quality problems in MPO planning areas are air pollutant concentrations monitored regularly at representative sites.

Unfortunately, such data do not exist for all the pollutants of concern for all MPO areas. Because of limited resources, air pollution control agencies are forced to limit their monitoring programs to the more critical problem areas.

As might be anticipated, air quality data are most frequently available in the largest urban areas. For example, over 83 per cent of the areas with populations of over 1,000,000 had at least one location where CO and O_x were measured on a regular basis in 1974. For areas under 250,000 regularly collected CO data were available for less than 25 per cent of the areas and O_x data were available for only about 20 per cent. Even for the largest areas, data for CO, O_x, and NO₂ are not uniformly available. In 1974 only about half the areas had information for all three pollutants. For the MPO areas of less than 250,000 in population, data were available for all three pollutants in less than seven per cent of the areas [9, 10].

To gain some insight into the relative severity of the air pollution problems in the MPO areas, measured pollutant concentrations for 1973 and 1974 were compared to NAAQSs. Comparisons for O_x and CO are summarized in Figures 1 and 2. Such comparisons provide only a crude indication of the severity of air pollution. Other factors such as the frequency and duration of periods of high pollutant concentrations are needed for more complete comparisons.

For 1973 in the 80 MPO areas where CO measurements were available, the ratio of the second highest concentration to the eight-hour NAAQS was over 2:1 in more than 18 per cent of the areas. For 1974 CO data were available for 101 areas. Second highest concentrations in excess of twice the standard were measured in over 16 per cent of the areas. (Because the CO NAAQS has been established in terms of a concentration not to be exceeded more than once per year, the second highest concentration is commonly used in control strategy development.)

In 1973 O_x data were available for 54 MPO areas. The second highest concentrations in approximately 40 per cent of these areas were over twice the NAAQS. In 1974 the number of areas for which O_x data existed increased to 93. Concentrations over twice the NAAQS for O_x were measured in 41, or 44 per cent of these 93.

APPLICABLE SIP PROVISIONS

The SIPs applicable to MPO planning areas may vary widely in terms of types of air pollution control measures included, the

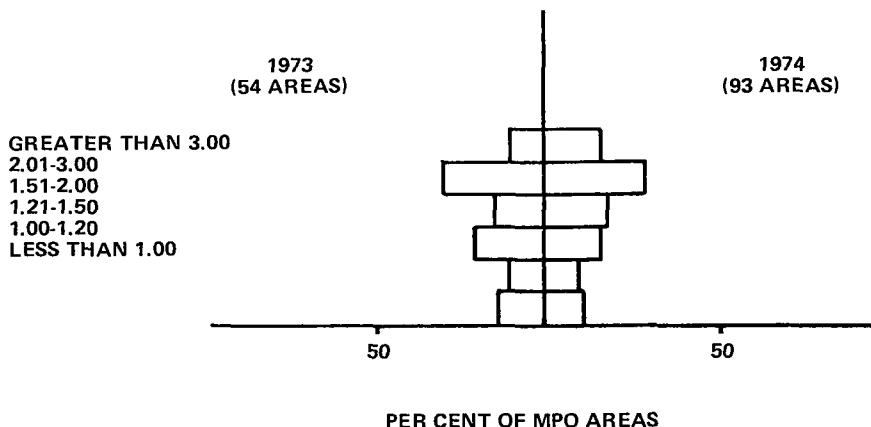


Figure 1. Ratios of measured second high 1-hour O_x concentrations to the NAAQS.

adequacy of these measures to attain and maintain NAAQS, and the extent to which the measures have been implemented. All these SIP characteristics must be considered in developing consistent transportation plans and programs, and in making annual evaluations of consistency. As noted previously, the SIP elements of primary importance in consistency determinations are the transportation control measures.

An MPO area may be part of or may contain all or part of one of the three categories of areas. These categories are not mutually exclusive.

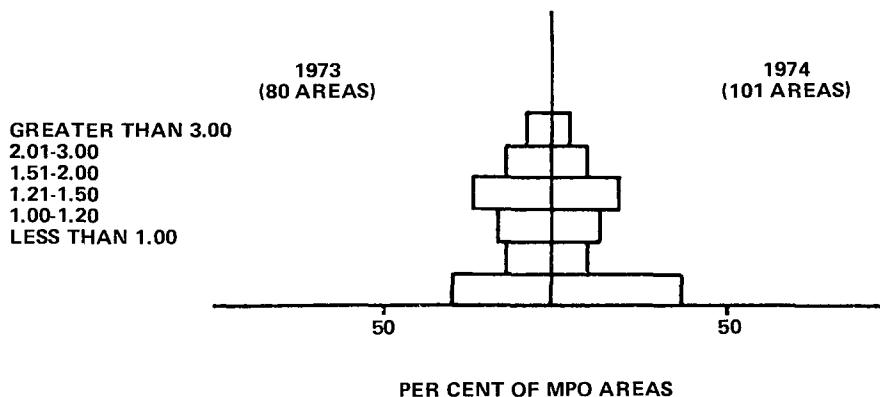


Figure 2. Ratios of measured second high 8-hour CO concentrations to the NAAQS.

Areas where TCPs are in existence or are under development—For purposes of this paper, this category includes all those areas where transportation control measures were determined prior to May 1975 to be necessary for NAAQS attainment.

Areas where existing SIPs are inadequate for attainment of NAAQSS for CO, O_x, or NO₂ by the deadlines in the 1970 amendments to the Clean Air Act—These areas include many of the TCP areas as well as other areas identified after May 1975 where additional measures must be added to the SIPs. The additional measures necessary may or may not include transportation control measures. The EPA currently estimates that approximately sixty-three metropolitan areas will require some form of transportation controls [11].

Areas where SIPs are inadequate to maintain NAAQSS once the standards are attained—These areas include air quality maintenance areas (AQMAs) designated pursuant to regulations promulgated in response to the court order resulting from NRDC v. EPA. AQMAs are areas with a potential for a violation of NAAQSS through 1985. Also included under this category are areas that have been identified subsequent to the AQMA designations where SIPs have been found deficient for ensuring NAAQS maintenance. The measures necessary for standards maintenance may include transportation controls.

In the initial SIP development period following the federal promulgation of NAAQSS in April 1971, thirty-one metropolitan areas were identified where transportation controls were needed to attain standards. Between the initial round of SIP development and May 1975, an additional nine areas were determined to require TCPs. All or part of forty-six MPO areas are included in areas where TCPs now exist or are under development. The number of these MPO areas in each of the ten federal regions is shown in Table 2.

Under the deadlines established by the 1970 amendments to the Clean Air Act, NAAQSS were supposed to be achieved in most areas of the United States by May 1975. At that time NAAQSS were still not attained in a substantial number of areas. Analyses by the states and by the EPA indicate that the measures in the SIPs for many of these areas are inadequate for standards attainment. In other areas SIP provisions have been found adequate, but other factors such as lack of enforcement have delayed standards attainment. During July 1976 states were officially notified of the

Table 2. Status of SIP Provisions for CO, O_x, or NO₂
Affecting MPO Areas in December 1976

<i>Federal Region</i>	<i>Number of MPOs</i>			
	<i>TCP Existing Or In Preparation</i>	<i>AQMA Designated</i>	<i>SIP Deficient For Attainment</i>	<i>Total In Region</i>
I	7	5	15	17
II	2	1	9	12
III	4	5	7	25
IV	0	1	27	53
V	4	4	44	45
VI	9	7	18	37
VII	1	2	3	15
VIII	3	4	1	9
IX	11	13	14	15
X	5	1	7	9
Total	46	43	145	237
Per cent of Total	19.4	18.1	61.5	100

deficiencies in their SIPs and of the schedules by which the deficiencies should be remedied.

As shown in Table 2, 145 MPOs, over 60 per cent of the total number, were in areas identified in December 1976 as having SIPs inadequate to attain standards. Studies by the states and the EPA have shown additional areas with SIPs deficient for NAAQS attainment or maintenance.

Implementation of the Consistency Determination Process

SUMMARY OF CONSISTENCY DETERMINATIONS MADE

By the end of 1976 the annual consistency determination and review process should have been completed three times for each MPO, once in response to the FHWA interim regulations published in 1973 [12] and twice in response to the final regulations published in 1974. To determine progress in the implementation of section 109(j), a survey was made by the EPA Office of Transportation and Land Use Policy of the results of this process for 1976. The survey focused on three basic questions:

1. Is the consistency determination and review process being completed for all 237 MPOs? If not, is the process being

Table 3. A Comparison of EPA Review Findings and FHWA Certification Actions

FHWA Certification Action	EPA Review Findings					
	Consistent		Inconsistent		No Review	
	Number	Per cent	Number	Per cent	Number	Per cent
Certification Continued	138	82.1	11	44.0	37	84.1
Certification Limited	24	14.3	13	52.0	5	11.4
Certification Denied	6	3.6	1	4.0	2	4.5
Totals	168	100.0	25	100.0	44	100.0

completed for all those MPOs which should be given priority because of the severity of their air pollution problems?

2. What have been the recommendations of the EPA regional offices in their consultations with the FHWA regional offices?
3. What have been the FHWA responses to the EPA recommendations?

The results of the survey are summarized in Figures 3 and 4 and in Table 3, which show the EPA regional office assessments of the MPO consistency determinations; FHWA actions to continue, limit, or deny certification of MPO transportation planning processes; and a comparison of these two types of federal actions.

EPA review findings—Of the 237 MPOs nationwide, the policy boards of 82 per cent made consistency determinations that were reviewed by the EPA. For this 82 per cent a consistency determination was formally submitted, through the FHWA, to an EPA regional office for review. The results of the review were then sent by the EPA to the FHWA. The policy boards of the 18 per cent of the MPOs falling in the "no review" category either did not make a consistency determination or the determination was not submitted to the EPA by the FHWA.

Based on their reviews of MPO policy board determinations, the EPA regional offices agreed that the transportation plans and programs of 165 (85.5%) of the 193 MPOs submitting determinations were consistent. It should be noted that regional offices have not used uniform procedures in their reviews or uniform

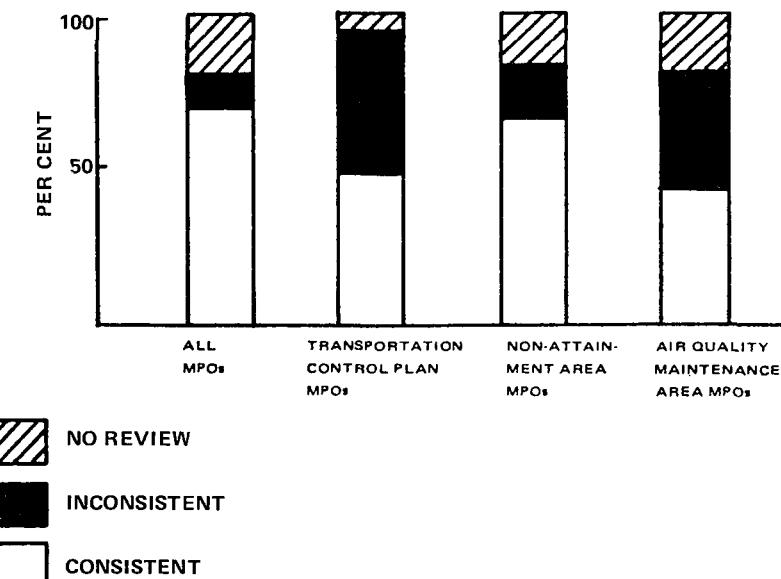


Figure 3. Results of regional office reviews of consistency determinations during 1976.

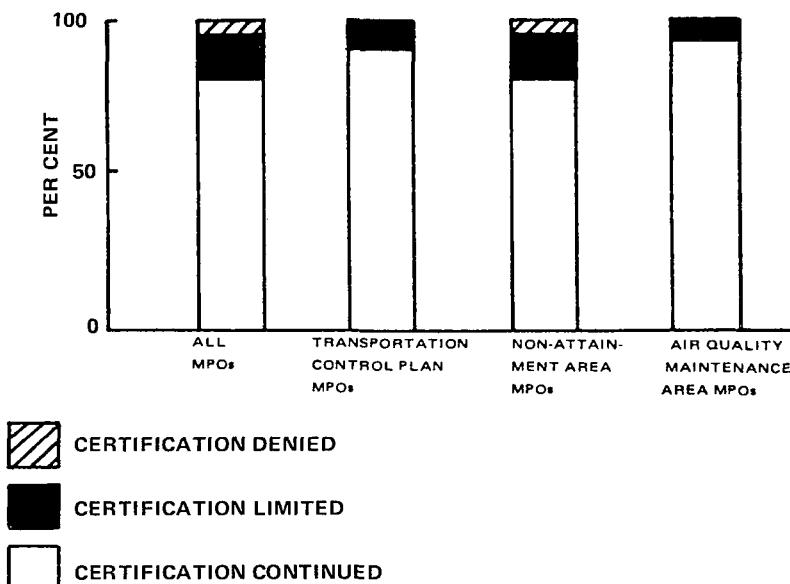


Figure 4. Summary of FHWA certification actions during 1976.

terminology in making their recommendations. As an example of the latter, one regional office may consider a MPO transportation plan to be consistent with a SIP if the MPO meets certain conditions in the future. Another regional office may consider the same plan inconsistent until similar conditions are met. For purposes of this paper, any conditional finding of consistency is considered to be a finding of inconsistency.

A number of EPA findings of inconsistency were not based on the contents of a MPO plan or program, but rather on the absence of an adequate technical analysis demonstrating the consistency of the plan or program and supporting the policy board's determination. This situation exists for several of the MPO areas where TCPs are part of SIPs. In most of these areas analyses are currently underway, but have not been completed.

Some EPA regional offices did not use the terms consistent or inconsistent in communicating their findings to the FHWA. For purposes of this paper these somewhat ambiguous findings are categorized as consistent or inconsistent based on the nature of the EPA comments and on the extent to which the EPA recommended changes in the MPO plans or programs, in the consistency determination process, or in the level of the technical analysis.

Figure 3 summarizes the results of EPA regional office evaluations of MPO consistency determinations for all MPOs reviewed. The results are further broken down according to whether the MPO areas have a problem in attaining or maintaining NAAQSs for CO, O_x, or NO₂. For MPOs in TCP areas, in non-attainment areas, and in AQMAs, EPA reviewed the consistency determinations of 95 per cent, 86 per cent, and 82 per cent, respectively. Of the MPO plans for TCP areas EPA found 49 per cent to be consistent with the applicable SIP. For the MPO plans for non-attainment areas and for AQMAs, EPA found 66 per cent and 44 per cent, respectively, to be consistent.

FHWA certification actions—As noted previously, the FHWA may withhold or condition certification of a MPO planning process if the MPO transportation plan and program are inconsistent with SIPs. Planning certification may also be withheld or conditioned for a variety of other reasons having nothing to do with air quality. Figure 4 summarizes the status of FHWA certification actions for 1976 [13]. The planning processes of 82 per cent of the 237 MPOs have been certified. Of the remaining 18 per cent, 14 per cent were given limited certification and four per cent were denied certification. Air quality considerations were included among the

reasons for limiting or denying the certification of some of the MPOs for which such action was taken by the FHWA.

The exact degree of the effect of the EPA evaluations of MPO consistency determinations and the subsequent recommendations is difficult to assess. Overall, the EPA reviews appear to have had some effect on the general pattern of FHWA certification actions. As shown in Table 3, the extent to which the FHWA certified planning processes does vary between those cases where the EPA found MPO transportation plans and programs inconsistent with a SIP and those where the EPA agreed with a determination of consistency by the MPO policy board or those where no formal reviews were made.

The EPA regional offices did not, in all instances, make recommendations about certification to the FHWA where the EPA assessments showed the MPO plans and programs to be inconsistent. In the sixteen cases where a specific recommendation to limit or deny certification was made to the FHWA, the FHWA did condition the certification, based at least in part on air quality reasons, for eleven MPOs. For the remaining MPOs the FHWA fully certified the planning processes despite the EPA recommendations. All the areas where FHWA continued full certification are TCP areas with substantial transportation-related air quality problems. On the other hand, the FHWA used air quality reasons for limiting certification of planning processes for several areas where the EPA had found the MPO plans and programs to be consistent with the SIP.

General Conclusions

The progress that has been made despite the limited resources available to implement the consistency process, the controversy and litigation associated with the use of transportation measures to improve air quality, and the complexity of the technical issues involved, demonstrates the potential of the consistency process. In some federal regions significant steps have been taken towards institutionalizing the process. MPOs have seriously begun to incorporate air quality considerations in their planning processes.

Unfortunately, positive steps toward implementation of the consistency process are not being taken uniformly nationwide. There exists a great degree of variability in the extent and manner of implementation between federal regions and among MPOs in individual regions. In some regions the requirements of the process still appear to be viewed as regulatory hurdles that are extraneous

to air quality and transportation programs. For a great many MPOs, the air quality analyses on which policy boards base their determinations are, at best, superficial, and no attempt has been made to integrate the analyses into the planning process.

Progress in implementing the consistency process has been greatest where federal regional offices and state and local agencies have been willing to work cooperatively and to attempt innovative approaches to problem-solving. With strong support from the national offices of EPA and FHWA, the rate of progress that has been achieved in these regions can be maintained and spread more uniformly nationwide.

During the time between acceptance of this article for publication and publication, several important events occurred. These include the enactment of the 1977 Clean Air Act Amendments, which include new schedules and other requirements for implementing NAAQSs, and the proposal of an NAAQS for lead.

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