Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs

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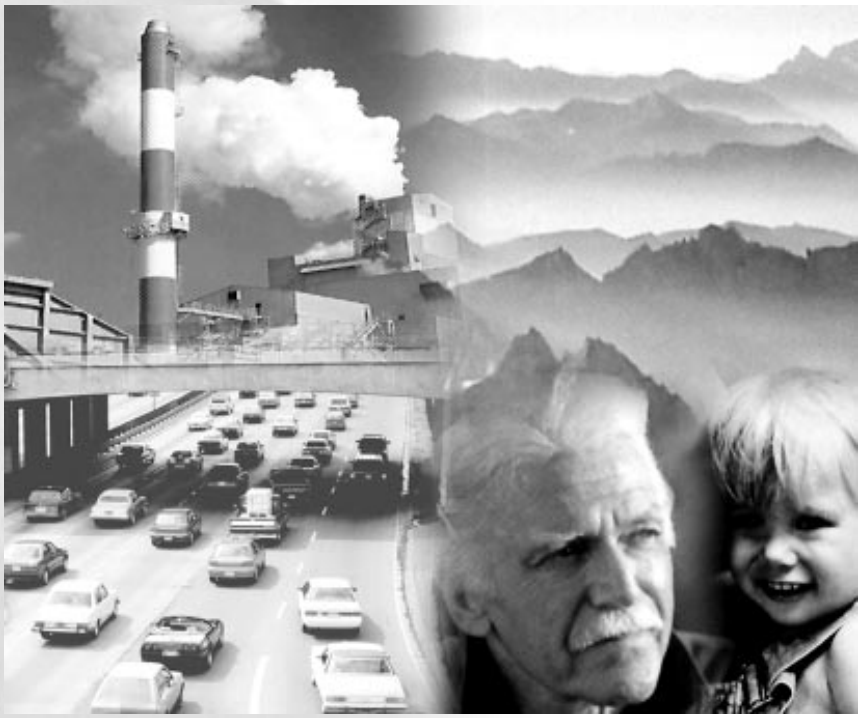

Initial Report on Subcommittee Discussions

April 1997

INITIAL REPORT

Federal Advisory Committee Act (FACA)
Subcommittee for Ozone, Particulate Matter
and Regional Haze Implementation Programs

INITIAL REPORT ON SUBCOMMITTEE DISCUSSIONS THROUGH NOVEMBER 1996

APRIL 7, 1997

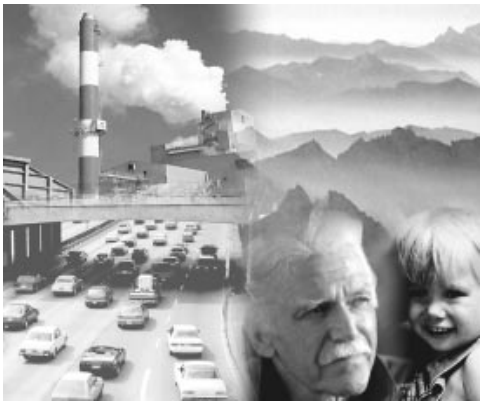

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TABLE OF CONTENTS

CHAPTER PAGE

Executive Summary ES-1

1 Introduction 1-1

2 Overview of Subcommittee Discussions 2-1

2.1 Status of Subcommittee Discussions 2-2

2.2 Issue Paper Relationships 2-6

3 Summaries of Issue Papers Discussed through November 1996 3-1

3.1 Designation Issues for New NAAQS 3-2

3.2 How Should Areas of Influence be Determined? 3-3

3.3 Update on the AOV/AOI Concepts 3-5

3.4 Attainment Dates 3-7

3.5 Economic Incentives 3-8

3.6 Implementation of a "Too Close to Call" Designation Category 3-10

3.7 Incentives for Ambient Air Quality Monitoring Under New NAAQS 3-11

3.8 Institutional Mechanisms for the Development and Implementation of Regional Strategies ... 3-13

3.9 Integrated Implementation of the Ozone and PM NAAQS and Regional Haze Rules 3-15

3.10 New Sources: Considerations for the Implementation of New Air Quality Standards 3-17

3.11 Options for Designating PM-Fine Areas 3-19

3.12 Population Weighting of Monitors (Exposure-Based Monitoring) 3-22

CHAPTER PAGE

3.13 Regional Haze 3-23

3.14 Integration of Ozone, Fine Particles and Regional Haze Air Quality Management (Green Book) 3-26

3.15 Treatment of Areas in Which Air Quality Trends Indicate the Risk of Becoming an AOV 3-27

4 Scientific Support for the Development of Implementation Strategies 4-1

4.1 Technical Discussion on the Integration of Ozone, Fine Particles and Regional Haze Air Quality Management 4-2

4.2 Conceptual Model Document Overview 4-11

5 Strategy for Communication of Findings and Recommendations 5-1

LIST OF FIGURES AND TABLES

Figure 1 Current Organization of the FACA Subcommittee 1-3

Figure 2 Issue Paper Flow Chart 1-5

Table 1 Overview of Subcommittee Discussions through November 1996 (Issue Papers and Consensus Categories) 2-2

Table 2 Overview of Subcommittee Discussions through November 1996 - Summary and Status 2-3

APPENDICES

Appendix A ..... Membership of Subcommittee and Work Groups
Appendix B ..... Primary Audiences and Information Needs

About the Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs

The Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs was established by the U.S. Environmental Protection Agency (EPA) as a part of the Clean Air Act Advisory Committee. The Subcommittee will advise and make recommendations on integrated approaches for implementing any revised national ambient air quality standards for ozone and particulate matter, as well as a new regional haze program.

Disclaimer

This report has not been reviewed and approved for distribution by the EPA's Office of Air Quality Planning and Standards. This document reflects the comments and discussions of the FACA Subcommittee and its work groups.

Executive Summary

The U.S. Environmental Protection Agency (EPA) established the Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs (Subcommittee) in September 1995 as a part of the Clean Air Act Advisory Committee (CAAAC), under the authority of the Federal Advisory Committee Act (FACA). At the time, the EPA was in the process of conducting a scientific review of the national ambient air quality standards (NAAQS) for ozone and particulate matter (PM), and the Grand Canyon Visibility Transport Commission (GCVTC) was developing recommendations on strategies for addressing regional haze in Class I areas such as national parks and wilderness areas. Given the potential for significant changes in national air quality standards and related implementation programs in 1997, as well as the existing information about common sources and atmospheric processes leading to formation of ozone, particulate matter and regional haze, EPA believed it was important to initiate a process through which it could obtain advice and recommendations from a broad group of stakeholders on possible new integrated approaches to attaining the NAAQS and reducing regional haze. This report provides a summary of the Subcommittee's first phase of discussions, from September 1995 through November 1996.

At the time of its November 1996 meeting, the Subcommittee was composed of 58 members representing a broad range of interests in air quality management, including State, local, and tribal governments, environmental and public interest organizations, industry, and academia. Five work groups were formed to assist the Subcommittee: the Base Programs Analyses and Policies Work Group (BPAPWG), the National and Regional Strategies Work Group (NRSWG), the Science and Technical Support Work Group (STSWG), the Communications and Outreach Work Group (COWG), and the Coordination Group. (Chapter 1 describes the responsibilities of each work group, and Appendix A lists work group memberships.) Together, the work groups involve more than 100 additional individuals and interested organizations contributing to the overall advisory committee process. The current organization of the Subcommittee is illustrated in Figure 1.

Upon their formation, the work groups identified priority issues to address and assigned lead authors for various "issue papers." An issue paper describes the background of the particular air quality management issue, options for addressing it, and pros and cons of each option. Where possible, the issue paper includes work group recommendations to the Subcommittee. Work group members were charged to develop innovative solutions to issues even if they were outside of the current regulatory framework (i.e., "thinking outside of the box"). The determination of whether any proposed solutions fall outside of the authority of the Clean Air Act (CAA) is an ongoing process. During the first phase of its discussions, the Subcommittee considered 15 issue papers, drafted and presented principally by representatives from the BPAPWG and NRSWG. Representatives from the STSWG have played a significant role in the development of the issue papers as well, through joint authorship and responses to specific technical questions. Although few specific consensus recommendations have been made, the Subcommittee and associated work groups have made significant progress in identifying options, discussing pros and cons for many critical air quality management issues, and agreeing on principles by which options in particular areas should be evaluated.

It is hoped the input provided to EPA from the Subcommittee through this process will be of great value as EPA develops its Phase I implementation strategy (scheduled for proposal in July 1997). Phase I will address issues such as ambient air monitoring, the process for designating areas that violate the standards and obtaining emission reductions from those areas which contribute to such violations, regional approaches to air quality planning activities, the need for technical assessments involving emission inventory data and air quality modeling, and certain issues specific to a regional haze program. The Subcommittee is being asked to continue its substantial progress throughout 1997 in order to provide EPA with input and recommendations on issues critical to the development of EPA's Phase II implementation strategy (scheduled for proposal in June 1998). This proposal is intended to address strategies for achieving cost-effective emissions reductions that allow attainment of the NAAQS and reductions in regional haze impairment.

This executive summary attempts to synthesize the key assumptions and potential recommendations emerging from the issue papers and Subcommittee discussions up through the November 1996 Subcommittee meeting. Table 1 seeks to characterize the relative degree of consensus achieved on each issue paper through the November 1996 Subcommittee meeting, while Table 2 highlights the key issues and status of each issue paper. Because full consensus recommendations generally have

not been developed for the issue papers, these tables describe whether the Subcommittee has been able to reach some level of agreement, such as on the range of options identified in a paper, or on a set of principles to guide future policy development. Table 1 also indicates whether the Subcommittee and work groups have continued to discuss the issue paper beyond the November 1996 meeting.

The central issues discussed by the Subcommittee from September 1995 to November 1996 include the following:

Scientific Basis. There is a scientific basis for pursuing the integration of implementation programs for ozone, particulate matter and regional haze. Evidence shows that many of the emission precursors, atmospheric processes, and spatial patterns of ozone and fine particles (and the resulting regional haze) are common or similar. It is recognized, however, that several important information gaps exist which present technical challenges to integration of the programs.

Interim Implementation Policy Principles. The Subcommittee provided recommendations to EPA on development of policies for implementing existing air quality management programs between the time any new NAAQS were promulgated and the time that State implementation plans (SIPs) were approved. Recommended principles include no backsliding on current control programs, maintaining progress for areas not attaining the current standard, and allowing certain substituted control measures to be made outside of a nonattainment area, recognizing the potential benefit of regional emission reductions to some current nonattainment problems.

Area of Violation (AOV) and Area of Influence Concept (AOI). The Subcommittee has spent considerable time discussing possible new approaches for defining areas requiring public health and visibility protection AOV and for defining related areas contributing to these air quality problems AOI that more extensively take into consideration the effect of regional transport of pollution. In general, there appears to be support for an implementation framework that, where appropriate, provides for reductions from areas that are contributing emissions to areas that are not meeting standards or progress targets. However, it should be noted that several Subcommittee members wish to hold their support for the AOV/AOI approach until several related issues are resolved to their satisfaction in Phase II. These issues include the location, type, and timing of required emission reduction measures and the roles and authorities of the institutions involved in implementing such an approach. Other Subcommittee members have raised important questions concerning whether (and how) the AOV/AOI approach could be implemented in a way that is consistent with the provisions of the CAA.

Technical Analyses. There is a need to initiate technical analyses (such as air quality monitoring, modeling, and emission inventory development) and planning activities in a coordinated and timely fashion following promulgation of any new ozone and PM NAAQS. It is recommended that planning and implementation efforts be enhanced through chemical composition analysis of PM monitoring filters. Incentives for States to conduct more widespread air quality monitoring continue to be explored by an ad hoc group. A critical issue in these discussions revolves around whether emission reduction measures are required immediately upon recording a monitored violation of a standard.

Institutions for Future Program Implementation. The Subcommittee has identified the need for new institutional mechanisms to be involved in regional planning efforts and the implementation of regional emission reduction strategies. Extensive discussions to date have focused on the appropriate geographic coverage, membership, authority, and functions of such organizations. Possible functions for these institutions include establishing consistent technical assumptions for defining areas that contribute emissions to areas violating a standard and designing the appropriate role for market mechanisms in regional emission reduction strategies.

Attainment Dates. New approaches are under consideration for establishing dates by which new air quality standards should be attained, as well as interim milestones for completing specific planning requirements. A series of concepts and principles to be addressed in finalizing this issue paper in Phase II was developed by the BPAPWG. These concepts include a date certain for attainment as a driver for implementation programs, the use of interim milestone dates, a reasonable planning cycle, flexibility for extensions, incentives for early reductions, sanctions based on the failure to plan or implement planned measures, and possible new metrics and other approaches for defining reasonable further progress.

PM Area Designations. The Subcommittee has developed a set of principles for designating areas not attaining any new PM-2.5 standards while the phase-in of a new PM-2.5 national monitoring network is under way. These principles include: the PM-fine monitoring program will fail without adequate financial and management support, speciated monitoring should be required to assist in planning and control program design, designations process must be completed no later than 3 years, planning process must begin as soon as possible as data indicates, more frequent monitoring should be considered, areas with sufficient data shall be designated as soon as possible after promulgation of the NAAQS, and early options for controls during the designation process should be explored and encouraged.

Regional Haze. The Subcommittee has discussed key program elements related to regional haze, including the definition of reasonable progress, criteria for measuring progress, and control strategies for achieving such progress. The issue paper recommended that regional institutions be involved in determining reasonable progress objectives. Some Subcommittee members recommended that the regional haze program include a Federal "backstop" (i.e., default reasonable progress targets) for such objectives, as well as specific timeframes for setting objectives and periodically assessing progress.

New Source Review. Several options for implementing the new source review (NSR) program under the AOV/AOI concept have been discussed, including options with and without a "technology floor" for new sources. These options ranged from the current NSR program approach to implementation of an emissions trading program for new and existing sources, without required technology limits for new sources. This issue will continue to be discussed by the Subcommittee in Phase II.

Economic Incentives. The role of market-based trading or other economic incentive programs in achieving emissions reductions and meeting air quality goals continues to be discussed by the Subcommittee. The paper proposes an initial set of principles for the design and implementation of an economic incentive program, including: incorporate all sources contributing to the problem, provide a common "currency" across source types, provide for seamless trading across jurisdictional boundaries, provide equivalent or greater environmental benefit compared to "command and control" approaches, provide a mechanism for evaluating and verifying performance, and reward sources that accomplish early emission reductions.

Areas at Risk of Violating a Standard. The Subcommittee considered the benefits to a metropolitan area that could avoid being designated as violating a NAAQS. It also considered how such areas should be identified, which institutions should identify them, and what the appropriate response by such an area should be. There was a range of opinion on whether such areas should be identified by State/local governments or by EPA, and whether specific measures should be voluntary or mandatory.

It is important to note the following matters that have not been considered by the Subcommittee in Phase I. They include:

- the appropriate level of the underlying NAAQS;
- the technological feasibility or cost-effectiveness of potential implementation strategies;
- whether, or in what time period, any implementation strategies will demonstrate compliance; and
- the degree to which recommendations are consistent with the CAA.

At this point in the FACA process, it is important to recognize the significant progress achieved by the Subcommittee and its work groups in addressing many complex air quality issues. Representatives from a broad range of interests have devoted substantial time and energy to this effort. The up-front advice and recommendations from the Subcommittee will enable EPA to craft more scientifically-defensible, cost-effective implementation strategies designed to protect public health and the environment from the adverse effects of ground-level ozone, particulate matter and regional haze air pollution. The Subcommittee and EPA look forward to continued progress in Phase II. It should be recognized that this report is an interim report only. Subcommittee members will have the opportunity to evaluate how all of the issues and recommendations are related to each other at the end of the FACA process.

CHAPTER

1

Introduction

1 INTRODUCTION

In September 1995, the EPA established the Subcommittee on Ozone, Particulate Matter and Regional Haze Implementation Programs as a part of the CAAAC. The Subcommittee was formed under the authority of the FACA.

At that time, the EPA was conducting a scientific review of the NAAQS for ozone and particulate matter, and the GCVTC was developing recommendations on approaches for addressing regional haze. Given the potential for significant changes in national air quality standards and related implementation programs in 1997, as well as the existing information about common sources and atmospheric processes leading to formation of ozone, particulate matter and regional haze, EPA believed it was important to begin exploring possible new integrated approaches designed to attain potential new or revised NAAQS for ozone and particulate matter and reduce levels of regional haze in mandatory Federal Class I areas.

The Subcommittee continues to discuss a range of policy and technical issues and seeks to provide consensus recommendations where possible. Input from the Subcommittee will be taken into consideration by EPA in the development of future implementation strategies. This report provides a summary of the Subcommittee's first phase of discussions, from September 1995 through November 1996.

At the time of its November 1996 meeting, the Subcommittee was composed of 58 members representing a broad range of interests in air quality management, including State, local, and tribal governments, environmental and public interest organizations, industry, and academia. Five work groups were formed to assist the Subcommittee: the BPAPWG, the NRSWG, the STSWG, the COWG, and the Coordination Group. Together the work groups involve more than 100 additional individuals and interested organizations contributing to the overall advisory committee process. The current organization of the Subcommittee is illustrated in Figure 1.

The Subcommittee has discussed a total of 15 issue papers during the first phase of its activities. Papers have been drafted and presented principally by representatives from the BPAPWG and NRSWG. Representatives from the STSWG have played a significant role in the development of the issue papers by responding to specific technical questions from other work groups, serving on joint issue paper teams, authoring sections of some papers, and providing formal comments on issue paper drafts. Although few specific consensus recommendations have been made, the Subcommittee and associated work groups have made significant progress in identifying options, discussing pros and cons for many critical air quality management issues, and agreeing on principles by which options in particular areas should be evaluated. To date, meetings have been held on the following dates: September 26, 1995, in Research Triangle Park, North Carolina; March 21, 1996, in Alexandria, Virginia; May 30, 1996, in Durham, North Carolina; July 30, 1996, in Crystal City, Virginia; September 26 - 27, 1996, in Norfolk, Virginia; October 29 - 30, 1996, in Dallas, Texas; and November 19 - 20, 1996, in Denver, Colorado.

It is hoped that the input provided to EPA from the Subcommittee through this process will be of great value as EPA develops its Phase I implementation strategy (scheduled for proposal in July 1997). Phase I addresses issues such as monitoring, designations, and planning activities. The Subcommittee is being asked to continue its substantial progress throughout 1997 in order to provide EPA with input and recommendations on issues critical to the development of EPA's Phase II implementation strategy (scheduled for proposal in June 1998), which is intended to address policies for control strategy development.

SUBCOMMITTEE ORGANIZATION

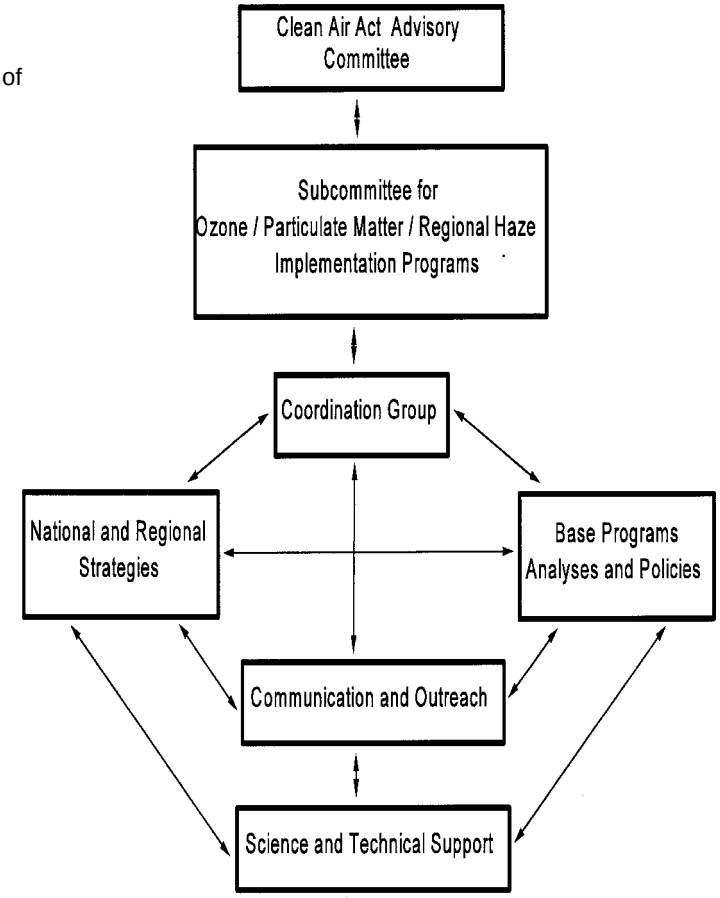
The following is an overview of the Subcommittee and the groups formed to support its work, including the Coordination Group and four work groups. A list of group members, as of November 8, 1996, appears in Appendix A.

ROLES AND RESPONSIBILITIES OF WORK GROUPS

The Subcommittee has established five work groups to research various issues and report their suggestions on integrated approaches for implementing revised NAAQS for ozone and particulate matter, as well as new regional haze reduction program recommendations. The following is a list of these

Figure 1.

Current Organization of FACA Subcommittee



groups and a brief summary of their roles and responsibilities:

The Coordination Group was formed to provide direction to work group chairs in determining priority issues and timeframes to be considered by the full Subcommittee without managing details of the work group process. It assures that the output of the various work groups is coordinated and supports the overall goals of the Subcommittee. To achieve this, the Coordination Group has established working principles for the work groups to follow in developing issue papers. In addition, the Coordination Group provides the work groups with an early review of work products before they are presented to the full Subcommittee. An ad hoc team from the Coordination Group drafted key principles for use in developing the proposed interim implementation policy covering the period from finalization of new standards to approval of State plans to implement the new standards. Ad hoc groups covering specific issues also report directly to the Coordination Group.

The STSWG is responsible for preparing and assessing the current state-of-the-art with respect to emission inventories, air quality models, meteorological models, and analysis of air quality monitoring data. The efforts of this work group are to be coordinated with the ongoing work of such groups as the Ozone Transport Assessment Group (OTAG), GCVTC, Southern Appalachian Mountains Initiative, and the North American Research Strategy for Tropospheric Ozone (NARSTO). The STSWG also supports the other work groups by providing comments and analyses on scientific and technical issues associated with specific issue papers.

The NRSWG is responsible for the development of broad regional and/or national strategies for addressing transport issues. This work group examines the AOV/AOI concept, institutional mechanisms, and broad-based market and trading approaches or other innovative strategies for achieving emission reductions. In doing this, the group considers the technical, policy and institutional issues

associated with these types of approaches from the perspective of both generators and receptors of emissions.

The BPAPWG is responsible for conducting a re-examination of the existing base regulatory program to take into account the potential new NAAQS, as well as the Regional Haze program, and to better integrate broader-based regional and/or national control programs including the perspective of both a receptor and generator of emissions. The work group's activities include a re-examination of the designation and classification process to better reflect associated health risks and the definition of air quality problems. An important component of its work is the development of transition policies to facilitate moving from the existing to new programs. The BPAPWG also has led development of issue papers on attainment dates, new source review, incentives for monitoring, and areas at risk of becoming nonattainment areas.

The COWG is responsible for developing recommendations for EPA regarding the education of all interested parties, including the general public through dissemination of information describing the nature and extent of air quality problems and the associated health and welfare impacts. The work group also considers how best to provide information to the public about specific options and recommendations developed by the Subcommittee as a result of its deliberations on issue papers. This includes an explanation of the measures being taken now and in the future to address these problems and the associated costs and benefits. The initial focus of the group is to explain the current state of our understanding of information on health and welfare effects. This will include the steps EPA is taking to address air quality problems through possible new NAAQS and the Regional Haze program. The COWG will describe how EPA, through the Subcommittee, is developing new integrated approaches to assure public health and environmental objectives are attained.

COORDINATION GROUP - OVERALL CHARGE TO WORK GROUPS

The Coordination Group developed the following charge to the work groups in March 1996:

The Administrator has charged the Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs with providing advice and recommendations to EPA for developing integrated approaches for implementing possible new ozone and PM NAAQS, as well as a regional haze reduction program. This effort will first focus on the most effective and cost-effective means of solving the problem of achieving attainment of the NAAQS and making reasonable progress under the Regional Haze program. Those options/solutions will then be addressed in the context of the appropriate standard, whether current or new, and in the appropriate legal context. It is critical to this process that the Subcommittee and its work groups strive to frame innovative and creative programs which identify new approaches to old problems without being restrained by the outcome of the standards review process and the law. This should result in the development of as full an options package as possible for presentation to the full Subcommittee.

DEVELOPMENT OF ISSUE PAPERS

The issue papers were assigned to the work groups based on the responsibilities of the work groups as outlined by the Subcommittee. For example, issue paper topics related to broad regional strategies for addressing pollutants (e.g., regional haze) were assigned to the NRSWG. In many cases, liaisons from other work groups collaborated with the lead work group to develop the issue papers and recommendations. In some instances, the issue papers were developed by two or more work groups. The work groups were given the guiding principles identified below and outlines to assist in formatting the issue papers and principles to guide the development of the issue papers. The work groups were not constrained by the requirements found in the current CAA, but were told they could "think outside the box" when developing the issue papers and recommendations. Figure 2 is a flow chart depicting issue paper topics as they relate to the air quality management process.

Smaller teams were formed within the work groups and members were assigned to develop the issue papers and recommendations. Work groups met on numerous occasions to discuss and make changes to draft issue papers. When final drafts were completed, a representative of the work group presented the issue paper and any recommendations/options to the Subcommittee. Many of the issue papers were revised and resubmitted based on comments from Subcommittee members. In certain instances where there was significant concern about

Figure 2. **Issue Paper Flow Chart**

Flow chart depicting Issue Paper topics as they relate to the potential air quality management process.

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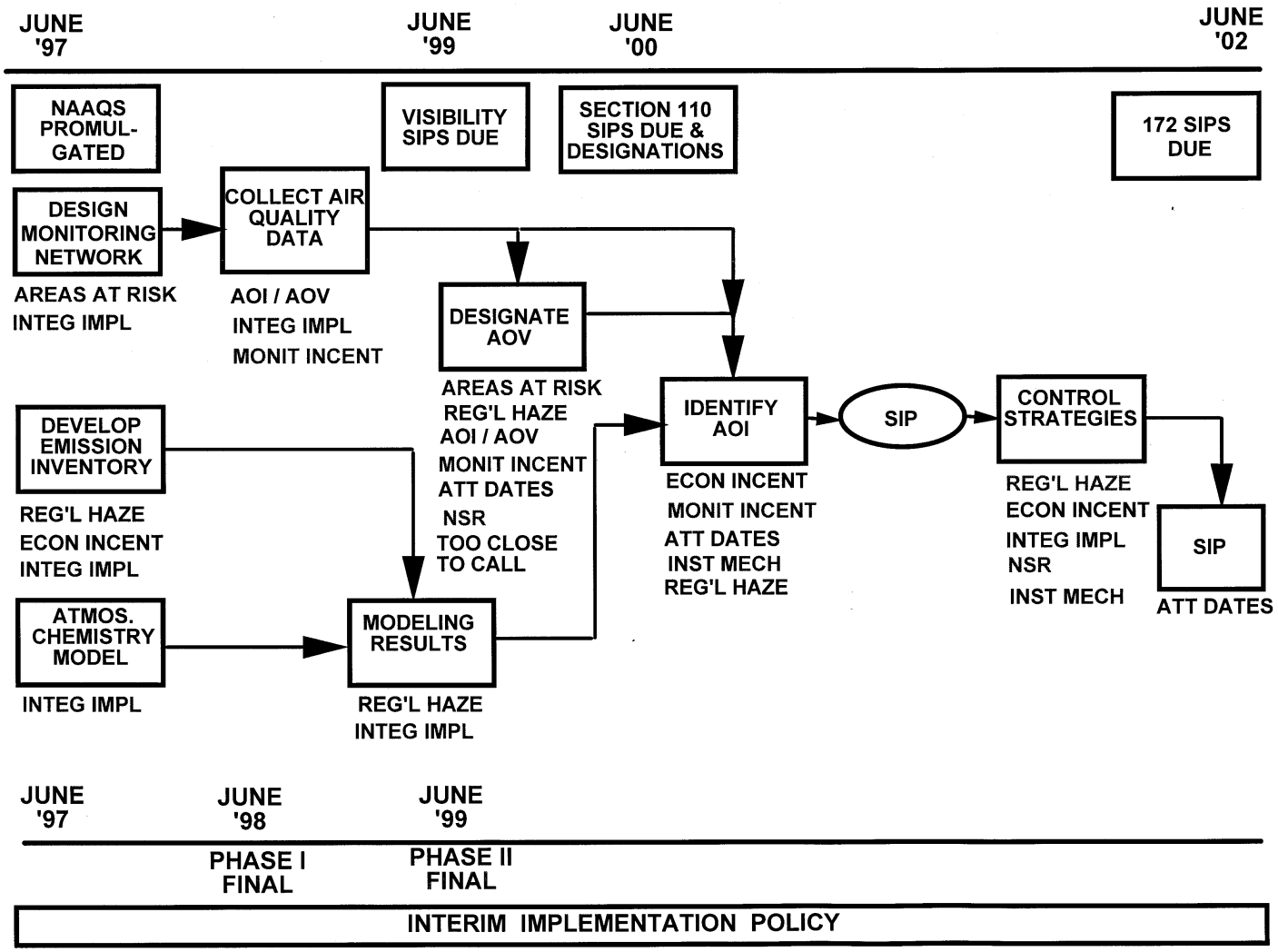

Note: NAAQS promulgation date has been changed to July 1997.

the recommendations from an issue paper, an ad hoc committee was formed to review the matter carefully and try to resolve the concerns.

SUBCOMMITTEE CONTENT-RELATED PRINCIPLES

In order to provide guidance to the work groups, the Coordination Group identified a series of content-related principles to follow when developing issue papers and proposed recommendations. A set of nine principles was presented to the Subcommittee at the November 1996 meeting and discussed extensively.

The outcome of these discussions is the following final version (dated January 24, 1997) of the content-related principles.

1. Progress toward attainment of revised NAAQS and achievement of Regional Haze program requirements should be achieved in an expeditious manner. Timetables for achieving progress should be formed by consideration of a number of factors, including health and environmental benefits, cost and technical impediments, available scientific information, requirements of the CAA, and administrative requirements.

2. In the event of State or other responsible institution's failure to plan (or to participate in planning) and implement plans within the designated timeframes, the Federal Government must take timely action to remedy the situation.

3. All options/recommendations must be based upon specified deadlines for planning, implementing, and attaining the NAAQS and implementing Regional Haze program requirements.

4. All options/recommendations which may require amendments to the CAA must be clearly identified with advantages and disadvantages for such changes analyzed.

5. Assure timely environmental progress. Timely environmental progress means, at a minimum, continuing air quality improvements at a rate no less rapid than will be required to meet the current NAAQS. Early Federal, State and local actions to improve PM fine air quality should be encouraged.

6. Control strategies should be effective in achieving air quality objectives, should be designed to accommodate flexible response methods by emission sources, and should encourage continuing improvements in air quality. To this end, the advantages, disadvantages, and available information on cost effectiveness of a full range of control methods should be presented, including technology-based performance standards, market-based approaches, and other traditional and nontraditional approaches.

7. All options/recommendations should provide for the use of best available, scientifically-based explanations in planning requirements and control strategy development. Such options/recommendations should include methods to identify the role of nonlocal transport processes and mechanisms designed to address such processes.

8. Opportunities for integration of planning and implementation of solutions for ozone, PM and regional haze problems that achieve better environmental results and lower costs should be fully pursued.

9. Planning and implementation proposals should identify methods for early and continued involvement of potentially affected interests, to the maximum extent possible, to assist in the attainment of the revised NAAQS and achieving reasonable progress toward Regional Haze program goals.

PROCEDURES FOR DEVELOPING ISSUE PAPERS AND PRESENTATIONS TO THE SUBCOMMITTEE

To further ensure the continuity and quality of the work products developed by the work groups and presented to the Subcommittee, the Coordination Group developed the following principles and procedures to guide their efforts:

- Active participation by all members in the work group is required.
- Work groups are to strive for consensus recommendations. Consensus is defined as support for a position by a majority of members from all groups of affected interests (i.e., States, industry, public interest). Consensus does not require unanimous support of all members from affected groups.
- If consensus cannot be reached on a recommendation within a work group, then the positions with the most support are to be

presented as options. Dissenting viewpoints will be presented in writing providing a detailed rationale of the viewpoint. When a work group sector disagrees with a position, the matter may be referred to a smaller ad hoc group for resolution.

- Issue papers and presentations to the Subcommittee will fully describe the positions of all work group members and, to the greatest extent possible, set forth the work group's recommendations. Presentations of the work group issue papers to the Subcommittee should emphasize recommendations/options and include the written reports of dissenting positions as described above.

- Latest drafts of issue papers and other presentations to the Subcommittee must be on the Technology Transfer Network (TTN) 7 days prior to the Subcommittee meeting. (One-page summaries of issue papers are acceptable substitutes for the full paper where no recommendations/options are being presented.)

- The Coordination Group will, in consultation with EPA, develop appropriate principles regarding content of issue papers for the guidance of the work groups.

Chapter 2 provides a summary of the issue papers presented to the Subcommittee at the seven meetings held to date. Also included is information regarding the level of consensus and the current status of each issue. Chapter 3 contains summaries of the issue papers and the resulting discussions from each meeting. Chapter 4 provides the scientific support for development of the implementation strategies. Chapter 5 outlines the strategy for the communication of findings and recommendations.

CHAPTER

2

Overview of Subcommittee Discussions

2 OVERVIEW OF SUBCOMMITTEE DISCUSSIONS

2.1 STATUS OF SUBCOMMITTEE DISCUSSIONS

To date, the work groups have presented 15 issue papers for consideration by the Subcommittee. The following section includes tables that describe the status of Subcommittee discussions on these issue papers. Table 1 attempts to categorize the overall degree of consensus reached by the Subcommittee on the various issue papers that were discussed through the November 1996 meeting. Table 2 provides a brief summary for each paper, including the date it was discussed by the Subcommittee, key issues, and status as of the November 1996 meeting.

TABLE 1. OVERVIEW OF SUBCOMMITTEE DISCUSSIONS THROUGH NOVEMBER 1996

Issue Paper	Lead Work Group	Consensus Category	Continue Discussion in 1997
Designation Issues for New NAAQS	BPAP; NRS	II	
How Should AOIs be Determined?	NRS	II	
Update on AOV/AOI Concepts	NRS	II	Y
Attainment Dates	BPAP	II	Y
Economic Incentives	NRS	II	Y
Incentives for Monitoring	BPAP	IV	Y
Institutional Mechanisms	NRS	II	Y
Integrated Implementation of the Ozone and PM NAAQS and Regional Haze Rules	NRS	II	Y
New Sources: Considerations for the Implementation of New Air Quality Standards	BPAP; NRS	IV	Y
Options for Designating PM-fine Areas	EPA Staff*	III	
Regional Haze	NRS	IV	
Technical Discussion on the Integration of Ozone, Fine Particle and Regional Haze Air Quality Management	EPA Staff*	N/A	
Treatment of Areas in which Air Quality Trends Indicate the Risk of Becoming an AOV	BPAP	IV	

Consensus Categories

I. - Subcommittee reached consensus supporting the recommendations presented in the issue paper.

II. - Subcommittee could not reach consensus on the recommendations, but agrees with the range of options presented in the issue paper.

III. - Subcommittee could not reach consensus or agree on a limited set of options, but could reach consensus on a set of principles.

IV. - Subcommittee could not reach consensus or agree on a limited set of options or principles.

* Prepared by EPA staff in support of the Subcommittee

Because of strong disagreement and current Subcommittee work load priorities, the Coordination Group recommended that the Implementation of a "Too Close to Call" Designation and Population Weighting of Monitors issue papers not be reworked at this time.

TABLE 2. OVERVIEW OF SUBCOMMITTEE DISCUSSIONS THROUGH NOVEMBER 1996

Issue Paper and Consensus Category	Status as of the November 1996 Subcommittee Meeting
Designation Issues for New NAAQS (7/25/96) Consensus Category: II	Discussed at the July 1996 Subcommittee meeting. The initial paper set forth the concept of designating both AOIs and AOVs in order to establish a framework that could more effectively reduce emissions transported from outside traditional nonattainment area boundaries. The Subcommittee gave cautious support to exploring new designation approaches. It was recognized, however, that further discussion is needed on several issues, including legality of the approach, tools for defining AOIs, and mandatory obligations of AOVs. The second paper developed on the AOV/AOI concept is **How Should Areas of Influence be Determined?**
How Should AOIs be Determined? (9/19/96) Consensus Category: II	Discussed at the September 1996 meeting. It is the second paper on AOV/AOI issues, following **Designation Issues for New NAAQS**. It recommends a three-step process: define large planning areas, define AOIs, and develop control actions in a spatially integrated plan (SPIP). States with only local AOV situations may possibly opt out of regional planning. Subcommittee members identified several key issues and concerns: better tools are needed for defining AOIs (monitoring, modeling, emission inventories including area and natural sources), continuous reductions are needed in nonattainment areas while regional planning process proceeds, criteria for opting out are needed, and EPA should consider development of trading programs in near term. Subcommittee did not reach closure on the issue, recognizing the need for additional discussion. The **Update on the AOV/AOI Concept** paper is the third on this subject.
Update on AOV/AOI Concepts (11/12/96) Consensus Category: II	Discussed at the November 1996 meeting. It is the third paper on AOV/AOI issues. Key elements including: AOIs are defined as a domain including anthropogenic and nonanthropogenic sources potentially contributing to downwind AOVs, all portions of an AOI would not be subject to controls, and regional plans would not substitute for SIPs and tribal implementation plans (TIPs). Three-step process: 1) designation of AOI occurs with best tools available at the time, 2) States/tribes develop regional plans addressing NAAQS attainment and regional haze progress, 3) develop SIPs/TIPs reflecting regional plan goals. In general, there appears to be support for an implementation framework that, where appropriate, provides for reductions from areas that are contributing emissions to areas which are not meeting standards or progress targets. However, it should be noted that several Subcommittee members wish to hold their support for the AOV/AOI approach until several related issues are resolved to their satisfaction in Phase II. These issues include the location, type, and timing of required emission reduction measures and the roles and authorities of the institutions involved in implementing such an approach. Other Subcommittee members have raised important questions concerning whether (and how) the AOV/AOI approach could be implemented in a way that is consistent with the provisions of the CAA. As of the November 1996 meeting, the Subcommittee had not addressed legal questions concerning the AOI/AOV approach. Subcommittee members also identified several key issues and concerns: incentives are needed to ensure that key entities participate in regional planning process and mandatory controls should be required in AOVs. Also, it may be difficult for States in the middle of the country to participate in more than one planning region. At the conclusion of the November 1996 meeting, it was recommended that this paper be further developed in conjunction with the **Institutional Mechanisms** and **New Source** (hereafter referred to as New Source Review) papers.
Attainment Dates (9/18/96, 11/12/96) Consensus Category: II	Discussed initially at the September 1996 meeting. This version recommended "flexible" attainment dates with 10-year planning cycles and requirements for progress and planned emission reductions. Some Subcommittee members expressed strong opposition to this approach and stated that fixed attainment dates are critical to ensuring continued progress toward attainment. Others stated that the paper did not ignore the idea of dates but offered flexibility to make the dates achievable. The Subcommittee recommended the work group rework the issue paper. At the November 1996 meeting, a subgroup of the BPAPWG proposed delaying a recommendation on attainment dates to Phase II, after the NAAQS are proposed. The group also recommended a set of concepts or elements to be considered in developing a future attainment dates recommendation.

Issue Paper and Consensus Category	Status as of the November 1996 Subcommittee Meeting
Economic Incentives (11/14/96) Consensus Category: II	An update on this paper, which will be finalized in Phase II, was given at the November 1996 meeting. This paper considers a range of market-based programs for achieving emission reductions, including fee and tax programs, offset requirements, open markets, and budgets and marketable permits. It proposes an initial set of principles as the basis for the design and implementation of any economic incentive program.
Incentives for Monitoring (10/21/96) Consensus Category: IV	Discussed at the October 1996 meeting. The paper identifies current disincentives to monitoring and proposes a list of several new options to consider. Significant disagreement was expressed over options to relax planning and mandatory nonattainment designation requirements for areas that have monitored a NAAQS violation. An ad hoc group on monitoring incentives was established by the Coordination Group to further discuss incentive issues and report back to the Subcommittee at the February 1997 meeting.
Institutional Mechanisms (10/17/96) Consensus Category: II	First discussed at the September 1996 meeting, with a more comprehensive discussion at the October meeting. This paper, which is scheduled to be finalized in Phase II, addresses the potential need for establishing new regional institutions to implement strategies designed to reduce transported pollution affecting the ozone, PM, and regional haze problems. Key questions were: What should be the membership, authority, operational rules, and role in trading programs of any new institutions? Who establishes these institutions? At the November 1996 meeting, it was decided that discussion of this paper should continue in Phase II in conjunction with the AOV/AOI and NSR papers.
Integrated Implementation of the Ozone and PM NAAQS and Regional Haze Rules (11/12/96) Consensus Category: II	Update given at the September 1996 meeting, more comprehensive discussion held at the November 1996 meeting. This paper addresses the extent to which the ozone, PM, and regional haze implementation programs should be integrated. Key issues addressed are integrated assessment and data needs (including the need for speciated PM-2.5 monitoring data), timing considerations, and potential benefits from integrated control strategies. Some members of the Subcommittee provided general support to a combination of national and regional guidelines for conducting technical assessments, including monitoring, emission inventories, modeling, and control strategy development.
New Sources: Considerations for the Implementation of New Air Quality Standards (Abbreviated as NSR) (11/14/96) Consensus Category: IV	Discussed initially at the September 1996 meeting. The revised paper was discussed at the November 1996 meeting. The paper initially provided four options for new source controls under the AOV/AOI concept. Option 4 recommended a trading and banking system without any specific technology floor as currently exists with best available control technology (BACT) and lowest achievable emissions reductions (LAER). Several Subcommittee members expressed concern about this option. Prior to the November meeting, option 4 was revised to include three technology suboptions. Because of the strong linkage between this paper and the AOV/AOI and **Institutional Mechanisms** papers, it was recommended that discussion of these papers continue into 1997.
Options for Designating PM-fine Areas (11/12/96) Consensus Category: IV	Discussed initially at the October 1996 meeting, final discussion at November 1996 meeting. This paper presents two main options for designating PM-fine nonattainment areas (or AOVs) within 3 years of promulgation of a new standard, taking into consideration the fact that data from a new national monitoring network for PM-2.5 will just become available during that same time period. Although no consensus was achieved on either option, a set of principles was developed based on the Subcommittee's discussion. After discussing these principles and making specific wording changes the following day, the Subcommittee appeared to achieve general agreement on the principles.
Regional Haze (11/12/96) Consensus Category: IV	Updates given at the September and October 1996 meetings. Final discussion of the paper, which made recommendations on eight issues related to implementation of a Regional Haze program, occurred at the November 1996 meeting. Because of time limitations, only recommendations relating to setting quantitative objectives for reasonable progress, criteria for measuring progress, and best available retrofit technology (BART) were discussed extensively. Some members preferred to have regional institutions define reasonable progress objectives, although concern was expressed that EPA set specific timeframes and a Federal "backstop" for progress objectives as well. There was general agreement to a list of criteria for measuring reasonable progress. The NRSWG recommended that BART provisions should not preclude innovative control strategy approaches.

Issue Paper and Consensus Category	Status as of the November 1996 Subcommittee Meeting
Technical Discussion on the Integration of Ozone, Fine Particles and Regional Haze Air Quality Management Consensus Category: N/A	This document was drafted principally by EPA for inclusion in the December 1996 advanced notice of proposed rulemaking for Future Phase I Implementation Rules for ozone, particulate matter, and regional haze. It provides a preliminary overview of technical and scientific issues concerning the possible integration of these three regulatory programs, in advance of the more comprehensive Conceptual Model document that is under development. The technical discussion states that it is appropriate to pursue integrated programs, given evidence that many of the emission precursors, atmospheric processes, and spatial patterns of ozone and fine particles (and the resulting regional haze) are similar. It also identifies important information gaps. The document was reviewed by the STSWG and comments were incorporated as appropriate. Although the document was not formally discussed by the Subcommittee, it has been available for their review. It is also known as the "Green Book."
Treatment of Areas in which Air Quality Trends Indicate the Risk of Becoming an AOV (10/20/96) Consensus Category: IV	Discussed at the October 1996 meeting. It addressed different options for how areas at risk of becoming nonattainment should be identified, who should have authority for making the identification, and what responses were appropriate for an area once it was designated at risk. Consensus was not reached on the options. A major point of disagreement was whether mandatory actions would be required for areas identified as at risk. Members also noted that it was difficult to discuss the requirements of "areas at risk" without fully understanding all the requirements of AOIs and AOVs, which continue to be debated.
Implementation of a "Too Close to Call" Designation Category (7/25/96) Consensus Category: N/A	Discussed at the July 1996 meeting. The paper proposed creating a "too close to call" attainment category to address the problem of some areas going in and out of attainment due to meteorological fluctuations. The paper suggests a statistical attainment test for constructing a "too close to call" interval. The issue previously had been referred to the STSWG, which did not address the validity of the "too close to call" implementation but emphasized instead that attainment flip-flops might lead to a problem in attaining the standard. Some Subcommittee members urged further consideration of the "too close to call" issue to provide flexibility to States. Others questioned the benefit of discussing the issue further. The Subcommittee returned the issue paper to the Coordination Group for resolution. Because of strong disagreement and current Subcommittee work load priorities, the Coordination Group recommended that the Subcommittee not rework or continue discussion of the issue paper at the present time.
Population Weighting of Monitors (7/24/96) Consensus Category: N/A	Discussed at the July 1996 meeting. The authors proposed a new approach to monitoring network design. The objectives of this approach are to measure overall progress in achieving the NAAQS and to measure reductions in overall health risks in an area rather than the current method of looking only at the pollution levels of the worst-case monitor. The Subcommittee was divided on this issue. Some members supported this new approach as a way to minimize the population at risk, while others felt the options presented included the controversial policy judgment that individuals in less densely populated areas should not be afforded the same level of public health protection as those in more densely populated areas. The Subcommittee returned the issue paper to the Coordination Group for resolution. Because of strong disagreement and current Subcommittee work load priorities, the Coordination Group recommended that the Subcommittee not rework this issue paper at the present time.

2.2 ISSUE PAPER RELATIONSHIPS

The 15 issues addressed by the Subcommittee through November 1996 can be grouped into 5 broad categories. These categories include how to define/treat AOVs, how to address AOIs, defining the institutional mechanisms for implementing integrated strategies, the timelines for implementation, and the availability of scientific tools and data to support integrated implementation strategies. The following section identifies these categories, describes how the issue papers are interrelated, and identifies topics that are covered in more than one issue paper. The first paragraph addresses the AOV/AOI concept which is the basis for several issue papers.

AOV/AOI CONCEPT

A central proposal of the Subcommittee to date is the AOV/AOI concept, which proposes the coupling of an AOV (i.e., the area in which a NAAQS is exceeded or 1 of the 156 mandatory Federal Class I areas identified for visibility protection) with an AOI (i.e., the geographic area containing sources that potentially contribute to downwind NAAQS violations or visibility impairment). This concept is based on scientific evidence outlined in the **Technical Discussion on the Integration of Ozone, Fine Particle and Regional Haze Air Quality Management** Issue Paper, the forthcoming Conceptual Model, and several other studies, that indicate regional transport of pollutants plays a significant role in nonattainment and visibility problems in many parts of the United States.

A goal of the AOV/AOI concept is to establish an air quality management framework that can more efficiently develop strategies for achieving emission reductions from a broader set of sources contributing to an AOV. While it is recognized that the current nonattainment approach has brought about significant progress in addressing urban air quality problems, the Subcommittee is seriously exploring whether the AOV/AOI approach would be more appropriate in addressing the effect of pollutant transport and ultimately achieving attainment of any new NAAQS.

In general, there appears to be support for an implementation framework that, where appropriate, provides for reductions from areas that are contributing emissions to areas which are not meeting standards or progress targets. However, it should be noted that several Subcommittee members wish to hold their support for the AOV/AOI approach until several related issues are resolved to their satisfaction in Phase II. The issues include the location, type, and timing of required emission reduction measures and the roles and authorities of the institutions involved in implementing such an approach. Other Subcommittee members have raised important questions concerning whether (and how) the AOV/AOI approach could be implemented in a way that is consistent with the provisions of the CAA.

The AOV/AOI concept has proven to be an important foundation to several other issue papers. The AOV/AOI concept was first introduced in the **Designation Issues for New NAAQS** paper. The concept is further developed in the **How Should AOIs Be Determined** and the **Update on the AOV/AOI Concept** issue papers. At the conclusion of the November 1996 Subcommittee meeting, it was decided that discussion of the AOV/AOI concept needed to continue into early 1997 in conjunction with discussions on the **Institutional Mechanisms** and **NSR** issue papers. It was noted, however, that EPA needs the benefit of the Subcommittee's deliberations as soon as possible since many of these issues are intended to be addressed in the Agency's Phase I implementation strategy, scheduled for proposal in July 1997.

AOV

The **Designation Issues for New NAAQS** issue paper recommends that AOVs be identified based on monitored data, or where available, on a combination of both monitored and modeled data. Under the CAA, areas are to be designated as attainment, nonattainment, or unclassifiable within 3 years of promulgation of new/revised primary and secondary standards. Should new or revised ozone and PM standards be issued in July 1997, it is believed that many of the urban AOVs for ozone could be determined using existing air quality data. The AOVs for regional haze would be considered to be the 156 mandatory Federal Class I areas, all of which are subject to some degree of visibility impairment. Treating Class I areas as AOVs is discussed in the **Designation Issues for New NAAQS** and **Regional Haze** issue papers.

The **Options for Designating PM-Fine Areas** issue paper addresses the timing associated with implementing a new PM-fine monitoring network and obtaining the data necessary for initiating the designations process for any new PM-2.5 standards. Options identified for

designating PM-fine areas include the rolling and early response methods. The rolling method consists of preliminary designations at promulgation of the new NAAQS based on all available information, interim designations of targeted high population exposure areas after collecting 2 years of data, and final designations after collecting 3 years of data. The early-response method would designate areas with high probabilities of violating the standards based on 1 year of PM-fine monitoring augmented with speciated monitoring. For areas not determined to be high probability and not included in the "early response," EPA could establish exceedance criteria based on 1 year of monitoring, which would then trigger "early response" monitoring in the second year. Although neither option was endorsed, the discussion of these options led to development of a set of principles addressing the PM designations issue. Principles include:
the PM-fine monitoring program will fail without adequate financial and management support, speciated monitoring should be required to assist in planning and control program design, designations process must be completed no later than 3 years, planning process must begin as soon as possible as data indicates, more frequent monitoring should be considered, areas with sufficient data shall be designated as soon as possible after promulgation of the NAAQS, and early options for controls during the designation process should be explored and encouraged.

The **Treatment of Areas in which Air Quality Trends Indicate the Risk of Becoming an AOV** issue paper discusses the desirability for areas that are tending toward violating a standard to take positive steps to avoid it due to the mandatory control measures currently associated with such a violation. Discussions have focused on whether areas at risk should be identified by EPA or the States and whether measures to prevent the area from violating the standard should be voluntary or mandatory. The **Implementation of a "Too Close to Call" Designation Category** issue paper addressed the problem of some areas going in and out of attainment and suggested a statistical test for constructing a "too close to call" interval. Analyses show that for virtually any form of a standard, "flip-flops" cannot be avoided. Subcommittee discussions were divided on the issue. Some members supported the flexibility provided by such an approach, while others questioned whether there would be any added value to further considering the issue.

AOI

The process and tools for defining AOIs are discussed in the **How Should Areas of Influence be Determined?** and the **Update on the AOV/AOI Concept** issue papers. These papers recommend that large planning regions, comprised of multiple States/tribes, should work to define the AOI related to each AOV and to deal with overlapping AOIs as appropriate. The papers recommend at least two (east and west) large planning bodies, although the possibility of smaller planning groups continues to be seriously considered. The **Institutional Mechanisms** paper has identified a number of important legal and administrative issues for consideration in forming any new institutions to coordinate regional planning efforts. Key questions for continued discussion include: who establishes these institutions, and what should be the membership, authority, operational rules, and role in trading programs of any new institutions?

A three-step approach for defining AOIs is described in the **Update on the AOV/AOI Concept** issue paper. The first step would be to create "sub-national designation regions" whose function is to identify the AOIs and the States and tribes who will be involved in the development of the regional plan. The second step would be to prepare the regional plan (and refine the AOI if necessary) for achieving emission reductions to meet the air quality goals. The third step would be to develop SIPs and TIPs based on recommendations in the regional plan. Specific options for defining AOI size and boundaries were presented in the **How Should Areas of Influence Be Determined?** issue paper, although no agreement has been reached to date on the geographic composition of these planning regions.

INSTITUTIONAL MECHANISMS

Draft working assumptions from the **Institutional Mechanisms** paper for establishing new institutions to assess and recommend regional strategies have been presented to the Subcommittee, but the paper has not been finalized. Before identifying the participants and operational rules for new air quality management institutions, it will be important to define the specific functions they will undertake. The **Institutional Mechanisms** paper recommends that such institutions play a role in establishing consistency in technical assumptions for defining AOIs (inventories, modeling, etc.), but also be flexible in allowing certain problems to be solved at a local level (since not all air quality problems involve transport). It is also suggested that such institutions may be responsible for designing

the appropriate role for market mechanisms in regional emission reduction strategies and for allocating emission reduction responsibilities. It is recommended that representatives from the highest level of participating organizations should be involved in the institution. It is not recommended that such regional institutions have enforcement authority, however. The **Regional Haze** issue paper recommends that a regional body be involved in determining reasonable progress objectives. Some of the Subcommittee members recognized that the Regional Haze program should include a Federal backstop for such objectives, as well as specific timeframes for setting objectives and periodically assessing progress. The **New Sources** issue paper even raises the concept that a regional body could define varying control strategies within a single AOI.

Once the levels and forms of the standards are known, the formation of regional planning institutions can be initiated. However, further discussion will be needed in 1997 on legal authorities for establishing these bodies, geographic coverage, required membership, incentives for ensuring continued improvement in air quality during the planning process, and consequences for failure of certain parties to participate in the activities of such institutions.

TIMELINES FOR IMPLEMENTATION

Once new standards are promulgated, nonattainment designations are required within 2 years unless another year is needed due to insufficient data. Nonattainment SIPs are then required 3 years after designation. For regional haze, Section 110 SIPs are required within 12 months after promulgation of regulations, and long-term strategies are also required periodically. Although the current statutory timelines for the implementation of the ozone NAAQS, the PM-fine NAAQS, and the Regional Haze program do not completely match, there may be sufficient flexibility to be synchronized. An integrated implementation program will require further analysis and adjustment of certain program timelines and/or activities.

The **Integrated Implementation** issue paper supports integration of the ozone, PM-fine, and Regional Haze programs when it makes sense but stresses that not all air quality problems or control strategies should be integrated. The task of defining appropriate approaches to program integration has been a significant challenge to the Subcommittee.

In order to support integrating the timelines for implementation, technical analyses are necessary to determine where and when they make sense. The range of analyses needed and technical tools needing enhancement are discussed in the **Technical Discussion on the Integration of Ozone, Fine Particles and Regional Haze Air Quality Management** document and the draft **Conceptual Model**, as well as in the **Integrated Implementation** paper. In most cases, the issue paper supports beginning planning activities (e.g., development of emission inventories) prior to the designation process.

The timing of nonattainment area/AOV designations is another important factor to consider for program implementation. It is recognized in the **Options for Designating PM-Fine Areas** issue paper that up to 3 years of ambient data may be needed in order to determine whether an area is attaining a new PM-fine NAAQS. Although this paper proposes options for expediting the PM designations process, integration of all three implementation programs may result in certain program delays.

Whether or not timelines for all three programs are integrated, deadlines must be specified by which the AOVs are to be in compliance with the NAAQS, and reasonable progress for regional haze is to be demonstrated. The current statutory requirement is 5 years to attain the primary NAAQS from the time of nonattainment designation. A 5-year extension and up to two 1-year extensions are allowed. The October 28, 1996, update by the ad hoc attainment dates group recommends that the attainment dates recommendations be made in Phase II after the level of the standard is proposed. A list of concepts or elements for inclusion in the recommendations includes a certain date for attainment as a driver for implementation programs, interim dates, a reasonable planning cycle, flexibility for extensions, incentives for early reductions, and sanctions on the basis of failure to plan or implement planned measures. The **Regional Haze** paper cites the national goal specified by Congress in the 1977 CAA: "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas in which impairment results from manmade air pollution." While a Regional Haze program would have no specific attainment date, it is recommended that there be requirements for periodic demonstrations of reasonable progress toward the national goal.

SCIENCE ACTIVITIES AND TOOLS

The **Technical Discussion on the Integration of Ozone, Fine Particle and Regional Haze Air Quality Management (or Green Book)** addresses the technical basis for integration of regulatory programs for ozone, particulate matter and regional haze. It states that it is appropriate to pursue program integration, given evidence that many of the emission precursors, atmospheric processes, and spatial patterns of ozone, fine particles, and regional haze are common or similar. Other key points from the **Green Book** include:

- Understanding the emission sources and atmospheric processes are responsible for elevated air pollutant levels requires an examination of urban and regional geographical scales.
- Ozone and fine particles may exhibit similar spatial patterns, although the frequency (and importance) of co-occurring patterns is not well understood.
- Many of the emission precursors (and sources of precursors) to ozone, fine particles and regional haze are the same.
- Many of the atmospheric processes (chemistry and meteorology) affecting ozone, fine particles and regional haze are the same.
- Several critically important information gaps exist which create very difficult challenges for air quality management of these pollutants.

The **Green Book** and the **Integrated Implementation** paper also recognize certain data gaps and the need for important scientific and technical tools for conducting integrated air quality analyses in the future. Under the AOV/AOI concept, data and tools will be needed to support multistate coordination of assessment and control strategy development. Planning activities are recommended to begin as soon as possible, providing some sense of urgency for expedited development of certain tools and guidance. The **Integrated Implementation** issue paper recommends the development of regional monitoring, modeling, and emission inventory guidelines to facilitate information sharing. This would allow regions to develop different monitoring, modeling, and emission inventory approaches, while ensuring that regional planning institutions use consistent analytical methods.

Specific technical activities recommended in the above papers include: rapid deployment of a new PM-fine monitoring network, with strong support for incentives (or requirements) for some form of particle composition analysis to help target pollutants and precursors for regional control strategy development; expansion of the ozone monitoring network to characterize rural conditions; expansion of the IMPROVE visibility monitoring network; assessments to define AOVs and AOIs; expansion of emission inventories to include ozone and PM precursors from nonattainment and attainment areas; continued development and validation of integrated regional modeling tools such as MODELS 3; and improvement of existing tools for control strategy development and assessment of associated costs and benefits. The Subcommittee generally recognized the need for these enhanced tools but also noted the reality that decisions to fund such improvements will need to be weighed against other EPA and State funding priorities. In addition, it has been recognized that certain assessment activities for ozone and regional haze may be able to move forward before those for PM-2.5 because of the availability of existing monitoring information.

The **Incentives for Ambient Air Quality Monitoring Under New NAAQS** issue paper identified existing disincentives for State and local agencies to expand ambient air quality monitoring networks due to the planning and control requirements associated with a nonattainment designation. The paper identified several potential incentives to expanded monitoring, including options to relax planning and mandatory designation requirements, and to fund monitoring through public/private partnerships. Because of concerns raised in the Subcommittee discussion over relaxation of mandatory requirements, the Coordination Group has formed a monitoring incentives ad hoc group to further address the monitoring incentives issue and report back to the Subcommittee in early 1997.

The **Population Weighting of Monitors** issue paper proposed new approaches to monitoring network design that would have the objective of measuring overall progress in achieving the NAAQS and measuring reductions in overall health risks in an area rather than the current method of looking only at the pollution levels at the worst-case monitor. The Subcommittee remains divided on this issue. Some members supported this new approach as a way to minimize the population at risk, while others felt the options presented included the controversial policy judgment that individuals in less densely-populated

areas should not be afforded the same level of public health protection as those in more densely-populated areas. However, members of the Subcommittee did indicate some support for the following statement: In evaluating different strategies, each of which would attain the health standard, decision makers should give preference to strategies that provide improved air quality for the greatest number of people. The Coordination Group recommended that the Subcommittee not continue discussion on this issue paper.

Several issue papers indicate the need for expanded and improved emission inventories. The **Integrated Implementation** paper identifies the need for a national modeling-quality inventory that includes annual and daily estimates for NO_x, VOC, SO_2, CO, primary PM-2.5, PM-10, and ammonia. Inventories are already being enhanced to some degree due to recent efforts of the OTAG in the east and the GCVTC in the west. However, it is recognized that a better understanding is needed of primary PM, ammonia and area source emissions. The **Regional Haze** issue paper (and GCVTC recommendations) suggests the use of an emission tracking system to help ensure that reasonable progress is made toward the national visibility goal and to prepare for possible implementation of a regional trading program. The **Economic Incentives** issue paper relies on an accurate emission inventory for establishing an emissions budget and projects the need for an inventory as a tool to track emission trades.

Atmospheric, photochemical modeling is under way in numerous areas, as described in both the **Conceptual Model** and the **Technical Discussion on the Integration of Ozone, Fine Particles and Regional Haze Air Quality Management** documents. In general, it appears that development of PM-2.5 and regional haze modeling capabilities is of higher priority than for ozone. The **Integrated Implementation** paper identifies the need to perform integrated modeling for ozone and PM/haze and notes that successful integration will depend on a common high quality of PM-2.5, ozone, and regional haze input data. The **Integrated Implementation** paper also points out that when there is no need for integration, strategies should not be integrated.

Evaluation of control costs and benefits is another important element in the development of control strategies and air quality plans. Subcommittee discussions demonstrate that many participants want some degree of flexibility in future implementation programs. One suggestion is to move away from command and control systems toward performance-based systems. The use of economic incentives and market-based emission control systems has been discussed as a central component of performance-based systems.

CONTROL STRATEGIES

Control strategy issues are being discussed in Phase II of this FACA process. One of the main goals for many Subcommittee members is that the new implementation program provide flexibility and environmental benefits at a lower cost than traditional command and control air pollution requirements. The **Integrated Implementation** issue paper recognizes that an integrated analysis may take some time and discusses an optional program that could be developed to encourage early, directionally-correct controls for one or more pollutants of concern. Both the **NSR** and **Economic Incentives** issue papers raise several questions regarding control strategies.

The **NSR** issue paper identifies four principles for implementation of the program under a potential new AOV/AOI concept: the selected approach should be cost-effective, flexible (to reflect different geographic regions), encourage real reductions and provide market incentives, and ensure that market mechanisms, if used, do not override local requirements.

In addition, the latest version of the **NSR** paper suggests that there be some type of technology floor, such as BACT or LAER. Some Subcommittee members had serious concerns with a previous version, which did not include such a floor.

The paper also raises a number of issues and questions:

- What should be the technology requirements for new sources?
- Should planning and control requirements be uniform in an AOI?
- Can sources that offset emissions avoid NSR requirements?
- Should PM-2.5 increments be proposed and promulgated and how should this be done?
- How should PM-10 increments be handled?
- What about bubbles and offsets for all pollutants?

- What about NO_x waivers? Transportation conformity?
- How should new or modified sources be permitted?
- How should coarse particle intrusion be handled in monitoring?

Discussion of the **NSR** paper will continue into 1997 in conjunction with the **Update on the AOV/AOI Concept** and **Institutional Mechanisms** papers.

The Subcommittee has received an update presentation on the **Economic Incentives** issue paper, but has not received a full presentation of issues and options. The paper will continue to be developed in Phase II. It raises a number of important questions, including:

- Should control regions have the option of charging fees or taxes on emissions?
- Should the fees increase over time?
- Should the control regions have the option of requiring offsets?
- Should the control region be allowed to establish a budget and marketable permit for emissions?
- Should the control region be allowed to use an open market?
- How will responsibility for emissions be assigned?
- How will emissions be verified?
- What is the compliance period?
- What intersector trading will be allowed?
- What will be the geographic scope of trading?
- Will interpollutant trading be allowed?
- Should banking be allowed?
- What institution runs the control region?

The **Regional Haze** issue paper includes recommendations on some control strategy issues such as BART and a long-term strategy, both of which are specified in section 169A of the CAA. BART is applicable to certain major sources emitting any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in a mandatory Federal Class I area. Traditionally, it has involved extensive technical assessments to demonstrate that a specific source is impairing a specific Class I area. The paper recommends that regional plans should consider a broader range of sources contributing to regional haze, and that BART provisions should not preclude the development of additional or more innovative strategies.

Long-term strategies are currently required to be updated every 3 years. The paper recommends several elements to be included in future plans for ensuring continued reasonable progress toward the national visibility goal.

NOTES:

CHAPTER

3

Summaries of Issue Papers Discussed through November 1996

3 SUMMARIES OF ISSUE PAPERS DISCUSSED THROUGH NOVEMBER 1996

The following are summaries of issue papers developed by the Subcommittee work groups. These summaries include a brief background on the issue, recommendations by the work groups, and a synopsis of Subcommittee discussion on the issue paper. The dated version of the issue paper discussed by the Subcommittee is indicated after the title of the issue paper in the numbered subheadings. The meeting(s) at which the Subcommittee discussed the paper also is indicated. For purposes of this report, the Subcommittee comments are grouped according to the sector making the comment (e.g., States, industry). It should be recognized that there may be a diversity of opinions within each sector regarding issues and recommendations. In many cases, the issue papers were developed by two or more work groups. When this has occurred, it has been documented in the text. To obtain a complete understanding of the issue papers and recommendations, the reader is referred to the full text versions of the issue papers found on EPA's TTN.

3.1 DESIGNATION ISSUES FOR NEW NAAQS

Discussed at July 1996 meeting.

Issue #1 • Should the approach to designation be changed to include areas that contribute to violations as well as areas that experience them?

Issue #2 • How should AOVs be defined and identified?

Issue #3 • How should AOIs be defined and identified?

BACKGROUND

Section 107(d)(1) of the CAA requires EPA to designate areas as attainment, nonattainment, or unclassifiable upon promulgation of a new or revised NAAQS. The purpose of designations was two-fold: the public was made aware of the fact that an area violated the NAAQS, and the nonattainment designation identified areas where controls were needed.

In the past, both ozone and PM-10 were treated as local problems, and controls were required for sources within the nonattainment area only. Many air quality studies in the past decade focused on understanding the relationships between sources of pollutants and their precursors and recorded violations of the NAAQS (including relationships that may be characterized by transport). Although the transport process is not fully understood, increasing attention has been given to trying to assess the role that it may play in NAAQS nonattainment. The existing regulatory framework focuses primarily on controlling those sources in the nonattainment area. The issue addressed was whether the current regulatory framework should be kept in place or changed somehow to consider the transport of pollutants or precursors.

RECOMMENDATIONS FROM THE BPAPWG AND NRSWG

The BPAPWG and NRSWG recommended the following for the designation process:

1. The designation process should be changed to include areas that contribute to violations as well as areas where the NAAQS are violated. EPA should separate the nonattainment designation into two parts, AOV and AOI.
2. AOV boundaries should be defined solely by the geography of the ambient monitors where violations have been measured. The boundaries should be based on monitored data, and where available, a combination of both monitored and modeling data. Modeling data should never be used alone as the basis for an AOV determination.
3. In determining AOI boundaries, anthropogenic and nonanthropogenic emissions should be considered. AOIs should be identified by county and metropolitan statistical area (MSA) and should be developed without identifying areas that have different emission types and levels, the so-called zones of influence.

DISCUSSION BY SUBCOMMITTEE

Below are the highlights of Subcommittee comments on the three recommendations.

STATES

- The current approach of "local solutions to local problems" should not be thrown out entirely.

INDUSTRY

- The AOV/AOI concept was preferable to the current designation process, but the interpretation

of what constitutes an AOI might not be consistent across the country.

- Potentially affected polluters should be protected from enforcement actions while making good faith efforts to satisfy requirements of the standards.
- Industrial plants considering relocation would be unsure about their responsibilities for controlling emissions that might affect a downwind AOV.

Academia

- AOIs could be defined regionally or nationally instead of State-by-State to achieve more consistency.
- Data were insufficient to allow a particular monitor to represent a given spatial area.

Environmental/Public Health Groups

- The way in which AOIs and AOVs would mesh with the current statutory framework was unclear.
- The discussion of the current nonattainment system was too negative.
- Retain the current nonattainment area designations and adopt AOIs on top of the current system to supplement it.
- Concern was expressed regarding the timing for designations if the current nonattainment system is abandoned.

Federal Agencies

- Questions were raised about whether tools existed for determining AOIs.
- A need will arise for culpability analyses.

3.2 HOW SHOULD AREAS OF INFLUENCE BE DETERMINED?

Discussed at September 1996 meeting.

Issue #1 • What are the mechanisms of defining AOIs?

Issue #2 • How will the sizes of AOIs be determined?

Background

The NRSWG, which prepared this issue paper, first worked to define an AOI as a specified domain containing the set of anthropogenic and nonanthropogenic sources potentially contributing to downwind AOVs. An AOI designation would not mean that all portions of an area would be required to implement regulations, nor did it indicate that sources in all portions of the area would be subject to regulation. However, all areas within a defined AOI would be required to participate in planning, even when the boundaries of the AOI crossed State borders. All areas within an AOI would be required to participate in developing a SPIP. The plans would address details such as which portions of an AOI should be subject to regulation and what the regulations would be and would consider the impact of each source and the costs to control specific sources. These complexities should be avoided as much as possible when making initial AOI determinations.

Recommendations from the NRSWG

The work group presented the issue paper as an update and indicated a need for further discussion on planning areas with help from STSWG. They recommended a three-step approach to implementation:

1. Large planning areas would include all 48 contiguous States and the District of Columbia.
2. Within the large planning areas, the participants would define AOIs and establish the States that would be included in each AOI. All States in an AOI would be required to participate in the development of the SPIP. The work group recognized that there likely would be cases of overlapping AOIs.
3. Individual actions would be worked out within the context of the SPIP.

Members of the work group participated in an exercise where they were asked to propose AOIs on a map, based on technical information that had been presented to them and their own expertise. When all pollutants were considered, it was obvious that there would be some large, complex, multi-pollutant AOIs. One result of this activity was the suggestion to initially have two large planning areas covering the eastern and western United States. The experience of OTAG and GCVTC would be used to formulate approaches for planning area activities.

The work group reached some preliminary conclusions on actions that would be needed:

- Develop planning regions, which would determine AOIs.

- Expect some large integrated AOIs for multiple AOVs and multiple pollutants.
- Use some kind of back trajectory or other model for establishing AOIs.
- Ask planning regions to specify the techniques they would use to determine their AOIs.
- Require each State in an AOI to participate in the planning phase for a SPIP and prepare a SIP that would be consistent with the principles and objectives of the SPIP.

If there are AOVs with local issues, allow the possibility of a State opting out of the planning and SPIP process if it agrees to take on the responsibility for regulating local AOVs. An example is a small isolated valley that has a particulate matter problem resulting primarily from woodstoves or unpaved roads.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the issue paper.

States

- A regional approach was important for focusing on real solutions, but all States should be involved in the initial planning.
- Some States in the middle of the country did not automatically identify with either east or west problems.
- Consensus on multistate issues would come down to how to pay for the program.

Industry

- The EPA should consider the following process: all States in a planning area and AOI would agree to a regional plan, each State then would develop a SIP consistent with the plan, and only the SIP would be submitted for approval.
- There would be bureaucratic issues and other problems in the AOI planning process, especially if States ended up split between two or more large planning areas.
- AOIs could be defined by geography; plans would determine which sources in AOIs needed controls. The choice of tools used to determine whether an area and source were contributing to an AOV was important, and EPA should consider natural sources in defining these areas.
- Experience in the Regional Haze program had shown that certain meteorological conditions resulted in no haze, largely because of source density upwind. If these areas were left out of consideration, it would be difficult to account for future conditions; new sources could be built in areas where there currently were none and might lead to future problems.
- An opt-out provision should be considered.
- A matrix plan that used sensitivity analyses to define the most important contributing sources was raised as a possibility for defining AOIs based on their potential to contribute to AOVs.
- The work group should consider trading issues in its next iteration of the paper.

Environmental/Public Health Groups

- Clarification was requested on how this process would connect to new source review.
- There might be a technical issue about average versus episodic conditions caused by very different types of meteorology.
- Incentives for continuing progress during interim implementation should be put in place.
- EPA should be cautious in allowing opt-out opportunities; sometimes States define problems too narrowly.
- Emission strengths must be defined sufficiently high to observe their influences if sensitivity analyses were to be used to define an AOI and its contributing sources.
- Some mechanism was needed to: 1) reach agreement on issues related to decision making on AOIs and the ultimate allocation of control requirements among AOIs, and 2) put together an AOI plan, possibly a multistate document that would have some binding force with SIPs.
- EPA should continue to mandate some form of emissions reduction while agreements were reached and to develop a way to encourage progress in the interim until all plans were adopted.
- Models for allocating emission reductions were not very sophisticated. The title IV example of emissions trading automatically driving "good enough" reductions might not apply directly to ozone, PM, or regional haze.
- Environmental groups would not accept recommendations that AOVs had no automatic controls. The notion that this concern could be addressed later was unacceptable.

Federal Agencies

- It would be a daunting task to find tools for defining AOIs, and the time and cost would be considerable.

Academia

- Plans should consider all sources in an AOI, not only those that would be included in an inventory.

3.3 UPDATE ON THE AOV/AOI CONCEPTS

Discussed at November 1996 meeting.

Issue #1	• What techniques and processes should be used to identify AOIs and develop regional plans?
Issue #2	• How will localized AOVs be addressed?
Issue #3	• How will broadly integrated AOIs be addressed?
Issue #4	• How will the planning process incorporate the designation of AOIs and AOVs?
Issue #5	• How will designation regions be identified?
Issue #6	• How will reasonable further progress be measured?

Background

The concepts of AOV and AOI were developed and presented to the Subcommittee in the July 25, 1996, and September 19, 1996, draft issue papers which were being used to frame many of the implementation proposals being developed by other work groups. Since the presentation on AOV/AOI was made to the Subcommittee in Norfolk, the work group had the opportunity to evaluate comments made at that meeting and at subsequent work group meetings. This update was an attempt to summarize the overall concepts of AOV/AOI as a way to develop control programs for regional haze and attainment plans for areas violating the standards.

The AOV/AOI concepts developed because traditional nonattainment areas had not proven to be workable when violations result from transported as well as locally generated pollutants. The designation of a nonattainment area would identify both the area in which a violation occurred and the area that was causing or influencing the violation, where controls would be required to bring the area back into attainment. The designation of an area as nonattainment would trigger automatic regulatory requirements and create a number of problems. To overcome these problems, the work group set up the AOV/AOI approach, which separated the concepts of violation and influence and established a process to develop attainment plans that would be fundamentally different from the current nonattainment process.

Recommendations from the NRSWG

The NRSWG updated several of its recommendations on AOV/AOI.

1. The AOV was defined as a region that exceeded the ambient air quality standard and thus provided information on where people were being exposed to unhealthy air. The boundary of the region should be based on monitoring data or, where available, on a combination of both monitoring and modeling data. Modeling alone should not be the basis for determining AOVs. The work group recommended that, in areas lacking monitors or in which monitoring data were insufficient, a monitoring plan be required and implemented. Where AOVs for ozone and PM-fine overlapped, co-AOVs might be defined by the State or tribe in which the violations occurred along with provisions to coordinate planning and SIP/TIP submittal dates. This approach would allow integrated planning and implementation. For Class I areas where regional haze had been identified as an air quality related value, the Class I area boundaries would define the area of concern, which would constitute the Class I regional haze equivalent of the AOV for ozone and PM-fine.

2. The AOI was a specified domain containing the set of anthropogenic and nonanthropogenic sources potentially contributing to downwind AOVs. States and tribes that were part of an AOI would be required to participate in developing a spatially integrated, or regional, air quality management plan. An AOI designation did not mean that all portions of the area would be subject to or required to implement regulations. This assumption was important to understand and accept. It allowed a more inclusive approach to identifying AOIs that encompassed all potentially significant sources. The AOVs might or might not be part of an AOI. This determination should be made early in the designation or planning process.

3. "Regional plan" was recommended as a new term, formerly referred to as a SPIP. It would document a set of recommendations to EPA. It

would not be a directly enforceable document, but rather would provide the framework in which SIPs and TIPs needed to fit; it would not be a substitute for SIPs and TIPs.

4. The work group recommended a three-step AOI process: identify AOIs, develop regional plans, and prepare SIPs and TIPs to reflect the process.

   a. AOIs would be identified by States and tribes participating in broad subnational designation regions, minimally east and west designation regions. The designation of the AOI should be undertaken with the best tools available at the time that the designation group convenes. AOIs might subsequently be refined by the States identified by the designation group. This first step should be done quickly with the data currently available recognizing that the AOI could be modified by the States involved. It was anticipated that there would be considerable overlap of individual AOIs and that integrated AOIs would be needed in some areas of the Nation.

   b. The second step would be to prepare the regional plan and in that process refine the AOI, if needed, based on new information and better tools for analysis. All States that were a part of the AOI would be required to participate in the planning process. The regional plans must address both the actions needed to bring the AOV into attainment and the regional haze needs of the AOI.

   c. Regional plans would be created that would define the control region; set the level of control/culpability for each of the tribes/States covered by AOI recommendations; make market-based incentive program recommendations, if applicable; and recommend Federal regulatory actions. The control region would be identified in the plan and would be the focus of the SIPs and TIPs developed through the regional plan. Federal actions might also be required in Step III. Regional haze actions needed by the affected units of government also would be identified in the appropriate plans and would be undertaken by the units identified.

5. The work group also recommended issues to be addressed in Phase II. They included the identification of designation regions, the refinement of AOIs as data and analyses allow, and the definition of reasonable further progress.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the five recommendations concerning AOV/AOI concepts.

States

- The question of who would select the participants in the designation process, expressing particular interest in EPA's role, was raised. Concern was expressed that States in the middle of the country would not have the resources to participate in more than one planning region. Will each AOI require a regional plan and will centrally located States have to participate in AOI decisions for both Los Angeles and New York?

- It was stated that a control region would be identified and then the AOI could be modified down the road in a dynamic process. Although the original convening body was not currently defined, the OTAG process was a good example. The opinion was expressed that it will take approximately 6 months from the time an AOV is designated until an AOI could be determined and the appropriate people brought into the discussion. The overall process would take approximately 4 years. An AOV does not mean automatic inclusion in the AOI and the control/planning region. Also, if an AOI is designated and goes through the planning process, it is possible that the control region would not be the entire AOI. An AOI does not mean regulation in all cases.

- What mechanism will exist to keep entities "at the table" who do not want to be there, including EPA?

- Incentives will be necessary to get the regional mechanism in place and operational. Without such a mechanism in place, the entire AOI/AOV concept is threatened.

Industry

- In terms of western regional haze, one recommendation includes entire States, rather than splitting the States of Texas, Oklahoma, Nebraska, etc. It was suggested that an option be added designating the 11 western States as one region and the rest of the country in some other manner.

- One interpretation of the issue paper is that a subdivision of the AOI had to prove that it did not belong at the table. Concern was expressed over the point of view that an AOV was innocent until proven guilty; the premise that AOVs contributed to violations in some form until proven otherwise should be used.

- The STSWG said to use the best scientifically based determination of what was causing the problem and develop the appropriate control strategy. It was suggested to examine whether there were natural groupings or boundaries for the individual pollutants.
- Concern was expressed regarding the GCVTC's finding that nearfield sources contributed most significantly to violation problems. There is a need to get away from the concept that long-range transport was the solution.

Environmental/Public Health Groups

- The OTAG process had not been able to determine a State's involvement without the development of refined tools. Very important elements of the CAA seem to be missing from the work group's approach.
- The current approach of using a monitored exceedance to trigger a mandatory control program was supported.
- Doing a better job initially of defining who should be at the table was supported.
- It was pointed out that the STSWG agreed that they did not have the capability to determine individual source culpability.
- Concerns were expressed over EPA's authority to force participation in the program and about how these issues would be merged with institutional mechanisms and new source review.
- Section 172 of the CAA lays out generic requirements that apply to SIPs for all nonattainment areas. It was asked whether those requirements applied to an AOV under this concept.
- Support was withdrawn for any proposal that eliminated mobile sources, conformity, requirements for reasonably available control technology (RACT), contingency measures, and reasonable further progress (RFP).

3.4 ATTAINMENT DATES

Discussed at September and November 1996 meetings.

Issue #1 • What dates or timeframes should be established for attaining the new NAAQS for ozone and particulate matter?

Background

Section 172(a)(2) of the CAA mandates that the attainment date for an area designated as nonattainment be as soon as practicable, but no later than 5 years from designation. The EPA Administrator may extend this date 5 years from designation and, under special circumstances, may grant two 1-year extensions. Sections 181 and 188 of the CAA establish a classification scheme for both ozone and particulate matter (PM-10) nonattainment areas under the existing NAAQS based on the severity of the problem. Attainment date options were developed by the BPAPWG for the potential ozone and PM-fine NAAQS based on CAA requirements and options outside of those requirements found in the CAA.

The BPAPWG noted the need for additional information on PM-fine and rural ozone monitoring data, which may affect the timing of designation. That is, the need to collect additional ozone and PM-fine data may delay the designation process.

Recommendations from the BPAPWG

The BPAPWG initially developed three major recommendations.

1. EPA should have flexible attainment dates using 10-year planning cycles that contain RFP targets and planned emissions reductions. Under this approach, States would submit a SPIP for each AOV. The SPIP would address the goal of achieving attainment as expeditiously as practicable and would include a date for achieving attainment. If attainment cannot be achieved, the SPIP would establish reasonable progress targets and emissions reductions that would move the area toward attainment.

2. Nonattainment areas would be eligible for successive planning cycles if they could demonstrate that they had met the planned level of emissions reductions, milestone requirements, and controls for the nonattainment area. If the area had failed to meet the milestone requirements and implement the SPIP controls, certain additional requirements might be established. During each planning cycle, a mid-cycle evaluation would be conducted to determine whether the area was meeting its milestones and planned emission reductions and moving toward attainment. Interim adjustments could be implemented if the plans were not moving the area toward attainment.

3. Incentives to encourage early attainment or emission reductions should be a part of the new attainment date approach. At a minimum, a "safe harbor" provision would allow areas implement-

ing programs for early attainment or early reductions adequate time for these programs to work. Additionally, these areas would not be required to implement new programs until the next planning cycle.

At the November 19, 1996, Subcommittee meeting, the work group proposed that they delay their attainment dates recommendation to Phase II, because they needed to know at what levels the proposed standards would be set before proceeding. In the interim period, the work group offered the following concepts and principles to be considered by the Subcommittee for inclusion in the Phase II report:

- Date certain as the driver
- Interim dates (due dates for planning process elements)
- AOV/AOI approach
- Reasonable planning cycle
- Timing of initiation of planning process
- Flexibility
- Scaled/targeted consequences
- Targeted RFP - reductions of ambient levels
- Planned emissions reductions
- Achievability (stringency) of standards
- Eligibility criteria for flexibility
- Contingency measures
- Mid-cycle reviews and adjustments
- Incentives (safe harbor) - early attainment/reductions
- End-of-cycle review, assessment and future planning
- Integration of approach to new NAAQS/ regional haze
- Public expectations
- Costs/benefits
- Transport
- Meteorological conditions (e.g., variability, natural events policy, international transport).

Discussion By Subcommittee

The summary below includes Subcommittee comments on the original three recommendations and the list of concepts and principles outlined by the work group at the November 19 meeting.

States

- The report did not represent consensus among work group members, the paper may have missed some important steps, and a revised paper should include more options and specific proposals.
- The idea of adding flexibility with scale-targeted consequences to the nonattainment concept while ensuring that deadlines were set and EPA had appropriate tools for accountability and sanctions had considerable appeal.
- Progress could be made when local areas felt that they were a part of the planning process.

Industry

- The paper offered flexibility to make the dates achievable and distinguished between areas that tried and failed versus areas that failed to try. However, while noting that there could be groups that put forth a good effort and failed for reasons beyond their control, no guidance was offered on how EPA would determine whether an area was truly making a good-faith effort.
- Certain date as a driver was useful only if the date was set after the end of the planning process.
- Regional haze issues, particularly a long-term review of progress, needed to be added because regional haze would not have date certain as its driver.

Environmental/Public Health Groups

- Strong opposition was expressed to the idea of eliminating attainment dates, which were fundamental to air programs; certain dates were needed to promote action and drive programs.
- While flexibility is valuable, there must be accountability for failure to meet prescribed goals, with part of the planning process to include the identification of specific air quality improvement objectives between now and the implementation date. The concepts of flexibility and extension of attainment dates appeared inconsistent with the certain date concept.

Federal Agencies

- Information on planning cycles and targets was needed to clarify how the absence of attainment dates would affect the ozone and PM programs.

3.5 ECONOMIC INCENTIVES

Discussed at November 1996 meeting.

Issue #1 • What economic incentive programs hold promise in reducing ozone, PM and regional haze levels with improved efficiency, thus reducing the overall cost to the economy?

Issue #2 • How can flexible regional strategies be designed around the concept of

sources contribution to ozone, PM and regional haze pollution problems and their corresponding responsibility for emissions reductions?

Background

Emissions sources have generally been controlled through mandatory requirements under part D, section 172, of the CAA, which contains general requirements for SIP submittals for nonattainment areas. However, with the CAA Amendments of 1990 and the formation of regional ozone commissions, such as the Ozone Transport Commission (OTC) and GCVTC, there is more flexibility in achieving emission reductions. Under new NAAQS for ozone and particulate matter and a new Regional Haze program, it is expected that emission reductions will have to come from controlling sources other than traditional stationary sources, including additional reductions from such sources as automobiles and woodstoves. In addition, there have been demonstrated successes of economic incentive programs, such as the Title IV Acid Rain Program.

A subgroup of members of the NRSWG worked with the Subcommittee's ad hoc group on economic analysis to produce an issue paper on economic incentives. They decided that market-based trading or other economic incentive programs could achieve necessary pollutant reductions at reduced costs to the overall economy. Regional strategies could be designed around source contributions and corresponding responsibility for emissions reduction, and the strategies could be structured to foster flexibility as to how each source would meet its responsibilities. The subgroup evaluated incentives programs being considered by OTC, OTAG, and GCVTC in their respective areas. They also evaluated two methodologies for implementing emission trading approaches.

Recommendations from the NRSWG and Ad Hoc Economic Analysis Group

There were no recommendations on specific options at this time. However, the subgroup developed a set of principles that it proposed as the basis for the design and implementation of any economic measure within a SPIP. They were:

1. Prevent backsliding.
2. Include the broadest possible spectrum of sources contributing to the problem, including mobile and area sources.
3. Account for differing temporal and geographic impacts of reducing pollutants.
4. Provide a mechanism for evaluating and verifying environmental performance.
5. Provide a consistent program across emission source types to ensure a common or convertible currency for trading.
6. Provide for transition from other emissions trading programs adopted by OTAG, OTC, and States.
7. Provide for seamless trading across governmental jurisdictions.
8. Avoid the creation of bias or market distortions.
9. Reward or protect sources that accomplish innovative, early, or voluntary reductions.
10. Avoid delays in meeting schedules or dilution of reduction responsibility.
11. Use economic incentives rather than command and control strategies.
12. Provide equivalent or greater environmental benefit compared to command and control approaches.

The categories of programs that the subgroup was considering included fee and/or tax programs, offset requirements, open market, and budgets and marketable permits. The subgroup's concerns included possibilities of conflicting goals between region-wide versus area-specific strategies, how difficult it might be to get a scientifically sound design, the timing of requirements, and how incentives would tie into areas of influence.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the issue paper.

States

- The lack of specifics in the discussion was frustrating: they did not know what the size of the region was; they did not know how to link science with theory; and they did not know what the incentives were.
- The goal was to force efficient improvements in air quality by placing the burden on the appropriate entity and setting emission reduction targets using a reasonable, scientifically sound method.
- Large-scale, regional effects of trades were the most important considerations, rather than the effects caused by individual trades.

Industry

- There were concerns about sources that would opt into an economic incentives program and what the requirements would be for their participation.
- Trading mechanisms tended to be added on to existing command and control programs, which made environmental groups nervous, because it was trading on top of existing command and control programs, themselves a form of compromise.
- Open-market principles should not be dismissed and could provide valuable benefits.
- The temptation to design the "perfect bullet" trading system should be avoided; complexity could make the system fail under its own weight.
- The costs associated with trading should be minimized, the market should be used to create incentives for technology advancements, and the market should not be fine-tuned after the fact.
- It appeared that they were asking a market-based program to do something that a command and control system was incapable of accomplishing. If a region came in today and said that it could not meet a standard, then there would be relief from the overall command and control strategy; a market-based program was incapable of providing such relief.
- It might be beneficial to evaluate the SO_2 and RECLAIM programs.

Environmental/Public Health Groups

- The integrity of the program went beyond major stationary point sources. It was very easy to document the installation and operation of emission controls on some types of sources and not so easy on other sources.
- Fees in lieu of credits was a problem and operated more as fines than fees. They reflected the cost of not installing the proper control equipment rather than the cost of keeping America healthy.

3.6 IMPLEMENTATION OF A "TOO CLOSE TO CALL" DESIGNATION CATEGORY

Discussed at July 1996 meeting.

Issue #1 • Should there be a category designated as "too close to call" to alleviate problems of areas going in and out of attainment because of extreme or unusual meteorological conditions?

Issue #2 • What would be an effective and understandable approach for defining the "too close to call" areas that would not cause areas to be inappropriately omitted from nonattainment status?

Background

The Clean Air Scientific Advisory Committee included the following statement in its closure letter on the primary standard portion of the staff paper on ozone.

"The present standard is based on an extreme value statistic which is significantly dependent on stochastic processes such as extreme meteorological conditions. The result is that areas which are near attainment will randomly flip in and out of compliance. A more robust, concentration-based form will minimize the flip-flops, and provide some insulation from the impacts of extreme meteorological events. The Panel also endorses the staff recommendation for creating a 'too close to call' category."

Under the current attainment test criteria for ozone, the effective design value needed to be at a level within the range of the background in some locations. The stringency of this attainment test caused concerns that the present air quality standards for ozone might not be achievable long term. Considering the likelihood that the revised ozone and PM standards would be more stringent than current standards, the achievability problems would become even more severe over large areas of the country.

A specific technical procedure was needed to define the "too close to call" category in the implementation policy. That procedure must be scientifically defensible and ensure that areas in nonattainment would not be inaccurately categorized and subject to inappropriate or insufficient control requirements.

Recommendations from the BPAPWG

Members of the BPAPWG developed five options for "too close to call" areas.

1. Do not change the present attainment test methodology. This approach would not change current procedures and prevents confusion. However, it continued to ignore basic problems associated with meteorological fluctuations affecting an area's attainment status.

2. Implement a new attainment test to determine whether an attainment area that briefly exceeds the level of the standards should be classified as "too close to call" or reclassified as nonattainment. The approach would be applied only to areas that have been classified as attainment. Use of standard error of the 3-year average of the annual *nth* highest measure value seemed to be a logical choice for a rigorous scientific test. This test assumed that the confidence in the annual average *nth* highest value increased or decreased as the annual concentration fluctuations decreased or increased respectively.

3. Implement the approach in (2) above and apply it equally for both attainment and nonattainment areas. This approach also would address areas that were just over the standards but had measurements below the standard in years of good meteorology.

4. Use a "weight of evidence" approach in the attainment test. This approach, considered primarily for ozone nonattainment, would apply a statistical test similar to that used now and a deterministic test that would require the modeled ozone concentration in every grid cell to be below the standard on all primary episode days. If an area failed either test, a weight of evidence determination could be applied to reassess attainment status. The weight of evidence procedure could consider factors such as model performance and confidence in model input variables, trend analyses, consistency in direction of control between observation based model results and grid model predictions, severity of episodes and incremental cost/benefit analyses for extraordinary control measures required to further emissions, etc. This approach had the benefit that it could take into consideration all possible factors that might lead to unusual values above the level of the standard, but it had the disadvantages that it would be difficult to explain and could be construed as being subjective.

5. Use 5 years of monitored data and ignore the highest and lowest values to calculate the mean from 3, not necessarily consecutive, years out of 5 years and compare the mean to the standard. This option did not address the "too close to call" procedure directly but might be used in conjunction with some "too close to call" test to reduce the impact of any 1 unusual year in terms of meteorology.

The work group referred these issues to the STSWG for their consideration and comment and provided no recommendations. The STSWG did not discuss the scientific aspects of the "too close to call" implementation but, instead, emphasized that ignoring the attainment flip-flop problems could lead to an overly stringent or unachievable design value.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the issue paper.

States

- An area currently has to measure 125 ppb to be considered in violation of the 120 ppb standard. If this margin increased, there might be a reduction in the number of attainment/nonattainment shifts, similar to the way permit levels are set relative to compliance levels.

Industry

- States should be given some flexibility in addressing meteorologically-influenced fluctuations in mean ozone concentrations when defining "too close to call" policy.

Environmental/Public Health Groups

- "Too close to call" should not be addressed in the standard setting process, which should remain completely driven by health and welfare concerns. Even when considering a rigid health-based standard, the paradigm of AOVs being distinct from AOIs for control purposes should soften the impacts of the "too close to call" problem.

- The idea of a margin should be dropped because scientific information indicated that increasing the "too close to call" margin would do little to avoid the problem of areas coming in and out of attainment.

3.7 INCENTIVES FOR AMBIENT AIR QUALITY MONITORING UNDER NEW NAAQS

Discussed at October 1996 meeting.

Issue #1 • How can EPA create incentives for monitoring?

Issue #2 • How can EPA create incentives for private-sector/regulator monitoring partnerships?

Background

There was a general reluctance among State and local governments and businesses to monitor ambient air quality beyond minimum requirements contained in regulations promulgated by EPA in the Code of Federal Regulations at part 58. This reluctance was in part because areas that monitored violations of the NAAQS were designated nonattainment and classified according to the seriousness of the air pollution problem. A nonattainment designation and classification automatically triggered State implementation attainment planning and demonstration requirements, potential stationary and mobile source emission controls, nonattainment new source review for sources wanting to locate or expand in the new nonattainment area, and possibly additional requirements related to nonattainment of the NAAQS. The current regulatory system resulted in a disincentive for detecting violations. In some areas, the strongest disincentive to the placement of additional monitors was that an area's attainment status and design value were completely determined by readings from individual monitors.

There also was a need to add monitors to the national monitoring network. Existing monitors making up the national monitoring network for ozone and PM-10 were located mostly in major urban centers and locations where the highest concentrations in an area were expected to occur. However, few ozone monitors were located in rural areas, even though ozone levels there might exceed human health-based standards and cause damage to vegetation. These monitoring networks were not designed with the systematic study of pollutant or precursor transport in mind. For these reasons among others, it was desirable to add additional monitors to the national sampling program.

In addition, there were as yet no Federally-referenced monitors designed to measure PM-fine concentrations. Questions arose about developing a PM-fine monitoring network to measure concentrations, distinguish among pollutant species, and aid in controlling emissions from specific sources. Given the interest in developing an integrated regulatory strategy for ozone and PM-fine, some thought needed to be given to coordinating PM-fine and ozone monitoring networks.

Recommendations from the BPAPWG

Members of the BPAPWG developed two options on the use of incentives for monitoring.

1. Promote incentives for monitoring and improve the current monitoring network by appointing a national task force to develop policy and technical guidelines for air quality monitoring. It was recommended that the task force, consisting of representatives of work group members and other interested organizations, be appointed and charged with the responsibility to develop policy and technical guidelines for air quality monitoring which will be used for development of implementation programs to attain the NAAQS. The task force should consider:

   a. Expanding the current national monitoring network to protect public health; learn about pollutant transport, composition, or chemistry of pollutants and source receptor relationships; better define AOV and AOI; and integrate monitoring with the overall implementation program.

   b. Providing incentives for the private sector to support and supplement the basic regulatory monitoring program, reduce monitoring costs for government agencies, and promote voluntary pro-active programs.

   c. Eliminating disincentives for monitoring, such as the requirements for mandatory non-discretionary control programs in response to monitoring violations.

The work group also developed suggestions related to the development of an incentives-based program and suggestions regarding overall monitoring issues.

2. Provide no incentives for additional monitoring, but have EPA develop new national guidelines for monitoring that specify the minimum number of monitors needed for a given area. The premise of this option was that the way to obtain more monitoring by the States and the regulated community was to mandate it. Monitoring was not merely a desirable practice, it was an essential component of a viable air quality control program. The problem to date had been the lack of clear Federal mandates for minimum numbers of monitors in various air quality control regions. Two recommendations were made with respect to obtaining additional monitoring without providing incentives:

a. EPA should adopt national guidelines specifying the minimum number of monitors required for each NAAQS pollutant (including precursors) in each MSA, consolidated metropolitan statistical area (CMSA), or similar area of reference. The guidelines also should specify requirements for additional monitors in areas of influence and potential hot-spot locations. In addition, the guidelines should set criteria for spatially siting monitors to supplement or amend EPA's existing criteria. The goal of these guidelines should be to create a high probability that all NAAQS exceedances would be detected, that ambient levels of the pollutants of concern were accurately characterized, and, where relevant, that sufficient data existed to support reasonable projections of pollutant transport.

b. Each State should be required to submit a monitoring SIP that provides for establishing and operating a monitoring network meeting EPA guidelines. Failure to submit the SIP, or its disapproval by EPA, would trigger relevant sanctions under the CAA for planning failures. Also, such failure would result in affected areas being designated nonattainment for relevant pollutants.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the issue paper.

States

- Particulate matter monitoring and ozone monitoring were different. PM monitoring was more valuable and could save money in other environmental quality programs.
- Incentives that relaxed environmental quality requirements were not the only incentives available. There should be some positive incentives to bolster monitoring networks.
- Unclassified areas needed to be addressed. The work group needed to look at incentives for monitoring in rural areas.

Industry

- Monitoring incentives were valuable and had worked in the State of Texas, which was a model for review.
- Creation of an ad hoc group to address the issues of incentives was a good idea.

Environmental/Public Health Groups

- The idea of monitoring incentives represented a clear departure from the intent of the CAA. Incentives would serve to severely reduce the CAA's ability to protect public health and welfare.

Next Steps

The issue was referred to the Coordination Group so that an ad hoc group could be formed to resolve disagreements about monitoring incentives.

3.8 INSTITUTIONAL MECHANISMS FOR THE DEVELOPMENT AND IMPLEMENTATION OF REGIONAL STRATEGIES

Discussed at September and October 1996 meetings.

Issue #1	• What entities need to be included in a regional air quality management institution?
Issue #2	• What authority should the regional institution have?
Issue #3	• What operational rules should the regional institution follow?
Issue #4	• What role will any new regional institution have in planning and strategy development and policy decisions?
Issue #5	• What role will a new regional institution play in emission trading?
Issue #6	• Is a new institutional mechanism needed, and if so, how will it relate to existing institutions?

Background

Use of regional strategies implemented over a large geographic scale might not be entirely compatible with available institutions. New institutional mechanisms might be needed to ensure development and implementation of strategies to reduce regional transport of ozone, particulate matter, regional haze, and their precursors. To develop an effective and equitable regional strategy, it would likely be necessary for a number of States, tribes, local governments, existing regional institutions, and EPA to work

in concert to assure consistency, efficiency, and broad public participation in the process. Some regional institutions already existed that might be appropriate forums for developing regional strategies. The options for the structure and function of a regional institution were based on an assumption that regional-scale air quality planning would be necessary to comply with new NAAQS and that compliance strategies would include performance-based standards and make use of market forces through emissions caps and trading programs.

Recommendations from the NRSWG

The work group recommended several options for each of the issues it addressed and expects, in each case, to develop more options over time. The options are:

1. **Size of the Institution.** The work group proposed two options here: a) beginning with a large, inclusive institutional mechanism and dividing it into smaller planning bodies as necessary and appropriate, which would allow all conceivable players to be involved from the outset, bring economies of scale, and minimize the need for participants to stretch limited resources among numerous overlapping institutions; and b) beginning with a smaller institutional mechanism and expanding it as needed to address transport from other contributing regions, which may be more manageable administratively, but could lead to inconsistencies and inefficiencies.

2. **Role of Participants.** The roles of Government officials and stakeholders will need definition. There are numerous models for decision making that will be examined, including: a) having Government officials be the decision makers with input from stakeholders; and b) creating an independent decision making institution, with nongovernment representatives appointed by the governor, tribal leader, or EPA and supported by government agencies within the region's jurisdiction.

3. **Authority of the Regional Institution.** This authority must be clearly defined and adequate to ensure timely development, implementation, and enforcement of regional strategies. States should retain primacy, subject to EPA oversight and Federal Implementation Plan (FIP) authority, with responsibility assigned at the lowest level of government practicable. The new institutional mechanism should involve EPA in a collaborative decision-making process, rather than EPA weighing in formally after plans have been developed. The options include: a) giving the institution quasi-regulatory authority, based on the model of the OTC through which the decisions of a majority of participating agencies become binding on all parties; b) implementing nonregulatory mechanisms to ensure implementation and compliance, such as interstate compacts, arbitration and negotiation, and incentives and disincentives; and c) using the current SIP/FIP approach, which would require examination of whether EPA has sufficient existing statutory authority to establish SIP requirements based on regional recommendations.

4. **Operational Rules for the Institution.** Operating protocols will need to define who gets to vote, the conditions under which a vote leads to action, the extent to which decisions are binding, how and by whom the decisions will be implemented, and steps to be taken for lack of compliance. Work group members said they would develop options and a recommendation after they have evaluated existing institutions and assessed how operating procedures affect effectiveness. Their focus would be on streamlining the decision-making process while ensuring public access to the process.

5. **Role of the New Regional Institution in Planning, Strategy Development, and Policy Decisions.** Criteria should be developed for establishing goals and objectives of the institution, identifying and evaluating regional control measures, and allocating implementation and enforcement responsibility among affected parties. The institutions should be structured to foster communication among States, tribes, and the private sector; should develop ways to summarize and distribute information about control measures and costs; and should serve as a clearinghouse of information on what different States are doing. Regional institutions could also be charged to identify common local air pollution problems that affect multiple jurisdictions even though the problems are not regional in scope. It could promote the use of improved analytical tools and databases and make consistent guidelines for emissions inventories and models. If the regional institution is operating effectively, it should have substantial political clout when competing for Federal funds and other resources. Options include: a) having a regional

institution that is primarily a technical body for data collection, database development, and analytical support; b) giving the regional institution primarily a policy/planning role; and c) having the institution provide both technical and policy/planning functions.

6. **Role of the New Regional Institution in Emissions Trading.** Regional institutions should oversee the orderly transfer of emissions credits among jurisdictions, including developing protocols for tracking, verifying, recording and enforcing the conditions of transactions. Options include: a) creating an institution that has a major, central role in an emissions trading program; b) establishing a framework for the program and assigning responsibility for managing interstate transactions to a private entity; c) establishing a framework and asking EPA to manage it; and d) providing technical support to independent State/tribal trading programs and managing an interstate emissions credit bank.

7. **Relationship of a New Institution to Existing Institutions.** The new institution should complement, supplement, or replace functions served by EPA, States, tribes and local governments. Options include: a) evaluating the use of existing multistate institutional structures as models or mechanisms for regional planning and implementation efforts; b) establishing a new institution, which from the outset could have the characteristics needed to develop and implement regional emissions management programs to meet new NAAQS; and c) outlining clearly the relationship between the new mechanism and existing institutions, defining their means of coordination and allocation of responsibilities and setting out procedural interactions for decision making.

The work group developed a preliminary list of characteristics and functions for an optimal institution, which may need modifications after decisions are made about the new NAAQS, designation of planning areas, and development of integrated control strategies. The work group requested contractor assistance in evaluating existing institutions, including Lake Michigan Air Directors' Consortium (LADCO), Northeastern States for Coordinated Air Use Management (NESCAUM), OTC, OTAG, GCVTC, and the Western Governors' Association Air Quality Initiative.

Discussion by Subcommittee

Following are highlights of Subcommittee comments on the issue paper.

States

- The approach of starting large and working down might not be the most appropriate; there were arguments to support the opposite tack. When one started large and moved smaller, one would be trying to prove the negative, which was not a good expenditure of an individual's time and effort.
- International considerations should not be forgotten.
- Regional consortia were successful when they had an individual who represented the regional perspective and not the perspective of any one State; the structure was not as important as having buy-in from the top.

Industry

- The timing of establishing the institutional mechanism was unclear, as was the number of layers of planning there would be in the proposed process.

Environmental/Public Health Groups

- Starting large and working down would provide more resources and more ideas and might be more efficient than a group of two or three States.

Academia

- There was a technical component of regionalization in addition to its decision-making component. Regional laboratories doing speciation analyses of PM-fine network data would benefit everyone, with regional data centers and modeling efforts more likely to have the expertise for full-fledged photochemical modeling and data analysis than individual State laboratories.

3.9 INTEGRATED IMPLEMENTATION OF THE OZONE AND PM NAAQS AND REGIONAL HAZE RULES

Discussed at September and November 1996 meetings.

Issue #1 • What implementation issues best lend themselves to an integrated approach?

Issue #2 • What data are needed to develop an integrated strategy and how will these data be gathered and analyzed?

Issue #3 • What would constitute the elements of integrated control strategies for geographical areas determined to be appropriate candidates for integrated implementation strategies?

Issue #4 • What additional issues need to be addressed in Phase II in order to integrate approaches to implementing the NAAQS and regional haze rules?

Background

There is a growing body of evidence linking ozone, fine particulate matter, and regional haze through common precursors, common photochemical reactions, and common transport mechanisms. This evidence suggests that the assessment of ozone, PM-fine, and regional haze should consider all three pollutants in an integrated fashion rather than independently. To the degree that integration of timelines and milestone dates does not delay the achievement of a NAAQS, integration may provide significant benefits.

Historically, implementation programs designed to meet a NAAQS, as well as the related Federal guidance provided to the States, focused only on the achievement of the NAAQS without formal recognition of the impact of that program on other NAAQS or related environmental criteria. This approach was due in large part to the lack of adequate understanding of pollutant transport and secondary pollutant formation chemistry, as well as the administrative complexities involved in dealing with integrated NAAQS implementation programs. In some cases it has led to increased costs to States in developing and administering overlapping or redundant programs. In addition, industries often face multiple and sometimes conflicting requirements in complying with different NAAQS implementation programs.

The establishment of a new PM-fine and ozone NAAQS and a regional haze rule, along with improvements in the state-of-the-science coupled with demands for more cost-effective implementation programs, creates the opportunity to consider integration of NAAQS implementation programs. Given the regionality, spatial patterns of air quality indices, precursors, sources, atmospheric chemistry and meteorological processes that affect more than one pollutant, and control options, integrating the ozone, PM-fine, and Regional Haze programs may make sense.

Recommendations from the NRSWG

The NRSWG addressed key issues related to integrating the implementation of NAAQS for ozone and PM and the new regional haze rule. The work group presented the following options:

1. **Pollutant by pollutant.** Continue the present, individual pollutant uniform nationwide monitoring, modeling, and emissions inventory approach.
2. **Uniform nationwide guidelines.** Use an enhanced uniform nationwide monitoring, modeling, and emissions inventory approach, including speciation. Specifically focus on multipollutant approaches to address issues of interpollutant interactions, transport and boundary conditions.
3. **Uniform nationwide guidelines supplemented with regional needs.** Develop a system focused on multiple pollutants, uniform monitoring, modeling, and emissions inventory, including speciation and transport, that uses regional air quality data variations. Uniform nationwide guidelines could lead to "lowest common denominator" guidelines or could request unnecessary information from some regions.
4. **Regional guidelines with some minimum formatting guidelines to facilitate sharing of information.** Recognize the regional nature of the array of monitors and speciation needed for future integration. Develop different regional performance-based, multipollutant monitoring, modeling, and emissions inventory approaches, including speciation and transport, with an effective periodic measurement and evaluation system. Common methodologies for modeling inputs, such as emissions inventories and monitoring data, should be ensured in order to conduct interstate or national modeling analyses. This approach would allow a region to do a more tailored job of defining information needs without getting formal approval from the EPA.

The work group stated its ideal recommendation as option 4, which work group members said made sense based on the work of GCVTC, OTAG, and others in identifying and addressing regional needs. They said that issues that develop during Phase II of the regulatory process might show options 2 or 3 to be necessary in the short term. Option 1 was rejected because an integrated approach would require enhanced PM, ozone, and regional haze monitoring, modeling capabilities, and emissions inventories, including speciation and transport considerations. The work group noted that speciation was needed regardless of whether or to what degree integrated implementation took place.

Discussion by Subcommittee

Based on the discussion at the November 1996 Subcommittee meeting, the Subcommittee seemed ready to accept a combination of options 3 and 4 , with some additional information needed to expand option 3. Following are highlights of the Subcommittee's comments from the November meeting.

States

- Continuity was needed in defining regional guidelines across the country.
- East and West should not be considered up front as the only two regions in the country.
- The concept of "minimum guidelines" in option 4 was a concern.
- If the level of complexity increased, it was much more likely that nothing would get done.

Industry

- Emission inventories were an issue and were characterized as the missing link that took up the most time, particularly putting all of the data into a common format.
- Options 3 and 4 could be combined, deleting the last sentences in each and then merging them.

Environmental/Public Health Groups

- It should not be a choice between national and regional guidelines. There should be national guidelines that are amplified by regional guidelines.

Academia

- There were at least two kinds of integration, within-pollutant categories and across-pollutant categories, both of which were desirable.

3.10 NEW SOURCES: CONSIDERATIONS FOR THE IMPLEMENTATION OF NEW AIR QUALITY STANDARDS

Discussed at September and November 1996 meetings.

Issue #1 • How can a new integrated implementation policy address new source controls in a cost-effective way considering the likelihood of geographically large control areas and AOV/AOI designations?

Background

The NSR policy has been a cornerstone of control programs in nonattainment and Class I areas for nearly 20 years. The policy is linked directly to the current nonattainment designation process. The process for defining new source requirements must be changed if new designations are to be based on AOV/AOI subject to a SPIP. The designation approach based on AOV/AOI may result in large areas within which new source controls should be required, but it is possible that specific sources or emissions from particular locations within AOIs may not contribute equally to measured standard violations in the associated AOVs. Therefore, the BPAPWG and NRSWG also are considering options that will serve to maintain cost-effective and competitive opportunities within these potentially large AOI areas in this review of the new source issues.

Recommendations From the BPAPWG

Four options were presented in the issue paper, although the work group recognized that these options do not encompass all possible approaches that could be considered. The options were:

1. The same planning and control requirements would be required for all new and modified major stationary sources in all AOIs. The advantage of this approach was that it was simple and offered no arbitrary siting benefits within the AOI. The disadvantage was that it conflicted with the intent of the AOV/AOI concept and might be less cost effective than other options.

2. Some specific control plan for new and modified sources would be required within all AOIs, but the SPIP could require different planning and control requirements to differentiate strategies applicable to specific locations and sources within the AOIs. The advantage was that it would allow flexibility in cases where it could be shown that not all sources in the AOI contributed equally to measured violations. The disadvantage was that it might result in some areas of an AOI being less competitive than others in the same AOI. This option might also include a mechanism to allow individual sources to challenge specified controls.

3. New and modified sources in an AOI that comply with new source performance standard (NSPS) and demonstrate offsets within the AOI would not be subject to

prevention of significant deterioration (PSD) requirements for the offset pollutants. The advantage was to reduce the burden in the permit process, while offsets may be required, sources might not be required to implement LAER. The disadvantage was that it was complex, might fail to protect PSD increments, and might result in higher emissions in some local areas.

4. Allow flexibility to determine the scope and breadth of the new source strategy within AOIs and implementation of a trading and banking system to obtain offsets and meet other new source requirements within an AOI. The advantages are that a system based on cap and trade will reduce emissions and promote cost efficiency. This option also could be expanded to include inter-pollutant trading.

The work group said it would focus further consideration on option 2 and option 4 with variations such as inter-pollutant trading.

Summary of Discussion by Subcommittee

At the November 20, 1996, Subcommittee meeting, the work group presented an update on its work. Work group members wanted to make it clear that they were trying not to duplicate any work by the Subcommittee established to investigate NSR. Their approach was to maximize the cost effectiveness of integrating NSR into the AOI/AOV structure, while providing flexibility to reflect regional differences. The work group noted that the NSR program should result in real reductions using market principles where appropriate. They also presented information on three technology floor options: retain NSPS as the floor, select BACT as the floor, or designate another technology as the floor.

Also at the November meeting, an overview was presented of the current package being considered by the NSR Subcommittee. That Subcommittee looked at four categories of rule changes: applicability, technology, Class I areas, and applicability of the 1990 CAA Amendments.

The Subcommittee discussions at its November 1996 meeting followed a session in September where the Subcommittee discussed new sources and the options that might serve to replace NSR for nonattainment areas with a cap and trade or declining cap and trade program over an entire AOI. The following highlights are drawn from both the September and November meetings.

States

- NSR should not be eliminated totally in favor of a cap and trade system. NSR is a known program, and the certainty of knowing what was expected gave both States and industry some degree of confidence that sources could locate and grow near urban areas.
- Some of the sources that could require controls in the future were area or fugitive sources that might not be included in a cap and trade program.
- NSR and LAER would still make sense for new sources since it was always more cost effective to add the best possible controls during the construction phase rather than as retrofits. The cap and trade concept might then be applied to existing sources. Removing the requirement for LAER during construction might eliminate some control opportunities at a later time.
- The problem with NSR was the time it took for approvals, not the fact that LAER was required.
- There needs to be a minimum performance-based approach while seeking flexibility in the market, such as option 2 with BACT as a technology floor.

Industry

- A cap and trade program to modify the existing NSR process was desirable.
- The rigidity of LAER and NSR at times prevented innovative solutions.
- Determinations for LAER should be negated only if they would inhibit a robust trading market.
- The success of a cap and trade would require political will more than buy-in from sources, and the only way to get the political backing was to demonstrate that it was the least-cost option.
- Achieving the new more stringent standard using traditional control strategies would be extremely expensive.
- The discussion of NSR should be tabled until there was a better idea of what the market program would be.

Environmental/Public Health Groups

- The NSR program should be retained to promote the maximum amount of emissions reductions. It had been very effective in limiting the growth in emissions to rates that are much lower than the growth in industrial activity.

Based on that success, the NSR program should not be discounted or scrapped.

- Controls are needed on fugitive sources, which might not be addressed adequately by a cap and trade program.
- The issue paper failed to address programs for the transition period or the need to consider specific hot spots.
- With all of the uncertainty over the adequacy of control programs, a combination of NSR and a cap and trade program should be considered as a strategy to encourage maximum emissions reductions from the maximum number of sources.
- The NSR proposal was trying to improve the function of the Federal Land Manager and provide clarity in dealing with air quality related values, which was inconsistent with the provisions recommended to eliminate PSD.
- Terminology should be changed to reflect a technology-based performance standard, not a technology floor.
- When technology-based programs worked well, they produced innovation.
- Although NSR programs could be expensive, any additional costs for controls had to be considered in light of the significant and rising costs associated with health problems in highly polluted areas.

Federal Agencies

- The concept of leaving PSD and some other details as Phase II issues to be addressed later was discomforting.
- The level of detail proposed here might interfere or contradict the separate NSR reform process.

3.11 OPTIONS FOR DESIGNATING PM-FINE AREAS

Discussed at October and November 1996 meetings.

Issue #1 • How will the requirement for 3 years of PM-2.5 data affect the Subcommittee's desire to identify integrated control strategies for ozone, PM-2.5, and regional haze?

Issue #2 • Should ozone designations be delayed so that the planning process for ozone and PM-2.5 will be synchronized? Is it important for them to be on the same schedule, or should we rethink our recommendation that only monitoring data be used to designate PM-2.5 areas?

Issue #3 • Is the use of monitoring data still a critical issue as we move from the current air quality management structure approach to the AOV/AOI approach?

Background

The EPA's proposed revisions to the NAAQS for particulate matter include a new standard for fine particulate matter, which is defined as particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. The EPA could approach ambient data requirements for the new standard in the same manner as for the PM-10 standards, with 3 years of ambient data needed to determine whether areas are attaining the new NAAQS. The most recent version of the issue paper on **Options for Designating PM-Fine Areas** was prepared by the EPA staff and made available to the Subcommittee on November 12, 1996.

Previous option papers circulated among FACA work groups dealt with PM-fine designation, notably the July 25, 1996, joint option paper prepared by the BPAPWG, NRSWG, and the STSWG. This paper discussed the designation issue in great detail and should be referred to for a full understanding of the AOV concept that will be referred to later in this paper. Briefly, AOVs describe those areas in which violations of the standard are observed and AOIs describe those areas that potentially contribute to violations. The AOV is the entire area not meeting the ambient air quality standard. The AOI would be designated based on scientific data, identifying the area that contains sources that potentially contribute to the exceedance of the ambient standards in the associated AOV.

There was disagreement among Subcommittee members regarding the use of a statistical approach to predict PM-2.5 concentrations. Several of the environmental Subcommittee members strongly supported using a statistical approach to predict PM-2.5 concentrations from a ratio of PM-2.5 to PM-10. However, other members conveyed their strong preference for using 3 years of ambient monitoring data rather than a statistical approach. Their concerns stemmed from EPA's decision in 1987 to use a similar approach for the PM-10 NAAQS, and was based on the uncertainties associated with the statistical approach and the resulting designations for PM-10. Some areas were designated

PM-10 nonattainment based on the statistical probability approach even though they never violated the NAAQS, while other areas with low probabilities subsequently violated the standard, but were not initially designated nonattainment. Other concerns with using a statistical approach for PM-2.5 are its regional nature, the potentially large secondary component, and seasonal variability compared to PM-10 concentrations.

There are fundamental CAA requirements tied to designations. For example, once a NAAQS is promulgated, within 3 years EPA must designate areas nonattainment that do not meet the new NAAQS. It would take time to develop a monitoring method, build monitors, and deploy them across the country. Also, EPA currently has no Federally endorsed method for monitoring for PM-2.5. Adequate funds are not expected to be available to build and deploy an extensive network of monitors that EPA ideally would like to see, at least not within the 3 years EPA has under the CAA to make designations.

Recommendations

In an earlier draft of this paper, EPA presented nine options for designating PM-fine areas. Based on comments received on that draft and discussions of the Subcommittee at its October meeting, EPA narrowed its list to two options. These two options were presented at the November 1996 meeting.

1. **Rolling Method.** Preliminary designation at promulgation of the new NAAQS would be based on all available information. As soon as 2 years of data were available from the sites EPA had targeted first because of high population exposure, an interim designation of either attainment or nonattainment could be made. Areas would receive final designations after they gathered 3 years of data. An interim nonattainment designation would mean that control strategy planning must begin immediately. As more sites come online, this process could continue to roll. For other areas where sufficient data would not be available by June 2000, the statutory deadline for designations, the preliminary designation made upon promulgation of the new NAAQS would remain in force until at least 2 years of monitoring data were available to make an interim designation. Once these areas had gathered 3 years of data, final designations could be made.

   Factors that favored this approach included the ability to make decisions based on monitoring data, satisfaction of the CAA requirement to designate within 3 years, no delays in control strategy development, and the provision of monitoring incentives. Arguments against this option include the introduction of a new interim status concept based on only 2 years of data, which may be challenged on legal grounds and would not be as stable and accurate as an estimate based on 3 years of data, and the possibility that control strategy development might be misdirected.

2. **Early Response Method.** This method uses statistical probability or another approach to determine areas that have a high probability of violating the standards. Those areas would be selected for accelerated monitoring, which would include 1 year of PM-fine monitoring augmented with speciated monitoring. At the end of 1 year, if the monitoring data show a violation, a nonattainment or AOV designation would be made. The area would initiate planning linked to a time-certain end point for all areas independent of the year of the AOV designation. For areas determined to be neither high probability nor included in early response, EPA could establish exceedance criteria based on 1 year of monitoring data that would then trigger early response monitoring in the second year. A time-certain attainment date could be an incentive for early monitoring.

Factors favoring this approach were early action for areas with the worst air quality and prompt response to public health concerns, early speciation to speed the planning process, no penalty or disincentive for early detection and response, reliance on monitoring data for redesignation, and satisfaction of CAA time requirements. Factors working against this approach were time-certain attainment dates that might not be consistent with the CAA, no early response from AOVs not initially determined to be high probability, and the possibility of errors in probability-based selections.

Based on the Subcommittee discussions that followed the presentation of the PM-fine issue paper on November 19, the presentation was revised and the following **proposed principles** were brought to the Subcommittee on November 20.

- The PM-fine monitoring program needed adequate financial and management support.

- The designation process must be completed within 3 years.
- Designations will drive data collection.
- Incentives were needed to monitor in areas initially designated as in attainment.
- The planning process should begin as soon as possible when data indicate the need.
- Speciated monitoring data were needed for planning and controls.
- Reports were needed on resource requirements for implementing PM monitoring.
- Monitoring more frequently than once in 6 days was desirable.
- Controls should not be implemented until after final designations.

On November 21, Subcommittee members proposed a number of wording changes to the proposed principles identified above.

The **final principles**, as revised by the Subcommittee, are as follows:

- The PM-fine monitoring program will fail without adequate financial and management support.
- Speciated monitoring should be required to assist in planning and control program design.
- The designations process must be completed no later than 3 years.
- The planning process should begin as soon as possible as data indicates.
- More frequent monitoring should be considered.
- Areas with sufficient data shall be designated as soon as possible after promulgation of the NAAQS.
- Early options for controls during the designation process should be explored and encouraged.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the issue paper.

States

- The rolling method might prove to be a disincentive for monitoring.
- Costs of additional monitoring and the source of funds to pay for it were not addressed.
- The labor and manpower necessary to collect the data and analyze them properly should be considered. It was an intensive process with no new monies put on the table.
- It was not clear whether NSR, LAER, and offsets would be operational under the interim period.
- They could move forward on the development of SIPs during the data gathering period. The real question was when they should start the planning process.
- Both monitoring and ratio techniques would be needed to meet the goals of this initiative.
- If a State has 3 years of data that show there are no exceedances, the State should not have to submit maintenance plans or go through redesignation but should be deemed to be in attainment.

Industry

- All available data should be used to make designations.
- An analysis of the funding, analytical, and administrative requirements for implementing the monitoring program was needed.
- An important issue was the risk of designating areas based on limited data. One way to reduce the risk was to run the data through an extreme value analysis.
- A monitor could be deployed early, the frequency of monitoring increased to weekly or daily for a year, and the top 10 percent of data readings speciated. If a problem was identified, then the high-frequency monitoring could be discontinued while a control strategy was developed.
- Sampling methods often affected the quality of data; nephelometry was at best a stretch when considering PM-fine concentrations.
- The planning process should be initiated early in the measurement process, but there was a problem with the concept of initiating controls at the same time.

Environmental/Public Health Groups

- Early designations should be required for areas that have a high probability of violating the NAAQS.
- Areas should be designated at the earliest possible date, using existing data whenever possible.
- Speciation of data should be used in conjunction with planning and control requirements. Speciated data should not be a pre-condition for controls.
- Strongly support early controls during the designation process and prior to SIP adoption.

Academia

- The data issue was not a function of science limitations but rather a function of management fallacies. The technologies were available to gather data and the means were available to analyze the data. To add 500 monitors would cost $5 million dollars annually, which was not a significant amount of money.

3.12 POPULATION WEIGHTING OF MONITORS (EXPOSURE-BASED MONITORING)

Discussed at July 1996 meeting.

Issue #1 • Should an exposure-based monitoring system be used with the new NAAQS?

Background

The primary and secondary NAAQS derive their authority in section 109 of the CAA, with current limits of NAAQS in 40 CFR Part 50. In implementing the NAAQS, some experts have recently recommended that ambient monitors be located so that they reflect actual human exposure and health risk, that is, monitors should be placed in regions of high population density. Others have argued that this approach could sacrifice the health of individuals located in less populated areas. As an aside, it has been shown that people, on average, spend approximately 90 percent of their time indoors (Robinson, J., and W.C. Nelson. 1995. National Human Activity Pattern Survey Data Base. U.S. Environmental Protection Agency, Research Triangle Park, NC).

Currently, EPA maintains 4,469 monitoring sites throughout the United States. The monitoring program is divided into State and Local Air Monitoring Networks (SLAMS) and National Air Monitoring Networks (NAMS). The objectives of the SLAMS are to determine the following: 1) the peak concentration in an area, 2) representative concentrations in areas of high population density, 3) impacts that significant sources have on ambient pollution levels, and 4) general background concentration levels. NAMS, which are a subset of SLAMS, can be divided into two specific groups: 1) urban-scale sites located in areas of expected maximum concentrations, and 2) neighborhood sites located in areas that combine poor air quality and high population density. Under the current approach, monitors often are not located where they obtain the best estimate of pollution levels to which the overall public is exposed. However, this approach is viewed by some as an appropriately conservative methodology that maximizes the protection of public health while also providing an adequate margin of safety.

The scientific community is now reaching consensus that there is no threshold for health effects of certain pollutants, especially ozone. Furthermore, recent analyses have demonstrated that some NAAQS may never be attained because of natural background concentrations of these pollutants. It is becoming clear that no zero-risk solutions are available, indicating that full protection is impractical if not altogether impossible to achieve. The cost effectiveness of mitigation strategies becomes important, as do developing, improving, and using important tools such as risk assessment. Since some risk must remain, resources should be prioritized so that their use maximizes beneficial results. One way to maximize benefits is by implementing some form of exposure weighting or averaging of monitors. This approach departs from current practices and raises questions about existing methodologies.

Recommendations from the BPAPWG

The BPAPWG examined different approaches to implement an exposure-weighted monitoring system, which included using existing monitoring networks, designing new or revised networks, weighting ambient monitoring data by population, and averaging ambient air quality data spatially. Following are the work group's recommendations.

1. Determining acceptable levels of risk and exposure should be part of the NAAQS review process, which means that consideration of

exposure-based monitoring to determine compliance with NAAQS must be allowed.

2. There is a potential role for exposure-based ambient monitoring in the implementation of emission control programs, regardless of the outcome of the current NAAQS review. It could be used to maximize reductions for population exposure and risk and also could be used as a measure of the effectiveness of emission control programs.

3. The EPA's current monitoring network design and siting criteria need review. The work group recommended that monitoring network design be consistent with the form of the NAAQS, including secondary standards.

Summary of Subcommittee Discussion

There was disagreement among Subcommittee members on the recommendations in this paper. General agreement was reached, however, on the following statement: "in evaluating different strategies, each of which would attain the standard, decision makers should give preference to strategies that provide improved air quality for the greatest number for people." Below are highlights of Subcommittee comments on the three recommendations concerning an exposure-based monitoring system outlined by the work group at the July 1996 meeting.

States

- Exposure-based monitoring could be used as a tool for measuring progress, but there is concern over wording in the existing proposal.
- A State representative agreed that the paper should be tabled.
- A State representative noted that much time had been spent on this issue but that consensus had not been reached.

Industry

- The use of population-based monitoring in nonattainment areas would minimize the size of the population at risk and provide incentives for nonattainment areas to install new monitors to better define their extent.
- The BPAPWG should revisit the issues and attempt to reach consensus on a strategy that would improve air quality for the greatest number of people.
- The use of spatial averaging of monitors was advocated to handle areas that move in and out of attainment.

Environmental/Public Health Groups

- Concern was expressed over potentially controversial policy judgments embedded in this issue (i.e., the recommendation could be interpreted to mean that people living in sparsely populated areas would not receive the same level of attention garnered by persons living in more densely populated areas).
- Changing the language from "give preference" to "give added weight" to strategies for improving air quality would allow diverse solutions rather than a single preferred strategy.
- Strongly oppose exposure-based monitoring as viable option in determining attainment.
- Strongly believe that exposure-based monitoring will weaken public health protection.
- Environmental groups believe this approach assumes that there are many monitors located in the appropriate places. There are few monitors and population in the vicinity of some monitors is lower and not indicative of public health impacts.

3.13 REGIONAL HAZE

Discussed at September, October, and November 1996 meetings.

Issue #1	• What quantitative objectives for regional haze should be set in State and tribal plans and how would they relate to the new NAAQS for ozone and PM?
Issue #2	• What institutional mechanisms should be used to implement a Regional Haze program?
Issue #3	• What changes in existing monitoring programs will be required to support a new regional haze initiative?
Issue #4	• How should/will reasonable progress be defined?
Issue #5	• Should Class I areas be addressed individually or in groups?
Issue #6	• How long should SIP/TIP planning take?

Issue #7 • How often should implementation progress be reported?

Issue #8 • How should BART be applied to regional haze?

Background

The NRSWG was asked to examine regional haze and visibility protection issues in the context of EPA's current review of the PM and ozone NAAQS and the pending response to recommendations of the GCVTC. The national visibility goal from section 169A of the CAA mandated the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas in which impairment results from manmade pollution. The CAA further specifies that visibility impairment consists of "reduction in visual range and atmospheric discoloration." It charged EPA with promulgating regulations to assure "reasonable progress toward meeting the national goal."

Since 1977, EPA has had the authority to promulgate regulations and guide States and tribes in their determination of what emission management programs constitute reasonable progress toward the national visibility goal. However, when EPA promulgated its initial visibility protection regulations in 1980, it deferred addressing regional haze. The 1990 CAA Amendments authorize EPA to establish visibility transport regions and associated commissions for assessing technical information and recommending regional haze measures, and specifically called for establishing a commission to protect visibility in the Grand Canyon region. The resulting GCVTC issued recommendations to EPA in June 1996. The CAA stipulates that EPA, within 18 months of receiving the recommendations, should carry out its regulatory responsibilities under section 169A to ensure reasonable progress toward the national goal. The statute also calls for EPA's regulations to include criteria for measuring reasonable progress toward the national visibility protection goal.

Recommendations from the NRSWG

The work group laid out several objectives of a Regional Haze program and options for meeting those objectives.

1. In developing quantitative objectives for regional haze, important factors were the target and the date that the target should be met. Options for meeting this objective included: a) having EPA specify the improvement needed for all Class I areas, by region or by area, in the regional haze rule; b) having Federal land managers (FLMs) provide information on current visibility impairments in their areas and their target objectives; and c) setting up institutional mechanisms that would include State(s), tribe(s), FLMs, the public, and other stakeholders to set objectives. The work group preferred option 3.

2. The role of these institutions would be in planning, analyzing, and implementing Regional Haze programs and also might include developing quantitative objectives. The institutions' role would influence the direction of the regional haze rule. Options for the institutions included: a) Visibility Transport Commissions; b) an AOI planning body composed of representatives from States, tribes, and other stakeholders; c) a multistate Memorandum of Understanding or informal agreement to work together among several States and/or tribes; d) individual States or tribes; or e) combinations of the above. The work group chose not to make a recommendation, saying that their recommendations needed to be developed in conjunction with the work group addressing institutional mechanisms. It was noted that any recommendation should reflect the fact that States and tribes have the authority to develop SIP provisions where needed.

3. Options for designating Class I areas included: a) addressing them one by one and developing AOIs for each; b) grouping Class I areas first and then identifying regional haze AOIs; c) identifying ozone and PM AOIs first, then modifying them based on which Class I areas were in or near them; and d) placing every State and tribe in a broad regional planning area that would identify PM, ozone, and regional haze AOVs. The work group supported option 4.

4. The EPA needed to include in its rule the criteria for determining reasonable further progress.

- Reductions in manmade impairment could be verified by emissions tracking and visibility monitoring data.
- Steady progress should be sustained and documented at each interval of review.
- Program adjustments would be made incorporating periodic review of progress from visibility and nonvisibility programs.
- Continuing improvement would be made to remedy existing and prevent future impairment.

- The cost effectiveness of additional controls would be evaluated in relation to visibility improvement.
- Unintended beneficial and adverse impacts of the program on energy, environmental, and other secondary factors would be taken into account.

Monitoring data and visibility modeling would be enhanced to ensure that controls were effectively achieving visibility improvement.

- Well-coordinated monitoring program(s), administrative systems, funding, and other support mechanisms would be in place to implement the program.

5. Regional haze measures must be included in a SIP, TIP, or regional plan. Once the planning had begun for all ozone, PM, and haze, the work group recommended that they proceed on a similar schedule.

6. The work group recommended that the frequency of progress reporting for regional haze be the same as for PM and ozone, that Federal visibility monitoring guidelines be developed for the Interagency Monitoring of Protected Visual Environments (IMPROVE) protocol, and that the monitoring network and number of laboratories that could perform specialized IMPROVE analyses be expanded.

7. The work group recommended long-term regional haze strategies that could add flexibility and long-term effectiveness if integrated with the PM-fine and ozone plans. These strategies might have an added importance in the eastern United States where the initial progress came from Title IV cap and trade programs.

8. Section 169A(b)(2) of the CAA requires that rules for regional haze address the issue of BART for certain major sources. Under the existing visibility program, BART has proven to be an expensive attribution and analysis process that has only been considered in a few cases. The work group recommended that the regional planning process consider a broader range of sources contributing to regional haze and determine the appropriateness of BART in the context of other requirements to address the new NAAQS and regional haze. Other measures might include market-based strategies, technological advances, and criteria for the impact of source categories, such as proximity, amounts of emissions, and types of particle formation.

Discussion by Subcommittee

Following are highlights of Subcommittee comments on the objectives of a Regional Haze program and options for meeting those objectives as outlined by the work group at the November 1997 meeting.

States

- Questions were raised over how regional haze relates to the integration of the standard setting process.
- A need was expressed for a basic criterion for the stakeholder group.
- There is a need for clarification as to who speaks for the States, tribes, and FLMs.
- A concern was raised about the secondary standard issues, and a question was asked about whether there are areas of violation, other than Class I, that would be selected to participate in the planning process.
- It was stated that the planning processes were getting confusing, and it is unclear what was supposed to be an enforceable document.
- In the East, there is little involvement in regional haze issues, which seem to be closely related to the integration issue discussed earlier. What are the distinctions between integration and visibility issues?
- It is believed that using innovative strategies to realize reductions in a BART-like manner will prove to be very successful.
- A need was expressed for the development of clear, objective targets for measuring reasonable progress.
- Stakeholders should be involved in setting objective visibility targets. These targets may be different based on the views of the stakeholders. For example, the targets for Mt. Ranier may be different than those set for Shenandoah National Park.

Industry

- It would be appropriate to set specific targets, whether they were long-term goals or specific progress targets. Reasonable progress involves taking all things in balance.
- A comment was made on the institutional mechanism, stating that the idea was to have a central coordinated planning group developing overall rules. A recommendation would move forward from this group to EPA and the States.
- A question was raised over how to incorporate non-NAAQS issues into a visibility program.

- There has been no discussion of the slope to measure progress.
- Confusion was expressed over the criteria laid out in item 4 above. It was asked whether the stakeholders needed to have the same criteria.
- An industry representative questioned whether BART was singled out in this process, or was it a whole suite of control processes. It was stated that BART had traditionally dealt with very specific sources, something different than what was proposed here. A preference was expressed for changing the wording to reflect regional haze control strategies.
- Regional haze was identified as a different part of the CAA and a request was made for a brief presentation at the next meeting on the legal aspects of regional haze.

Environmental/Public Health Groups

- To remain consistent with the content principles, the Regional Haze program needed to incorporate specific timeframes (for setting reasonable progress objectives and periodically assessing progress), as well as a Federal "backstop" for reasonable progress objectives.
- In regard to the criteria, it was assumed that the fourth item, continuous improvement, is the driving one.
- It was noted that this program will help to address welfare effects to be protected by a secondary standard.

Federal Agencies

- NAAQS exist for ozone and PM. There was no standard for regional haze, and thus a process was needed to reach the national goal for regional haze. There was an opportunity here to start the process early, without having to use the whole concept of a visibility transport commission.
- Preference was exhibited for moving away from the terminology of BART and allowing as much innovation as possible. Although BART allowed one to look at a whole suite of alternatives, it also raised the possibility that this could be a Phase II issue.

3.14 INTEGRATION OF OZONE, FINE PARTICLES AND REGIONAL HAZE AIR QUALITY MANAGEMENT (GREEN BOOK)

Discussed at July 1996 meeting.

Background

The BPAPWG and NRSWG of the Subcommittee asked several questions regarding the technical basis and issues underlying the integration of regulatory programs for ozone, fine particles and regional haze, and the specification of geographic scales required for air quality management. The STSWG responded to these and other inquiries by developing a document that discusses in a less technical way the current scientific understanding of ozone, fine particles and haze; the associated gaps and uncertainties; and responses to questions posed by work groups. This document served as the background technical discussion in the Advanced Notice of Proposed Rulemaking issued in December 1996 for Ozone, Particulate Matter and Regional Haze Implementation Programs.

Discussion by the STSWG

Following are the primary points of the work group's discussion:

- Understanding the emission sources and atmospheric processes that are responsible for elevated air pollutant levels requires an examination of urban and regional geographical scales.
- Ozone and fine particles may exhibit similar spatial patterns, although the frequency and importance of co-occurring patterns is not well understood.
- Many of the emission precursors and sources of precursors to ozone, fine particles and regional haze are the same.
- Many of the atmospheric processes (chemistry and meteorology) affecting ozone, fine particles, and regional haze are the same.
- Several critically important information gaps exist that create very difficult challenges for air quality management of these pollutants.

Discussion by Subcommittee

Following are the highlights of Subcommittee comments on the document presented by STSWG at the July 1996 meeting.

States

- A representative noted concern about the fact that we know more about air quality problems affecting the East than those affecting the West. This may be a problem if funding for the development of tools is cut from EPA's budget.

Industry

- It is important, when one considers regional haze, to look at the entire distribution of issues. For example, a small change in aerosol concentration on a clean day can make a significant change in perceived visibility.
- There is a need for enhanced tools to obtain political acceptability as the Subcommittee considers interstate situations. The STSWG should make an inventory of the tools needed. This inventory should also give a timeline for development.

3.15 TREATMENT OF AREAS IN WHICH AIR QUALITY TRENDS INDICATE THE RISK OF BECOMING AN AOV

Discussed at October 1996 meeting.

Issue #1 • How should areas tending toward AOV status be identified?

Issue #2 • Who should be responsible for identifying areas that are tending toward AOV status?

Issue #3 • What is the appropriate response for an area at risk?

Background

Section 107(d)(1) of the CAA requires EPA to designate areas as attainment, nonattainment, or unclassifiable following promulgation of a new or revised NAAQS. Areas that are very close to nonattainment are not subject to any additional requirements. Because of the stigma and prescribed control measures associated with nonattainment status, it would be preferable for these areas to take positive steps to avoid slipping into nonattainment. An example of such a step is "ozone action days " where the public and businesses take voluntary actions to reduce emissions on those days. The BPAPWG noted that EPA's consideration of a range between the second highest and fifth highest concentrations in connection with a revised ozone NAAQS indicates that identification of areas at risk is desirable, although EPA did not identify how these areas should be treated.

Recommendations from the BPAPWG

The BPAPWG addressed key issues related to the identification of the areas at risk and the appropriate response of these areas. The BPAPWG recommended the following options:

1. Areas at risk of becoming AOVs should be identified using a combination of air quality trends, emissions data, and air quality monitoring data. It was noted that some work group members favored using air quality monitoring data only to determine whether an area was at risk of becoming an AOV.
2. The identification of areas at risk of becoming AOVs should be left to the discretion of States and local air pollution authorities, which is the same as the current program. It was noted that some members of the environmental community wanted these areas to be identified by EPA using a national approach.
3. The EPA should provide States with incentives for adopting programs in areas determined to be at risk of becoming AOVs. Under this option, EPA could allow States or AOIs some flexibility in timing and/or control requirements if they have adopted voluntary programs that satisfy EPA by the time a NAAQS is exceeded. Some members of the environmental community favored an option that required States and potential AOIs to implement specific measures aimed at preventing an area from becoming an AOV.

Discussion by Subcommittee

Below are highlights of Subcommittee comments on the three recommendations outlined by the work group in the November 19 meeting.

States

- Discussion of a nationwide approach and identification of the level of support that was available was recommended. It was noted that cities are a key issue and needed a level of certainty in making decisions so they could move forward and continue being proactive in solving problems.
- It is necessary to prevent as many areas as possible from drifting into nonattainment.
- It is important for EPA to get its budget synchronized with State and local budgets.

- A warning was given to steer away from nonmandatory measures until budgetary concerns were resolved.

Industry

- It was pointed out that the issue paper was initially aimed at an AOI/AOV approach. The premise statement indicated the inclusion of both AOIs and AOVs.
- Because EPA staff were not in the field collecting data, 3 years would not be enough time to determine AOIs, AOVs, or areas of risk of violating the NAAQS.
- It was suggested that installing new monitors and getting new PM-fine data was extremely important and could be very helpful in implementing the new particulate standard.
- Defining mandatory programs was said to be the real problem. Mandatory measures under the current nonattainment designations are not working very well. If there was a potential AOV that also had a new AOI, then the source targets needed to be identified before forcing unnecessary reductions on the wrong sources. Which measures were mandatory would be key to support on this issue.
- Because the distinction between an area at risk and an AOI was still unclear, it would be helpful to clarify this issue.
- It was suggested that it would be helpful to examine other EPA programs that had similar goals and objectives (e.g., SARA and the insecticide program). In both of these programs, there were no mandated controls, but their flexibility was working effectively across the Nation.

Environmental/Public Health Groups

- Although this is an extremely important paper, one of the difficulties in the approach is the focus on areas that do not, or were planned not to, meet the standard. It is equally important to look at fringe areas that might be tending toward nonattainment. Mandatory requirements should be considered for these regions, not the proposed voluntary efforts, to prevent them from becoming nonattainment areas.
- Support was expressed for EPA providing the regulatory muscle. One State could make environmental decisions that would have adverse impacts on other States. There should be incentives, but EPA should be ultimately responsible.
- This concept is viewed as bringing maintenance to the front of the process as opposed to waiting until the end. Maintenance plans are not optional. The measures have to be implementable and enforceable. Substance and consistency is important. Thus, it is imprudent to leave the determination of areas at risk to the States. The risk being States adopting the area at risk plan to get an extension on their SIPs.
- It was not agreed that requiring mandatory maintenance plans for areas at risk was synonymous with designating them as nonattainment.

CHAPTER

4

Scientific Support for the Development of Implementation Strategies

4 SCIENTIFIC SUPPORT FOR THE DEVELOPMENT OF IMPLEMENTATION STRATEGIES

Following are discussions of two key scientific documents developed by the STSWG of the Subcommittee, which offer a preliminary framework for understanding the complex scientific and technical issues associated with the revision of the ozone and particulate matter NAAQS and the regional haze rule. The documents attempt to establish the current understanding of the present environmental condition, describe how that condition has evolved, identify tools to address the current state, and address regional transport of pollutants. The first document is a preliminary commentary developed by the STSWG as a result of inquiries from the BPAPWG and NRSWG on the technical basis for underlying integration of the regulatory programs for ozone, particulate matter, and regional haze. The second document is a summary of the conceptual model that is being developed by the STSWG. When completed, the conceptual model will be comprehensive and will replace the preliminary technical document.

4.1 TECHNICAL DISCUSSION ON THE INTEGRATION OF OZONE, FINE PARTICLES AND REGIONAL HAZE AIR QUALITY MANAGEMENT

BPAPWG and NRSWG of the Subcommittee have asked several questions regarding the technical basis and issues underlying the integration of regulatory programs for ozone, FP, and regional haze, and the specification of geographic scales required for air quality management. The STSWG of the Subcommittee is responding to these and other inquiries by developing a conceptual model framing our current scientific understanding of ozone, FP, and haze, the associated gaps and uncertainties, and responses to questions posed by work groups. This model provides preliminary commentary on the subjects of integration and geographic scales, in advance of more comprehensive discussion on these topics being developed in the STSWG's conceptual model.

Regarding the rationality of integration, the initial response of the STSWG is a qualified yes, given the regionality, spatial patterns of air quality indices, precursors, sources, atmospheric chemistry and meteorological processes which affect more than one pollutant, and control options. However, while reading this discussion, it is important to recognize and distinguish those attributes where there is little linkage. Moreover, many examples and inferences presented here tend to reflect what is known about eastern United States air quality issues (e.g., ozone), with possibly little relation to western United States phenomena. At the risk of generalizing (and simplifying) air quality descriptions for illustrative purposes, recognition that a generalized approach cannot operate effectively everywhere must be retained. The discussion focuses on the relationships between ozone and fine particles (FP), given the close linkage between FP levels and regional haze (the widespread impairment of visibility in every direction, mostly attributed to FP light scattering and absorption).

Some sections of this discussion are fairly technical and may only be understood by the more scientifically-inclined reader. However, a scientific background is not necessary to embrace this discussion's primary points:

- Understanding the emission sources and atmospheric processes which are responsible for elevated air pollutant levels requires an examination of urban and regional geographical scales.
- Ozone and FPs may exhibit similar spatial patterns, although the frequency (and importance) of co-occurring patterns is not well understood.
- Many of the emission precursors (and sources of precursors) to ozone, FP and regional haze are the same.
- Many of the atmospheric processes (chemistry and meteorology) affecting ozone, FP and regional haze are the same.
- Several critically important information gaps exist which create very difficult challenges for air quality management of these pollutants.

1. Interacting Spatial Scales of Emissions, Atmospheric Processes and Air Quality Indices

As explained in greater detail below, there are a variety of emissions that are precursors to elevated levels of ozone, FP and regional haze and of sources to these emissions. Historically, attempts at air quality management of these problems focused on local sources in the context of an anonymous background term quantifying imported air quality.

The evolution in our understanding of the spatial and temporal scales of the effects on ozone, FP and regional haze of the emissions from all sources has, however, spawned the recognition of the need for a larger geographical perspective. This larger geographical perspective, which considers individually sources over regional, as well as local, scales, is needed to support quantitative analysis of the relative contribution of the various source types and of their emission types (species) that contribute to "nonattainment" levels. The need for an altered perspective has been recognized by the establishment of the OTC, the OTAG, and the GCVTC.

Air quality management on the MSA or CMSA has worked well historically to control the local source effect on "nonattainment" problems. This is evidenced by the significant decrease in the number of ozone nonattainment areas over the past decade. As these controls have reduced emissions and as modeling tools have progressed, the role of the effect of sources beyond the MSA or CMSA, and the varying spatial scales of air quality indices and atmospheric processes, continue to be investigated and supported by a strong body of scientific evidence:

- 1991 National Academy of Science (NAS) Report, Rethinking Ozone in Urban and Regional Scales (NRC, 1991)
- 1993 NAS Report, Protecting Visibility in National Parks and Wilderness Areas (NRC, 1993)
- National Acid Precipitation Assessment Program (Trijonis et al., 1990)
- Southern Oxidants Study (Chameides and Cowling, 1995).

Recent analyses based on ambient air monitoring data (Rao, 1995) and Regional Acid Deposition Model air quality modeling (Appleton, 1995) suggest a very broad spatial air pollution region covering the greater part of the eastern United States. These studies indicate that, while sources still have their largest influence in the near field, the zones of potential influence of source regions (e.g., an urban city) can, under certain conditions, extend out hundreds of kilometers for ozone, FP, and regional haze. Moreover, these scales appear to be similar for ozone and FP. In other words, sources once thought to be remote with respect to "nonattainment" levels of ozone, FP and regional haze are seen as potential contributors to those levels. The analyses suggest that chemical and meteorological processes which influence pollutant generation, air mass movement, and pollutant removal (e.g., clouds and precipitation) are key factors in delimiting regional zones of influence. When the various "nonattainment" areas of the eastern United States are surrounded by even conservative estimates of the zones of influence of these other sources, what results is a modeling domain that may span the greater part of the eastern United States. Accordingly, efficient air quality management requires addressing these additional sources, atmospheric processes and related impacts as scales of interactions over multiple spatial and temporal frames.

In air quality management practice, the term "transport" has been used in a very broad context beyond the strict meteorological definition of the term. This broad context includes the (a) overall regionalization of both the scale of pollutant distributions and zone of influence of sources; (b) interaction (or effect of one area on another) among local, urban and regional source scales; and (c) meso and large-scale meteorological phenomena such as recirculation due to stagnant high pressure systems and land-sea interactions, "transport," which refers to large scale movement of air masses with fairly uniform motion, and other events perhaps as simple as widespread elevated temperatures. The prevalence and importance of biogenic volatile organic compound (VOC) emissions (e.g., emissions from trees) in the eastern United States is "region wide," as are many other area source emissions such as motor vehicles. All of these regional attributes are enhanced by the relatively flat and consistent terrain in the East and Midwest, contrasting the greater topographic and meteorological effects in the western United States.

Several physical and chemical events act together in determining pollutant concentrations over multiple space and time scales. Moving air masses carry all chemical species; including precursors[1] , fast reacting intermediates[2] , and chemical sinks[3] , as well as the specific pollutant species of interest (e.g., FP and ozone). Removal of pollutants occurs continuously through deposition. Also, the

[1] Precursors are compounds which contribute or lead to the formation of a secondary pollutant. For example, oxides of nitrogen (NO_x) and VOC are ozone precursors.

[2] Intermediates include the short-lived radicals (hydroxyl, hydro-, and organic-peroxy) which perform many of the important atmospheric oxidation reactions.

[3] Chemical sinks are termination compounds that essentially remove other compounds (e.g., nitric acid, hydrogen and organic peroxides). Some "sinks" can eventually break down and reform precursor compounds (e.g., peroxy acetyl nitrate).

impact of these pollutants is not simply additive. Ozone (or precursors) transported from one location can affect ozone levels "downwind" by indirectly accelerating atmospheric chemistry reactions through the production of chemical intermediates (e.g., hydroxyl radicals). Clouds play several roles in modifying concentrations by: (1) dissolving soluble gases (e.g., nitric acid, sulfur dioxide, hydrogen peroxide) and generating aerosols through aqueous phase reactions, (2) circulating and venting pollutants to high altitudes where strong winds promote large horizontal transport, and (3) removing pollutants through precipitation. Cloud related dissolution and transport also contribute to pollutant removal, depending on one's reference frame. Vertical air mass movements, or phenomena as basic as the daily mixed layer growth, affect air concentrations on various scales. Superimposed on these processes are a variety of emission sources with their own spatial, temporal and component (speciation) scales. Depending on location, pollutant and season, one particular spatial scale (e.g., urban) may or may not exert a dominating influence on air quality relative to another scale (e.g., regional). Even in cases where local and urban sources are responsible for most of the "local" air quality, an assessment of the contribution of distant sources to local air quality is required to reach such a conclusion. Thus, to avoid the exclusion of potentially important considerations in air quality analysis, "Regionality" or "Interacting Scales" are more descriptive terms than transport that encompass the broader meaning and effects of several complex interacting phenomena operating over extensive and multiple time and space scales.

The eastern United States differs markedly from the West, so any extension to the West based on eastern analyses or vice-versa is not appropriate (important differences exist between northern and southern regions as well). The monitoring data and modeling analyses of the GCVTC process highlight the challenge of identifying and quantifying specific sources, some at great distances in order to estimate their effects in western national parks and wilderness areas. The variations in topography, meteorology, and source distribution across regions require that area and case specific differences be accounted for in any air management approach. The effects of emission reduction strategies should be viewed through multiple scales, considering regional and urban scale consequences (i.e., health and welfare protection).

A few points summarizing "interacting scales" and "regionality" should be considered in air management practices:

1. Analyses of observations in the eastern United States reveal the existence of very broad multistate regions (interacting scales approaching linear extents of 1,000 km or more) of elevated pollutant levels and zones of source influence (Rao, 1996).

2. Air quality modeling for the East suggests that similar regions of influence exist for ozone and FP (Dennis, 1996), although only sparse monitoring data exist to support these similarities .

3. Modeling analyses for the Grand Canyon National Park and other Class 1 areas show that FP and precursors causing visibility impairment episodes are derived from both nearby (less than 50 km) and more distant (up to 1,000 km) regions of influence (NRC, 1993; GCVTC, 1996).

4. Area and case-specific analyses are required to delineate reasonable geographic areas for air quality planning purposes, because of the wide regional variations in meteorology, topography and source distribution.

5. The use of terms such as "transport" or "background" inadequately describes the complex set of emissions, chemistry, and meteorological processes and interacting scales which contribute to the regionalization of air pollution.

6. Because of broad spatial extents and gradations of interacting scales ranging from regional down to sub-grid cell scales, an air quality assessment focusing on a particular scale (e.g., urban) must consider effects due to interactions across various space and time scales. The concept of a single MSA/CMSA nonattainment area is inconsistent with the spatial and temporal scales for ozone, FP and haze problems.

2. Technical Basis and Considerations for Integrating Ozone, FP, and Regional Haze Implementation Programs.

The technical and scientific rationale underlying the integration of ozone, FP and regional haze air quality management practices is based on a mix of empirical observations, atmospheric processes, and practical administrative concerns. While this discussion focuses on common attributes across pollutant groups, it is important to recognize and distinguish those attributes where there is little linkage. Many examples and inferences presented

here tend to reflect what is known about eastern United States air quality issues (e.g., ozone), with possibly little relation to western United States phenomena. At the risk of generalizing air quality descriptions for illustrative purposes, recognition that a simplified approach cannot operate effectively everywhere must be retained. The discussion focuses on the relationships between ozone and FP[4], with the implicit assumption that FP levels and chemical composition directly relate to regional visibility impairment, given the strong relationship between the constituents of FP and the manmade portion of visibility impairment. Regional haze is a widespread impairment of visibility in every direction, mostly attributed to light scattering from FP.

EMPIRICAL EVIDENCE FOR INTEGRATION.

Ozone and PM-10 concentrations in the eastern United States can exhibit similar spatial patterns during summertime episodes (NESCAUM, 1995). Analysis of particulate data consistently indicates that FP constitutes the majority mass fraction of PM-10 in the summertime East (EPA, 1996)[4] . In combination, these observations qualitatively imply co-occurrence of elevated ozone and FP. However, quantification of the similarity and frequency (very common or quite unusual) of such events is severely restricted by a lack of an FP database in the East. While more data exists in certain western locations, the episodic relationships between ozone and particulate matter appears to be more complex than in the East. For example, a major component of the FP problem in Los Angeles (as well as the San Joaquin Valley, Salt Lake City, and Denver) is wintertime formation of ammonium nitrate, which is not stable at the high temperatures associated with elevated ozone. High levels of FP in western nonattainment areas can impair visibility when high ozone concentrations are not observed. Nevertheless, "smog" events in Los Angeles almost always are accompanied by impaired visibility, and visibility is directly associated with FP levels. Although some limited empirical evidence is highly suggestive of area specific co-occurring events, other considerations (as described below) provide a stronger rationale for the appropriate level of integration across ozone, FP and regional haze control programs.

EMISSIONS AND ATMOSPHERIC PROCESS LINKAGES ACROSS OZONE, FP AND REGIONAL HAZE

Several connections exist among the three pollutant categories. The linkages are based on the existence of common emission precursors, source categories, and atmospheric chemistry and meteorological processes that affect more than one pollutant. For example, emissions of NO_x potentially can lead to both ozone and FP formation. A combustion source often emits both sulfur dioxide (an FP precursor) and NO_x (an ozone precursor). The sequence of atmospheric chemistry reactions underlying ozone formation is in part responsible for FP formation. Similar meteorological processes affect the movement, mixing and removal of ozone, FP, and precursors. Some of these connections are complicated and explained more completely in forthcoming FACA science documents. The following are very brief, more technical, descriptions of the connections across pollutant categories, provided for those interested in more detail.

1. **Common "Direct" Precursor Emissions.** Emissions of NO_x, VOC, and carbon monoxide (CO) are considered precursors for ozone formation. NO_x, VOC and sulfur (SO_x, mostly as sulfur dioxide) emissions also can lead to FP formation through "secondary" atmospheric chemistry reactions. Both ozone and a substantial fraction of FP, which can vary greatly with season and location, are the result of secondary formation processes. The major components of secondary FP also are highly variant. They include sulfates, carbon (elemental and organic) and nitrates. The fraction of FP due to secondary processes is highly variant in space and time. During certain conditions (e.g., available ammonia, negligible sulfate, low temperatures), NO_x emissions can lead to fine particulate ammonium nitrate formation. Several directly emitted organic compounds contribute to FP organic aerosols. These organic compounds may contribute as "primary" organic aerosols, that is, they almost immediately condense to the aerosol phase during the emissions process or shortly downstream. Or, certain VOC,[5] (e.g., toluene) which exist as gases under most conditions, can undergo atmospheric reactions and transform into condensable "secondary" organic aerosols. Thus, a VOC like toluene can contribute to either ozone or FP formation as a precursor emission.

[4] However, most of the chemical component analysis are based on samples derived from rural networks like IMPROVE.

[5] Most low molecular weight VOC species (which are most prevalent in ambient air) are not expected to contribute significantly to secondary aerosol formation. Certain aromatics and higher molecular weight alkanes and alkenes (>6 carbons) are believed to be the major contributors to secondary organic aerosol formation.

2. **Common Source Categories.** Based on the multiple roles of precursors, a particular source (natural or anthropogenic) emitting one precursor (e.g., NO_x or VOC) can affect ozone and FP, and a single source emitting multiple precursors (e.g., combustion process releasing NO_x, VOC, CO, and SO_x) can affect one pollutant category. In this case, integration is not dependent on atmospheric chemistry linkages. This commonality among sources should lead to a more consistent approach in estimating emissions of multiple precursors within a specific source category. For instance, a consistent approach needs to be applied for estimating and projecting both NO_x and SO_x emissions from a combustion source.

3. **Interaction of Atmospheric Chemistry Reaction Cycles and "Indirect" Precursors.** Much of the general atmospheric chemistry involved in ozone formation can affect FP formation, as alluded to above, in certain instances. For example, ozone is the major initiator of hydroxyl radicals, a chemical intermediate that converts sulfur dioxide and nitrogen dioxide to more oxidized sulfate[6] (e.g., sulfuric acid) and nitrate (nitric acid) forms. Both sulfates and nitrates can contribute to FP formation. Clearly, a linkage between ozone and FP exists through the role of ozone in generating hydroxyl radicals. Note that this linkage between ozone and FP is at the process level and does not require coexisting "high" ozone and FP levels. Many other important linkages involving oxidizing chemical species (radicals and peroxides) exist within the NO_x, VOC, SO_x, ozone chemistry system. A correct characterization of the basic ozone chemistry and the associated linkages among the precursors is needed to predict the affect of changing emissions on air quality indices. Consequently, the predictive air quality models used to assess ozone and FP impacts should include a basic core set of atmospheric chemistry reactions (e.g., a gas phase ozone chemistry mechanism).

Because of their common atmospheric chemistry linkages, many precursors associated with one pollutant might be considered as an "indirect" precursor for another pollutant as well. Virtually all precursor emissions (NO_x, SO_x, VOC, CO) undergo initial attack by hydroxyl radicals and participate in the general cycling of various chemical intermediate species. Therefore, precursors that typically may not be associated with a particular secondary pollutant, such as the effect of VOC on either sulfate or nitrate, indirectly participate through their roles in atmospheric chemistry. In this general context, the term "precursor" does not imply a positive effect on an associated secondary species as the emission precursor may only share in certain atmospheric chemistry processes without leading to increases in a secondary pollutant. Multiple possibilities exist. For example, NO_x, which affects the cycling of hydroxyls radicals that convert SO_x to sulfate, could act indirectly as a sulfate particle precursor. The majority of VOC species that do not transform into organic aerosols could nevertheless be FP precursors through their general role (i.e., cycling of radicals) in atmospheric chemistry. Nitrogen oxides could serve as indirect precursors for aerosol sulfate formation. This "universal" pool of precursors does not imply that reductions of any specific precursor lead to reductions of every pollutant. Just as reductions in NO_x potentially can raise local ozone levels, a reduction of an FP precursor possibly can increase ozone or increase a different FP component (e.g., SO_x reductions leading to increased ammonium nitrate, or NO_x reductions increasing sulfate formation). These examples are some of several conceivable indirect precursor relationships. Many other relationships with similarly unknown degrees of effect exist. Thus, integrated implementation is far from a straightforward exercise. Complex air quality simulation models, in combination with simpler models and receptor/observational methods that include approximations of these process linkages, will need to be exercised to account for the multiple nonlinearities and positive and negative feedbacks. This complexity demands high-quality emission inventories, technically credible models, and spatially and temporally representative monitoring data for use in predicting pollutant concentrations and control strategies.

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[6] Although significant gas phase transformation of sulfur dioxide occurs, aqueous phase oxidation is believed to be responsible for the majority of annual sulfate conversion in the eastern U.S.

Integrating Control Strategy Development through an Air Quality Modeling Approach

What does integration mean from an implementation perspective? Given the complex mechanisms for and linkages between ozone and FP formation, the formulation of control strategies should acknowledge the need to optimize control options. Control of one precursor might affect both ozone and FP or might be detrimental for one or both. For example, one might start with ozone management strategies being developed as part of ongoing urban and regional studies, and attempt to quantify the future impact on secondary aerosols. On the other hand, because NO_x controls might increase ozone levels in certain localized urban areas or because SO_2 reductions might lead increased concentrations, efficient air quality management would attempt to optimize the system in relation to VOC, NO_x, and SO_x emission reductions.

The real benefit of integration is the prospect of a more systematic, efficient, and comprehensive treatment of emission inventories, episode selection, and atmospheric physics and chemistry that might empower the air quality manager to characterize source to receptor effects in an orderly way. The addition of data on the costs and effectiveness of control options would enable the air quality manager to identify the cost-effective means for attaining a variety of air quality goals.

To this end, emission bases underlying most current ozone modeling efforts include most of the sources for aerosol formation, but not necessarily the aerosol specific emissions such as organic aerosols from motor vehicles. Notable exceptions include many of the fugitive primary particle sources and most sources of ammonia emissions. The result of this exercise would produce the residual aerosol and regional haze related air quality benefits from an ozone precursor control perspective. (Additional analysis directed at the specific needs for meeting FP and visibility concerns would follow this ozone oriented approach. Ideally, an objective and likely iterative ability to assess the benefits and tradeoffs associated with managing all three pollutant categories would evolve.) Although this example does not represent "full" integration given the unidirectional information flow (ozone to particles), it does acknowledge similarities among programs and avoids mistakes and inefficiencies incurred from independent analyses. Aside from any direct regulatory policy, the linkages across pollutants and emissions are reasons by themselves for planning for more efficient development and use of emissions, air quality models, and monitoring networks which address sometimes confounding multiple pollutants and their related health/welfare effects and control options.

Distinctions among ozone, FP and regional haze

Coincident ozone and FP episodes may be expected to occur given similarities in the meteorological and atmospheric chemistry processes underlying ozone and FP formation, maintenance, and destruction. As discussed above, the linkages associated with emission source categories and physical and chemical processes exist more frequently than the occurrence of co-episodic events. For example, several basic atmospheric chemistry reactions involved in ozone and FP formation occur whether or not high ozone and FP levels are generated in the atmosphere. Nevertheless, several distinctions among the pollutants persist. These differences include the contribution of primary particles to total FP, and especially PM-10, and wintertime (actually non-summertime) FP events. Some primary particles are generated by strong wind conditions (e.g., soil, geologic material) and other mechanical processes (e.g., roadway fugitives). The fraction of primary PM peaks in summer in most of the western third of the country where there is little precipitation for 6 to 8 months per year, leading to dry, windy conditions for the generation and movement of geologic materials. As discussed earlier, ammonium nitrate, a significant FP component in the West, is stable at relatively low temperatures and therefore does not form significant levels during the summer. Meteorological effects that influence the creation, maintenance, or removal of high levels of ozone and FP may be significantly different among pollutants, regions of the country, and times of the year. Other specific emissions-driven events such as forest burning and wintertime woodsmoke (a major wintertime source of urban PM) bear virtually no relation to ozone. Many of these PM episodes can be dominated by either primary or secondary FP components, or by primary anthropogenic coarse PM emissions. Research exploring the frequency and characterization of co-episodic and uni-episodic events would yield further insight into underlying causes of events and provide direction for integrated implementation opportunities.

Visibility protection presents several additional considerations beyond the scope of topics covered under ozone and FP. First, FP concentrations that are far below a NAAQS can adversely affect visibility in a significant manner, particularly in more pristine environments such as Class I areas in the rural West. For this reason, visibility management needs to consider the protection of "clean" days separately from assessments focusing on highly impaired days. The meteorology and emissions characteristics during "clean" days differs from those common during high pollution episodes. This concern raises complex technical issues related to the ability of models and monitoring instruments, which often have been designed or tested for meeting high concentration requirements, to characterize low-level conditions. Second, relative humidity plays a significant role in enhancing visibility impairment, particularly in the East. In humid conditions, particularly above 70% RH, sulfates, nitrates, and certain organics readily take on water and expand to sizes comparable to the wavelength of light. Particles in this size range (i.e., 0.1 to 1.0 micron in diameter) are efficient scatterers of light. Third, unlike the NAAQS approach of setting a national standard, the Regional Haze program under section 169A of the CAA has as its goal "the prevention of future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas in which impairment results from manmade air pollution." States are required to make "reasonable progress" toward this goal. The notion of background versus manmade air pollution raises several technical and policy challenges, particularly in the protection of visibility in "cleaner" environments where small increases of FP can lead to significant visibility changes.

Generally, PM-10 is not considered in the integration discussions of ozone, FP, and regional haze. This is because the coarse fraction (i.e., greater than 2.5 microns) typically is derived from primary emissions such as fugitives and geologic material with little association to ozone from a process, or episodic, perspective. In addition, visibility impairment leading to regional haze is overwhelmingly associated with the FP fraction of PM-10.

3. Major Technical Issues

The principal technical issues associated with integrated air quality management involve the adequacy of databases and models, including specific process formulations, on which to base credible assessments. While it is impossible to ascribe consensus opinion regarding clear acceptable limits on the available information, gradations of acceptability or comfort level can be associated with various pollutants. Generally, the tools (ambient data, models, and emissions) underlying ozone analyses are far more mature than those for FP. Major efforts in chemical mechanism development, ambient monitoring methods, and establishment of national and special study efforts for monitoring, emissions, and modeling have resulted in a wealth of information and familiarity with these tools. This relative abundance of knowledge for ozone should not be construed as a science lacking uncertainty, as significant technical issues remain (e.g., the current NARSTO effort), and even more are yet to be defined. A sampling of these issues includes the representativeness of emission inventories, particularly biogenic emissions; uncertainties in the modeling system (chemical characterizations of aromatics and biogenics, treatment of vertical mixing processes); difficulties in monitoring techniques (carbonyls, NO_x-NO_2, polar VOC); and lack of measurements (total reactive nitrogen, NO_x upper air data). These gaps are significant and compromise our ability to perform highly credible ozone analyses and to ascribe confidence levels in our results.

Consideration of FP and regional haze presents several additional issues, a result of: (a) a very complex multiphase, multicomponent, multiseason aerosol system; (b) the complex covariance of these data; and (c) the present PM-10 form of the NAAQS, which has resulted in few regulatory pressures to drive an improved characterization. Significant concerns include major positive and negative measurement artifacts related to gas-particle phase changes; a simple lack of ambient data, especially urban FP measurements; poor quality assurance/control of ambient sampler data; emissions data with poor general spatial applicability; very limited availability and nearly nonexistent application and evaluation of regionally-accurate air quality models; and highly empirical treatment of organic aerosols within the available models. These gaps are interconnected in the sense that quality model evaluation and improvement rely on available quality measurements. The issue is further complicated by complexities, lack of precedence, and resource constraints in designing a data collection program to evaluate a gridded model's ability to characterize FP covering wide scales of time (annual, seasonal, daily) and spatial resolution

(regional, urban, local). On the positive side, a strong history of using ambient data for PM source apportionment probably is more adaptable to FP analyses than ozone, given that the measurable components of secondary FP (e.g., sulfate) have some direct linkage to precursors, whereas an ozone measurement by itself provides no inference regarding contributing precursors.

Several interesting atmospheric chemistry questions remain to be answered. Two examples include nitrate FP formation and organic aerosols. Where and when do ammonia and sulfate become limiting factors in ammonium nitrate formation? The relatively abundant nitrate FP at sites in the urban West contrasts with abundant regional sulfate FP in the East. Substantive decreases in sulfur dioxide emissions could lead to increased nitrate FP formation in the East, if sufficient ammonia (a highly uncertain emissions category) is available. What impacts will NO_x emission reductions have on FP? Many possibilities exist. If nitrate is significant, one would expect a reduction in FP. However, if sufficient sulfur remains available, NO_x reductions could increase or decrease sulfate formation (and therefore FP) depending on a complex cycling of oxidizing species. Reductions in NO_x emissions could actually lead to sulfate increases by reducing competition between SO_x and NO_x for gas phase oxidizing radicals, or by increasing peroxide levels leading to greater aqueous phase sulfate production. NO_x reductions could slow down sulfate formation through overall reductions in ozone and other oxidants. This relationship is very complex and we must exercise caution in associating FP benefits with NO_x reductions in the eastern United States.

What are the relative contributions of primary and secondary organic aerosols across varying spatial and time scales? The potential for large secondary organic aerosol production from biogenic sources (e.g., pinene emissions) exists throughout the East. How significant are biogenic-derived aerosols compared to local/urban contributions from primary anthropogenic organic aerosols? How different are these relative contributions across seasons, given that secondary organic aerosol formation increases during the summer? Many uncertainties underlie the integration of primary and secondary particles, aside from integrating particles and ozone. For instance, what are the interactive roles that elemental carbon emissions, other products of incomplete combustion, and geologic materials exert in both primary contribution to PM and as formation nuclei for highly complex secondary PM? On balance, the ability to perform ozone air quality assessments far exceeds that of FP. However, the infrastructure for conducting FP analyses appears to be in place as a result of progress gained from ozone and acid deposition modeling and existing monitoring programs for ozone and visibility (e.g., the IMPROVE program). Finally, although uncertainties remain in transforming particles into visibility impairment within short averaging times, the IMPROVE methodologies for particle and visibility measurements and the relationships between particles and visibility are widely accepted.

Specific issues across PM and ozone include the ability to formulate fully integrated models accounting for multidirectional effects on several pollutants. For example, the formation of secondary organic aerosols is a loss mechanism for VOC, that presently is not accounted for in ozone models. Many other integration topics exist, and collectively there is uncertainty regarding the overall importance of one pollutant imparting an effect on another.

Two basic issues span the gap between science and policy: (a) the manner in which tools are applied, and (b) accommodating scientific findings and uncertainties in air quality management decision making. The first topic reflects the concerns of how one applies deterministic[7] (i.e., models that establish exact cause and effect relationships) and uncertain air quality models to probabilistic forms of the standard in ascribing rigid control requirements. The selection of "severe" meteorological episodes versus "prototypical" episodes for ozone and PM-10 modeling has been controversial and remains a difficult model application issue. Equally complicated is the emerging need to model seasonal and annual cases. The debate on the credibility of models is fueled by the manner in which they are applied as much as the valid concerns about their formulations and supporting databases. The second topic acknowledges the need for conducting policy-relevant as opposed to policy-driven research, and recognizing the different time scales operating in the research arena and the policy arena where the timeframe demands move much faster than research results. Extremely useful information emerges continuously from research programs, yet a separate, sometimes very significant, time lag occurs before information is considered in the policy

[7] Note, the use of a deterministic model for naturally occurring stochastic processes is a separate technical issue.

setting process. Hence, opportunities must be available to incorporate the latest science into policy.

4. Integrating Models and Observations for Sound Air Quality Management Practice

Much emphasis has been placed on the complementary and integrated use of models and ambient data in air quality management practice (Rao et al., 1996). Several facets are associated with this topic, ranging from the need to evaluate models with sound databases to conducting fully integrated analysis optimized through the separate, strong attributes of data and models. As the technical debate on the use of models and data continues to mature, perceptions such as "model" or "data" are replaced by the intelligent and integrated use of "models and data." Clearly, the demand for measurements as ground-truthing and feedback information loops initiated by the National Academy of Sciences Ozone Report (NRC, 1991) has been adopted by large segments of the air quality community and reflected in major efforts such as the Photochemical Assessments Measurement Stations and NARSTO.

An appreciation of the strengths of models and observations can assist the understanding of current analyses and lead to improved techniques. A model's strength is its ability to a) integrate an enormous spectrum of data (e.g., emissions and meteorological variables) and process understandings (e.g., chemical mechanisms and flow phenomena), and b) serve as an exceptional space and time mapping tool. This latter attribute reflects the model's unique ability to predict into the future and to supplement or fill in present gaps in observed data. The process formulations embedded in models enable the addressing of so many "what if" questions related to emissions control. However, models are engineering tools that invoke substantial approximations of scientific understandings of natural phenomena. Both their formulations and application methods reflect engineering principles more than fundamental science. Observations provide a basis for testing and diagnosing models, but in some instances, can capture process type relationships by themselves (e.g., the emergence of observational based models for defining NO_x and VOC control preferences). However, the observations are very sparse. Hence, applied in isolation, the use of models or observations is not acceptable. Space and time constraints often bias the interpretation of observational analyses (e.g., analysis results reflect time and space of monitors which may or may not reflect the scales of concern). Models suffer from a very large spectrum of weaknesses because they attempt to portray so many phenomena. Most critical though is the risk of using a potentially biased model that is assumed bias free. The integrated use of observations and models mitigates the individual weaknesses of both approaches and produces a powerful air quality management tool, especially when applied in an iterative, even retrospective, manner to continually assess model results and related implementation strategies.

5. Summary

Air quality assessments for FP, ozone, and regional haze must consider emissions, meteorological processes, atmospheric chemistry, and deposition, all of which interact over multiple spatial and temporal scales. Examining in detail the sources only from the MSA/CMSA surrounding the monitor reporting "nonattainment" levels of air quality may need to be augmented (on a space and time basis) to responsibly allocate those levels to the sources causing them. When examining the issues on expanded time and space scales, air quality management should also take into account the similarities of these air quality indices such as their common precursor emissions (e.g., NO_x, VOC), common emissions sources (e.g., mobile sources, stationary and area source combustion emissions, biogenics), and shared chemical and meteorological processes (e.g., transport, transformation, precipitation, removal).

The principal technical issues associated with integrated air quality management involve the adequacy of databases and models, including specific process formulations, on which to base credible assessments. Many of these gaps are interconnected, since model evaluations rely on available high quality measurements of emissions, atmospheric processes, such as wind fields, and ambient concentrations. On balance, the ability to perform ozone air quality assessments far exceeds that of FP, due mostly to the maturity of ozone research as well as lack of urban FP measurements and important emissions components. However, many of the components of the infrastructure for conducting FP analyses appear to be in place as a result of progress gained from ozone, acid deposition, and visibility modeling and monitoring programs.

The integrated application of models and observed data is strongly encouraged. In combination, both approaches help to mitigate the weakness of an isolated approach, producing a powerful tool for air quality management.

REFERENCES:

"A Cross-Media Approach to Saving the Chesapeake Bay," Environmental Science Technology, (Appleton, E.L., 1995, 29, 550A-555A).

Dennis, R.L., Personal Communication, 1996.

NESCAUM, "Preview of 1994 Ozone Precursor Concentrations in the Northeastern U.S.," 1995 Northeast States for Coordinated Air Use Management, Boston, MA.

EPA, 1996, "PM Criteria Document."

Rao, 1996, Personal Communication, 1996

"Dealing with the Ozone Nonattainment Problem in the Eastern United States" (Rao et al., 1996).

NRC, "Rethinking the Ozone Problem in Urban and Regional Air Pollution," National Academy Press, 1991.

NRC, "Protecting Visibility in National Parks and Wilderness Areas," National Academy Press, 1993.

"Determining Temporal and Spatial Variations in Ozone Air Quality," J. Air & Waste Management Association, 1995, 45, 57-61 (Rao, S.T. E. Zalewsky and I.G. Zurbenko).

"Report 24 - Visibility: Existing and Historical Conditions - Causes and Effects," from Acidic Deposition: State of Science and Technology," Volume III, National Acid Precipitation Assessment Program, 1990 (Trijonis, J. et al.).

4.2 CONCEPTUAL MODEL DOCUMENT OVERVIEW

Emerging air quality management control policies for ozone, particulate matter and regional haze rely on technical information and scientific knowledge gleaned from many diverse sources. An increasing amount of interaction among a diverse community of air quality professionals accompanies any effort toward integrating programs across pollutants and over wide geographic regions. Compounding the differences among programs and specialties is the overriding motivation to understand similarities and overlaps to optimize technical resources and identify windows of opportunity for successful integrated air quality management. The objective of the **Conceptual Model** document is to establish a common reference frame for the technical information and methodologies underpinning the implementation programs, which are designed to improve subsequent dialogues addressing program integration and accompanying science-policy interface issues.

The Conceptual Model document was developed by the STSWG to address the state-of-the-science pertaining to integrated pollutant implementation and was organized by the following topics:

- existing environmental state (through summaries of measured ambient air quality data)
- physical/chemical processes which characterize air quality, and
- scope of monitoring, modeling/analysis and emission inventory programs to characterize and predict air quality phenomena.

The information presented is reference oriented. It covers a very broad scope of topics, but provides direction and insight to the major national/regional programs and special field studies/programs that collectively form the technical foundation for ozone, particulate matter and Regional Haze programs.

The initial draft version of the **Conceptual Model** will not adequately address some of the technical issues of concern because of inherent uncertainties in the current state-of-science. To this end, much of the focus of the STSWG will be directed toward a full exploration of what is known and what is not known over the next months, with an objective assessment of uncertainty attendant in the data and tools used for air quality analyses. Accordingly, suggestions regarding additional information sources, topics and issues requiring attention and technical corrections are strongly encouraged and will be considered in future versions of this and other documents submitted to the docket by the STSWG. Feedback in these areas is critical for providing a meaningful and useful reference document and crediting those individuals/groups responsible for the technical and scientific work supporting national and regional air quality programs.

THE NEED FOR A CONCEPTUAL MODEL

To develop an adequate understanding of ozone, PM formation, and regional haze in different areas of the country, it would be very useful to develop conceptual models of the processes that lead to the formation of each. Further, it would useful to develop a conceptual model of how monitoring, data analysis, emissions, modeling, and assessment can be used in the subsequent implementation programs. In setting out the initial model, there will be many more questions than available information to answer them.

Consequently, the conceptual models will provide the feedback necessary to identify additional information needs. While these models will be useful in setting research agendas, they also identify the "act as if we know how it works" assumptions that will be necessary in formulating and applying any practical computational models within a timeframe shorter than that needed to advance fundamental knowledge. The entire process of creating conceptual models is iterative in nature, but provides an overall framework for increasing the scientific and technical information needed to provide a basis for sound air quality planning. In addition, conceptual models can codify the processes independent of any air quality modeling and, thus, provide an independent mechanism to evaluate the performance of computational air quality model(s).

The Formulation of a Conceptual Model

In formulating a conceptual model, we accept the following: (1) that there are in the environment pollutants which are harmful to human health and welfare, (2) that there are acceptably safe levels of these pollutants (codified as NAAQS), and (3) that human and civilized activities do influence or even create the harmful levels. The social goal desired is to modify human activities so as to reach safe levels of these pollutants. We accept that some form of regulation will be necessary to achieve this modification of human activities. In the specific case of ozone, PM-fine, and regional haze, we accept that these are pollutants that have effects on humans and the environment. We accept that ambient levels of these need to be maintained below specific air quality standards and that the magnitude and form of these standards are outside the scope of this work group's activities.

While there are specific emissions, transport, and transformation processes that are unique to ozone, PM, and regional haze, we accept that there are also common processes that link the three. That is, ozone, PM-fine, and regional haze have a sufficiently common origin that it makes sense to seek an integrated set of modified human activities that will achieve reduction and maintenance of ambient concentrations of these pollutants.

In the following chapters of the **Conceptual Model** document, detailed information is contained on the following:

Chapter 2: The Current Environmental State

Chapter 3: Processes: How the State is Created, Sustained and Maintained

Chapter 4: Current Tools to Address and Implement the Current State of Knowledge

Chapter 5: Time-Distance Considerations Relevant to Transport and Regions of Influence

It is through the compilation of these chapters that we attempt to form a conceptual framework for our understanding of the pertinent scientific issues surrounding the revision of the ozone and particulate matter NAAQS and the regional haze/visibility rule.

1. Precursors are compounds that contribute or lead to the formation of a secondary pollutant. For example, NO_x and VOC are ozone precursors.

2. Intermediates include the short-lived radicals (hydroxyl, hydro-, and organic-peroxy) that perform many of the important atmospheric oxidation reactions.

3. Chemical sinks are termination compounds that essentially remove other compounds (e.g., nitric acid, hydrogen, organic peroxides). Some sinks can eventually break down and reform precursor compounds (e.g., peroxy acetyl nitrate).

4. However, most of the chemical component analyses are based on samples derived from rural networks like IMPROVE.

5. Most low molecular weight VOC species (which are most prevalent in ambient air) are not expected to contribute significantly to secondary aerosol formation. Certain aromatics, and higher molecular weight alkanes and alkenes (> 6 carbons) are believed to be the major contributors to secondary organic aerosol formation.

6. Although significant gas phase transformation of sulfur dioxide occurs, aqueous phase oxidation is believed to be responsible for the majority of annual sulfate conversion in the eastern United States.

7. The use of a deterministic model to naturally occurring stochastic processes is a separate technical issue.

CHAPTER

5

Strategy for Communication of Findings and Recommendations

5 STRATEGY FOR COMMUNICATION OF FINDINGS AND RECOMMENDATIONS

The following is a plan for communicating the findings and recommendations of the Subcommittee to interested parties:

I. Overarching Themes

Regionality — The work group recommends that communications need to stress that the nature of the pollution problem in the United States has changed. In many cases, it is a regional problem, and we need to address ways to deal with the regionality.

Long-Term Strategy Needed — The work group also recommends that a long-term communication strategy be put into place to ensure that the communication channels that are opened up as a result of this process continue to be used to educate all interested parties, including the public, about air pollution issues.

II. Recommended Outreach Activities

The work group recommends that EPA undertake the following outreach activities in the upcoming year.

A. Materials for Distribution with 11/29/96 Proposal Package

RESPONSIBILITY: EPA

TIMING: The work group recommends that as much information be provided in advance of the proposal as possible.

- Ozone and PM NAAQS Proposals and Interim Implementation Policy (IIP) Proposal: Proposed NAAQS and IIP and related fact sheets should be made available on the Clean Air Act Bulletin Board on TTN immediately after signature.
- Information Kits: EPA should provide informational materials to the press, affected industry contacts, key environmental/public interest group officials, and State and local officials.

AUDIENCE: EPA Regional Offices, State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) public information officers (for distribution to States), and other major stakeholders

- Plain English Fact Sheets
- Background: Health Effects of Ozone
- Background: Health Effects of Particulate Matter
- How the NAAQS Process Works
- How the FACA Process Works
- EPA's Proposed Primary and Secondary NAAQS for Ozone (New)
- EPA's Proposed Primary and Secondary NAAQS for PM (New)
- Implementation Fact Sheet.

AUDIENCE: EPA Regional Offices, STAPPA/ALAPCO public information officers (for distribution to States and localities), and other major stakeholders

- Questions and Answers: Qs and As need to be developed for a wide range of issues related to the ozone and PM proposals.

AUDIENCE: EPA Regional Offices, STAPPA/ALAPCO public information officers (for distribution to States and localities), and other major stakeholders

- Press Releases — The EPA Press Office should issue a press release in conjunction with the proposals.
- Communications/Press Information Kit — The EPA Press Office should prepare a packet of outreach materials, including the press release, fact sheets, and other materials for the press and other interested parties.

B. Briefings to Constituents/Stakeholders

RESPONSIBILITY: EPA

- A series of briefings should be held with stakeholders to provide information related to the NAAQS proposals (may begin in December and continue into early 1997).
- December 7, 1996: Council of State Governments Meeting.
- December 12, 1996: National Conference of State Legislators meeting.
- January 7 & 9, 1997: EPA will speak at workshops sponsored by the Washington Department of Ecology covering air quality trends, NAAQS proposals, and topics of local interest.

C. Public Hearings

RESPONSIBILITY: EPA

- EPA should hold a set of public hearings on the NAAQS proposals with probable participation by Assistant Administrator Mary Nichols.

D. Satellite Broadcasts

RESPONSIBILITY: EPA, with work group input to content, audience, advertisement

- December 9, 1996 — Satellite broadcast on Proposals on the Review of the Ozone and Particulate Matter NAAQS

PURPOSE: To provide background information on the ozone and PM health and environmental or welfare effects considered in the review, the implementation strategy being developed, an overview of the proposals on ozone and PM NAAQS revisions, and a description of the IIP.

AUDIENCE: (1) State and local air quality personnel who implement the programs of the CAA and who would be impacted by revisions to the ozone and PM standards, (2) industries that could be impacted by revisions to the ozone and PM standards, and (3) environmental groups and members of the public concerned about EPA's decision on NAAQS revisions. About 600 downlink sites planned.

FORMAT: Panel discussions from EPA staff followed by Q&A sessions.

- Early 1997 — Additional satellite broadcasts should be planned for early 1997 to provide information to stakeholders related to the NAAQS proposals and implementation strategy development process.

E. Phase I FACA Products — Issue Papers

RESPONSIBILITY: Subcommittee, work groups, and EPA

- Early 1997 — FACA Phase I issue papers and related plain English fact sheets: the Phase I issue papers from FACA and a plain English fact sheet about each paper should be made available through the TTN and the web site.

F. Air Quality Information Packet — Early 1997

RESPONSIBILITY: COWG

- An information packet is being developed for the COWG that will provide information on health effects, the NAAQS review process, the FACA process (implementation issues) and other material related to the standard reviews and implementation.

AUDIENCE: Design of the packet (tri-fold folder with pockets for changeable inserts) allows for customization to fit all audiences (State/locals, industry, environmental groups, interested public).

IV. Long-Term Communications Strategy Recommendations

The work group feels strongly that a long-term communication strategy is integral to overall success of the program. A successful communication strategy will require commitment of resources.

The key to the long-term strategy is reaching the public and gaining their support for the air program. The work group recognizes that the best way to reach the public is through the media.

Specific Recommendations:

A. Specialized Briefings

RESPONSIBILITY: EPA

- Science/Health Writers' Conference
- Society of Environmental Journalists
- Environmental Health Center of the National Safety Council
- Local governments (community boards)

B. Materials for State/Local Agencies

RESPONSIBILITY: EPA

- Audio/Visual Materials (can be customized for local message)
- Real-time maps (ozone, PM, visibility)

C. Other Mechanisms

RESPONSIBILITY: EPA

- Outreach/educational materials for children
- Ad Council message

1. Electronic Communication Mechanisms

RESPONSIBILITY: EPA, with work group review and input

- Ozone, PM, Regional Haze FACA Bulletin Board became available on TTN — April 1996

PURPOSE: To facilitate information sharing within and among work groups as issue papers were being developed and to make information about the process available in a public forum.

USAGE: Averaging about 485 downloads per week. Busiest week: week of September 23 (Norfolk meeting) with 1,001 downloads.

- Ozone, Particulate Matter and Regional Haze web site available — July 1996

PURPOSE: To provide information related to the NAAQS reviews and the integrated implementation process to anyone interested in obtaining either background/general information or detailed technical information.

2. Plain English Fact Sheets - July 1996

RESPONSIBILITY: EPA

PURPOSE: To provide basic background information that others may tailor to their own needs.

1. Implementation of New EPA Air Quality Standards and the FACA Process
2. EPA's NAAQS: The Standard Review/ Reevaluation Process
3. Advanced Notice of Proposed Rulemaking: NAAQS for Ozone and Particulate Matter
4. Health and Environmental Effects of Ground-Level Ozone
5. Health and Environmental Effects of Particulate Matter
6. EPA Staff Paper on the Ozone Standard
7. EPA Staff Paper on the Particulate Matter Standard

3. Maps - July 1996

- Maps showing areas with ozone data (93-95) not meeting the current ozone standard and each of the options being considered were made available on the web site.
- PM-10 maps showing 24-hr. PM-10 concentrations and annual mean PM-10 concentrations based on 1993 data were made available on the web site.
- Visibility maps and a map showing the Class I areas were made available on the web site.

4. Public Meetings

RESPONSIBILITY: EPA

July 25, 1996 - Philadelphia, PA
August 5, 1996 - St. Louis, MO

PURPOSE: EPA held two public meetings with Assistant Administrator Mary Nichols to receive input from stakeholders on possible revisions to the ozone and particulate matter NAAQS and implementation issues pertaining to potential revisions.

5. EPA Briefings with Regional Offices

RESPONSIBILITY: EPA

PURPOSE: To provide Regions with information they need to go out and work with States, industry groups, the press, and others.

- July/August 1996 - EPA/OAR staff held a series of informational briefings in each Regional Office for Regional Air, Congressional, and Communications staff on the possible revisions to the NAAQS and on implementation issues. Regions asked to go out and work with States, industry groups, press, etc.
- Briefing for Regional Administrators
- EPA briefing Regional Office Division Directors on the possible revisions to the NAAQS and the FACA process to develop and implementation process.

6. Briefings to Specialized Interest Groups

RESPONSIBILITY: EPA (unless otherwise noted)

PURPOSE: To provide background information and information about possible revisions to the NAAQS.

- EPA spoke to Annual Conference of National Association of County Officials in Houston - July 12-13, 1996
- EPA spoke at STAPPA/ALAPCO Communicating Air Quality Conference - September 1996
- EPA staff and stakeholders spoke to Society of Environmental Journalists meeting about FACA process — October 19, 1996
- EPA spoke at STAPPA/ALAPCO Fall Membership Meeting: panel on FACA process — October 1996
- EPA spoke to Washington representatives of the National Governors' Association (NGA)
- EPA spoke to U.S. Conference of Mayors
- EPA spoke to National Association of County Officials
- EPA spoke to National League of Cities
- EPA spoke to NGA meeting of Governors' Staff on Environmental Issues — June 1996
- EPA held Briefings for Congressional staff in House and Senate
- EPA spoke to National State and County Legislators' Association
- EPA spoke to North Carolina County Health Officials — September 1996
- EPA met with many Industry Groups (American Trucking Associations, National Federation of Independent Businesses, Chemical Specialty Manufacturing Association)

7. Satellite Broadcasts over EPA's Distance Learning Network

RESPONSIBILITY: EPA, with work group input to content, audience, advertisement

- Satellite broadcast on Ozone and PM NAAQS Reviews - October 2, 1996

PURPOSE: To provide information related to the ozone and particulate matter NAAQS reviews and implementation issues.

AUDIENCE: Targeted State/local agencies; approximately 345 participants at 100 downlink sites.

FORMAT: Panel discussions by EPA staff followed by Q&A sessions. Questions came in at the rate of 1 per minute.

NOTES:

APPENDICES

APPENDIX A

MEMBERSHIP OF SUBCOMMITTEE AND WORK GROUPS

Subcommittee Membership

NAME	AFFILIATION
John Seitz, Co-Chair	U.S. EPA
Alan Krupnick, Co-Chair	Resources for the Future
William Hamilton, DFO	U.S. EPA
David Baron	Arizona Center for Law
William Becker	STAPPA/ALAPCO
Carla Berroyer	AASHTO
Vincent Brisini	Pennsylvania Electric Company
Nicholas Bush	Natural Gas Supply Association
Georgia Callahan	Texaco
Glen Cass	California Institute of Technology
Lawrence Codey	Public Service Electric and Gas Company
Ben Cooper	Printing Industries of America
Mary Gade	Illinois EPA
Richard Dworek	U.S. Steel
Larry Feldcamp	Baker & Botts
Jeff Gabriel	National Pork Producers Council
Stephen Gerritson	LADCO
Thomas Godar	American Lung Association
Charles Goodman	Southern Company Services, Incorporated
Jane Hall	California State University-Fullerton
Beverly Hartsock	Texas NRCC
Abraham Haspel	Department of Energy
Stan Hathcock	Webster South, Incorporated
David Hawkins	Natural Resources Defense Council
Richard Hayslip	Salt River Project
Ben Henneke	Clean Air Corporation
Mike Hertel	Southern California Edison
Bruce Hill	Appalachian Mountain Club
Harvey Jeffries	University of North Carolina
George Bluhm	Department of Agriculture
Carter Keithley	Hearth Products Association
Shawn Kendall	Phelps Dodge Corporation
James Lents	South Coast Air Resources Board
William Lewis	Morgan Lewis & Bockius
Tom Looby	Colorado
Langdon Marsh	Oregon DEQ
Elsie Munsell	Department of Defense
Timothy O'Brien	Ford Motor Company
Robert Palzer	Sierra Club
Jerry Pardilla	National Tribal Environmental Council
Sarah Peirce-Sandner	Eastman Kodak Company
Richard Phelps	Eastman Chemical Company
Patrick Raher	Hogan & Hartson
Harold Reheis	Georgia DNR
Molly Ross	Department of Interior
Robert Russell*	Conservation Law Foundation
Ted Russell	Georgia Tech

** no longer on the Subcommittee*

Robert Shinn	New Jersey DEP
James Souby	Western Governors' Association
Christine Shaver	Environmental Defense Fund
Karl Schultz	E.T. Dupont De Nemours & Company
William Shapiro	Volvo Cars of North America
James Shrouds	Department of Transportation
Bradford Smith	Environmental Elements Corporation
Sandy Stash*	ARCO
John Taunton	Exxon Company, USA
Jack Ward Thomas	Department of Agriculture
Ted Wernick	The Gillette Company
Joe Williams	WESTAR
Robert Wyman	Latham & Watkins

Coordination Group Membership

NAME	AFFILIATION
Sally Shaver, Co-Chair	U.S. EPA
Pat Raher, Co-Chair	Hogan and Hartson
William Becker	STAPPA/ALAPCO
Georgia Callahan	Texaco Corporation
Mary Gade	Illinois EPA
Thomas Godar	American Lung Association
Charles Goodman	Southern Company
Beverly Hartsock	Texas NRCC
David Hawkins	Natural Resources Defense Council
Richard Hayslip	Salt River Project
Shawn Kendall	Phelps Dodge Corporation
Timothy O'Brien	Ford Motor Company
Jerry Pardilla	NTEC
Molly Ross	Department of Interior
Karl Schultz	DuPont Corporation
Robert Shinn	New Jersey DEP
Jim Souby	Western Governors' Association
Bradford Smith	Environmental Elements
John Taunton	Exxon Corporation

** no longer on the Subcommittee*

Science and Technical Support Work Group Membership

NAME	AFFILIATION
Tom Helms, Co-Chair	U.S. EPA
Harvey Jeffries, Co-Chair	University of North Carolina
Diana Andrews	Kentucky
John Cabaniss	AIAM
Glen Cass	Cal Tech
Kirit Chaudhari	Virginia
David Chock	Ford Motor Company
John Core	WESTAR
Ellis Cowling	North Carolina State University
Bruce Hill	Appalachian Mountain Club
Jay Hudson	Santee Cooper
David Kelly	Navajo EPA
Dave McNeil	Utah
Tom Moore	Arizona
Rich Poirot	Vermont
S.T. Rao	New York
Jay Rosenthal	Department of Defense
Mark Scruggs	Department of Interior
Jay Turner	Washington University
Manop Vanichchagorn	Louisiana
Dan Weiss	Cinergy Corporation
Jeffrey West	NARSTO
Steve Ziman	Chevron

National and Regional Strategies Work Group Membership

NAME	AFFILIATION
David Mobley, Co-Chair	U.S. EPA
Don Theiler, Co-Chair	Wisconsin
Andrew Aitken	New England Power Service Company
Mark Brownstein	Public Service Electric and Gas Company
Nina Dougherty	Sierra Club
Christine Shaver	Environmental Defense Fund
Robert Russell*	Conservation Law Foundation
Joe Belanger	Connecticut
Timothy Byrd	Gallo Winery
Bruce Craig	NGSA
Cliff Doumas	Mobil Corporation
Larry Feldcamp	Baker and Botts
Joe Francis	Nebraska
Mike Frost	S. Ute Tribe
Stan Hathcock	Webster South
Jon Heuss	General Motors Corporation
Dewayne Huckabay	City of Houston
David Hyder	North Carolina DOT
Dan Johnson	Washington
Donna Lamb	USDA/Forest Service
John Leary	Western Governors' Association
Amy Lilly	AIAM
Marvin Lowry	Georgia
Timothy Method	Indiana
John McManus	American Electric Power Company
William Miller	Philadelphia
Sarah Peirce-Sandner	Kodak
Terry Rowles	Missouri
Ted Russell	Carnegie Mellon
Lydia Salmon	Kennecott Copper Company
Ted Wernick	Gillette Company
Tom Wright	AAMVA
Robert Wyman	Latham and Watkins

** no longer on the Subcommittee*

Base Program Analysis and Policies Work Group Membership

NAME	AFFILIATION
Joe Paisie, Co-Chair	U.S. EPA
Jerry Golden, Co-Chair	TVA
Robert Palzer	Sierra Club
David Baron	Arizona Center for Public Law
Vincent Brisini	Pennsylvania Electric
John Crouch	Hearth Products Association
Richard Chastain	Southern Company Services
Gregory Dana	AIAM
Richard Dworek	US Steel
Jeff Gabriel	National Pork Producers
Stephen Gerritson	LADCO
Rich Halvey	Western Governors' Association
Robert Kappelmann	Jacksonville Electric Authority
Dennis Lawler	Illinois EPA
Arthur Lee	Texaco Corporation
Brock Nicholson	North Carolina DEM
Steve Pezda	Ford Motor Company
Richard Phelps	Eastman Chemical Company
Jim Ralston	New York
Jim Salvaggio	Pennsylvania
Greg Schaefer	ARCO
Conrad Schneider**	Natural Resource Council of Maine
Dick Schoeneberg	Department of Transportation
Eric Skelton	Spokane Company
Jean Vernet	Department of Energy
Herb Williams	Texas NRCC
Mel Zeldin	South Coast AQMD, CA

*** Resigned from Subcommittee in November 1996.*

Communications and Outreach Work Group Membership

NAME	AFFILIATION
Tom Curran, Co-Chair	U.S. EPA
Ron White, Co-Chair	American Lung Association
Tad Aburn	MDDE
Bruce Carhart	OTC
Alice Collingwood	Puget Sound
Margaret Cook	Inter Tribal Council of Arizona
Kathy Ellis	Department of Defense
Nancy Kruger	STAPPA/ALAPCO
Jayne Mardock	Clean Air Network
Richard Paul	AAMA
Caryl Pfeiffer	Kentucky Utilities Company
Nancy Seidman	Massachusetts
Quin Shea	National Mining Association
Sandy Stash	ARCO
Scott Thomas	Oklahoma

APPENDIX B

PRIMARY AUDIENCES AND INFORMATION NEEDS

How will I be affected? Implementation Issues		
Information Need	**Primary Audience**	**Where Information Is Addressed[1]**
What does integrated implementation mean?	State/local	Integrated Implementation issue paper one-pager
What will the standards be and when will we know?	State/local, affected industries	Ozone/PM NAAQS promulgation: 6/97
Will EPA develop national emission standards to support State control efforts?	State/local	
How will PM and regional haze be measured?	State/local	Regional Haze issue paper one-pager
What will the implementation period be?	State/local	Attainment Dates issue paper one-pager
What Federal money will be available for monitoring, plan development, and implementation?	State/local	Monitoring Incentives issue paper one-pager
Given the current proposed EPA timeline, will we be able to adequately characterize our attainment/ nonattainment status through monitoring before EPA designates our areas?	State/local	AOI/AOV issue paper, Monitoring Incentives issue paper one-pagers
How will the boundaries of nonattainment areas be determined, and how will transport problems be addressed?	State/local	AOI/AOV Issue Paper one-pager
How will the revised standards affect existing SIPs?	State/local	Interim Implementation Policy one-pager
How is EPA going to factor in "natural events" and "exceptional events" and explain these policies to the public in a way that makes sense?	State/local	
Are there any cross-over benefits to controlling ozone, PM, and regional haze? If so, what are those benefits? What other pollutants may play a role?	State/local	Integrated Implementation issue paper one-pager, regulatory impact analysis fact sheets, Ozone/PM fact sheets
What sources contribute to ozone, PM, and regional haze?	State/local Airline Pilots Assoc.	Ozone and PM staff paper fact sheets, Ozone/PM health effects fact sheets
What measures can be implemented to control these sources?	State/local Airline Pilots Assoc.	Phase II FACA issue — materials to be developed
Is my business affected? Are there circumstances whereby my business could be exempted (e.g., size of the operation)?	Affected Industries	Maps (with NAAQS Proposal)
What must I do to either comply with the new standards or have my business designated as exempt?	Affected Industries	Economic Incentives Issue Paper, New Source Review Issue Paper one-pagers
Timing issues: When do I have to comply?	Affected Industries	Areas at Risk Issue Paper, Economic Incentives Issue Paper, Attainment Dates Issue Paper, New Source Review Issue Paper one-pagers, time lines may also be developed
Compliance options that would be acceptable to EPA.	Affected Industries	
Interrelationship among the three programs — how does one pollutant affect the other?	Affected Industries	Integrated Implementation Issue Paper one-pager

[1] *Issue papers and related fact sheets will be made available on the TTN and the website.*

How will I be affected? Implementation Issues

Information Need	Primary Audience	Where Information Is Addressed[1]
What can the average citizen do to control ozone, PM, and regional haze?	State/local, interested public	
What Federal control programs can we expect? When?	State/local	
What are the costs of control?	State/local	
What are the costs of implementation?	State/local	
Where will the money come from?	State/local	
What are the costs of not controlling?	State/local, environmental/public interest, interested public	Ozone/PM RIA fact sheets
How will the FACA process coordinate with other ongoing efforts, including OTAG and the GCVTC?	State/local, environmental/ public interest	
Is my area in compliance with the standards?	Interested public	Maps (with NAAQS proposal and promulgation)
Why is EPA reviewing the standards? On what basis are they set?	Interested public	NAAQS Review fact sheet
How is EPA addressing implementation?	Interested Public	FACA fact sheet

Why are we doing this? What is the basis for the rule?

Information Need	Primary Audience	Where Information Is Addressed[1]
What is ozone? What is PM? What is regional haze?	Interested public	Ozone Health/Environmental Effects fact sheet
Why should I be concerned?	Interested public	Health/Environmental Effects fact sheets
What are the health and environmental effects of ozone, PM, regional haze?	State/local, environmental/public interest, interested public	Ozone, PM staff papers, Criteria Documents, Health and Environmental Effects fact sheets
How can we explain, in layman's terms, why multiple exceedances are allowed if the standard is set to protect health?	State/local	Ozone and PM NAAQS Proposal Preamble (possible fact sheet also)
How much of a safety margin will be built into the standards? Can we anticipate health effects below the standard, and if so, how do we explain how the standard was determined?	State/local	Ozone and PM staff papers, Criteria Documents, NAAQS Proposal Preamble
Concise information in plain English regarding the health and environmental need for revised standards.	Environmental/ public interest	Ozone and PM Health/Environmental Effects fact sheets
Concise information in plain English about the regional nature of the fine PM/ozone/regional haze problem, and the role of the FACA subcommittee in developing control strategy recommendations.	Environmental/ public interest	Ozone and PM Health/Environmental Effects fact sheets

[1] *Issue papers and related fact sheets will be made available on the TTN and the website.*

Why are we doing this? What is the basis for the rule?		
Information Need	**Primary Audience**	**Where Information Is Addressed[1]**
Access to this information via the Internet, preferably the World Wide Web. It was recommended that EPA establish a web page specifically for the subcommittee process.	Environmental/ public interest	Ozone/PM/Regional Haze FACA Website — July 1996
Graphics on PM-10/2.5 and ozone source emissions and trends.	Environmental/ public interest	
Recommendation that EPA issue a press release on the Subcommittee process and the regionality of the ozone/PM air pollution problem (observation that EPA press releases get better coverage than those of environmental/public interest groups).	Environmental /public interest, State/local agencies	
A single contact at EPA for environmental/public interest groups on the PM/ozone/regional haze implementation issue.	Environmental/ public interest	

[1] *Issue papers and related fact sheets will be made available on the TTN and the website.*