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Title 3—

The President

Memorandum of July 16, 1997

Implementation of Revised Air Quality Standards for Ozone and Particulate Matter

Memorandum for the Administrator of the Environmental Protection Agency

I have approved the issuance of new air quality standards to provide important new health protection for all Americans by further controlling pollution from ozone and particulate matter. These new standards promise to improve the lives of millions of Americans in coming years.

Consistent with my Administration's approach to regulatory decision making, I also want to ensure that these new standards are implemented in a common sense, cost-effective manner. It is critically important that these standards be implemented in the most flexible, reasonable, and least burdensome manner, and that the Federal Government work with State and local governments and other interested parties to this end.

I have determined that there are certain essential elements of an approach to implementation that will accomplish these goals. I direct you to use the following elements when implementing the new air quality standards:

1. Implementation of the air quality standards is to be carried out to maximize common sense, flexibility, and cost effectiveness;

2. Implementation shall ensure that the Nation continues its progress toward cleaner air by respecting the agreements already made by States, communities, and businesses to clean up the air, and by avoiding additional burdens with respect to the beneficial measures already underway in many areas. Implementation also shall be structured to reward State and local governments that take early action to provide clean air to their residents; and to respond to the fact that pollution travels hundreds of miles and crosses many State lines;

3. Implementation shall ensure that the Environmental Protection Agency (''Agency'') completes its next periodic review of particulate matter, including review by the Clean Air Scientific Advisory Committee, within 5 years of issuance of the new standards, as contemplated by the Clean Air Act. Thus, by July 2002, the Agency will have determined, based on data available from its review, whether to revise or maintain the standards. This determination will have been made before any areas have been designated as ''nonattainment'' under the $PM_{2.5}$ standards and before imposition of any new controls related to the $PM_{2.5}$ standards; and

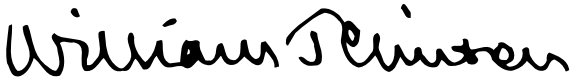
4. Implementation is to be accomplished with the minimum amount of paperwork and shall seek to reduce current paperwork requirements wherever possible.

Excellent preliminary work on the strategy for carrying out these implementation principles has been accomplished by an interagency Administration group and I commend that group for these important efforts. The group's work is set out in the attached plan, which is hereby incorporated by reference.

In order for the implementation of these standards to proceed in accordance with the goals I have established, I hereby direct you, in consultation with all affected agencies and parties, to undertake the steps appropriate under law to carry out the attached plan and to complete all necessary guidance and rulemaking no later than December 31, 1998.

This memorandum is for the purposes of internal Administration management only, and is not judicially reviewable.

You are authorized and directed to publish this determination and plan in the **Federal Register.**



THE WHITE HOUSE
Washington, July 16, 1997.

Implementation Plan for Revised Air Quality Standards

An interagency Administration group has discussed and evaluated approaches for the common sense, flexible, and cost effective implementation of the revised National Ambient Air Quality Standards (NAAQS) for ozone and particulate matter (PM). This document reflects the preliminary work by that group on a strategy for implementing these health-based standards consistent with the principles discussed by President Clinton in his announcement of the standards. The Environmental Protection Agency (EPA) will continue to work with other Federal agencies, State and local governments, small businesses, industry, and environmental and public health groups to fully develop and implement this strategy.

This implementation plan provides a road map for areas to attain the standards and protect public health without sacrificing economic growth. The goals of the plan are to: 1) maintain the progress currently being made toward cleaner air and respect the agreements and technological progress already made by communities and businesses to pursue clean air; 2) reward State and local governments and businesses that take early action to reduce air pollution levels through cost-effective approaches; 3) respond to the fact that pollution can travel hundreds of miles and cross many State lines; 4) work with the States to develop control programs which employ regulatory flexibility to minimize economic impacts on businesses large and small to the greatest possible degree consistent with public health protection; 5) minimize planning and regulatory burdens for State and local governments and businesses where air quality problems are regional, not local, in nature; 6) ensure that air quality planning and related Federal, State, and local planning are coordinated; and 7) recognize the substantial lead time necessary for State and local governments and businesses to plan for and meet standards for a new indicator of PM.

The Clean Air Act (CAA) requires the EPA to set air quality standards to protect the public health and the environment without consideration of costs. The 1997 revisions to the NAAQS for ground level ozone and PM fulfill this requirement. However, the Act recognizes that the EPA and the States must work together to develop cost-effective, flexible, and fair implementation plans if the standards are to be met as expeditiously as practicable.

There are a number of important linkages between these pollutants. There is also a linkage between these pollutants and their precursors and regional haze problems. Promulgation of the two standards simultaneously provides a more complete description of the health and environmental effects associated with two of the major components of air pollution. It can help States and local areas better manage their air quality by focusing on the common precursors of both pollutants and provides the opportunity to work jointly with industry to address common sources of multiple air pollutants in a comprehensive manner. This will lead to more effective and efficient protection of public health and the environment.

In addition to the interagency process, the EPA has been soliciting other input. While the review of the ozone and PM NAAQS was underway, the EPA convened a group of air quality experts representing industry, environmental, and public health groups; State and local governments; other Federal agencies; and academia under the Federal Advisory Committee Act (FACA). This group was charged by the Administrator of the EPA to develop innovative, flexible, and cost-effective implementation strategies that utilize a mix of control measures to address ozone, PM, and regional haze. This group will continue working with the EPA to further develop this strategy.

In addition, all Federal agencies will continue to do their part in carrying out the Federal responsibilities in the State/Federal partnership that has been so successful in improving air quality in the United States. In addition, the EPA, in partnership with the other Federal agencies, has developed

an interagency research program that is described in Appendix 1 for the coordination of future research on both ground level ozone and PM.

IMPLEMENTATION OF OZONE STANDARD

Phase-out of 1-hour standard

The revised ozone standard is intended to replace the current 1-hour standard with an 8-hour standard. However, the 1-hour standard will continue to apply to areas not attaining it for an interim period to ensure an effective transition to the new 8-hour standard.

Subpart 2 of part D of Title I of the CAA addresses the requirements for different classifications of nonattainment areas that do not meet the current 1-hour standard (i.e., marginal, moderate, serious, and severe). These requirements include such items as mandatory control measures, annual rate of progress requirements for emission reductions, and offset ratios for the emissions from new or modified stationary sources. These requirements have contributed significantly to the improvements in air quality since 1990. Although the EPA initially offered an interpretation of the CAA in the proposed Interim Implementation Policy (IIP) (61 FR 65764, December 13, 1996) under which the provisions of Subpart 2 would not apply to existing ozone nonattainment areas once a new ozone NAAQS is promulgated, the EPA has reconsidered that interpretation after receiving comments on the proposed IIP. Based on EPA's legal review, the Agency has concluded that Subpart 2 should continue to apply as a matter of law for the purpose of achieving attainment of the current 1-hour standard. Once an area attains the 1-hour standard, those provisions will no longer apply and the area's implementation of the new 8-hour standard would be governed only by the provisions of Subpart 1 of Part D of Title I.

To streamline the process and minimize the burden on existing nonattainment areas, the 1-hour standard will cease to apply to an area upon a determination by the EPA that an area has attained air quality that meets the 1-hour standard. In light of the implementation of the new 8-hour standard, which is more stringent than the existing 1-hour standard, States will not have to prepare maintenance plans for those areas that attain the 1-hour standard. Within 90 days, the EPA will publish an action identifying existing nonattainment areas and maintenance areas to which the 1-hour standard will cease to apply because they have attained the 1-hour standard.

For areas where the air quality does not currently attain the 1-hour standard, the 1-hour standard will continue in effect. The provisions of Subpart 2 would also apply to designated nonattainment areas until such time as each area has air quality meeting the 1-hour standard. At that time, the EPA will take action so that the 1-hour standard no longer applies to such areas. In any event, the ''bump-up'' provisions of Subpart 2, which require areas not attaining the standard by the applicable attainment date to be reclassified to the next higher classification, will not be triggered by the failure of any area to meet the new 8-hour standard. The purpose of retaining the current standard is to ensure a smooth legal and practical transition to the new standard.

Implementation of New 8-hour Ozone standard

This section discusses the general timeline for implementing the 8-hour standard, the importance of regional approaches to address ozone and options for classifying and designating areas relative to the 8-hour ozone NAAQS.

General Timeline

Following promulgation of a revised NAAQS, the Clean Air Act provides up to 3 years for State governors to recommend and the EPA to designate areas according to their most recent air quality. In addition, States will have up to 3 years from designation to develop and submit State Implementation Plans (SIPs) to provide for attainment of the new standard. Under

this approach, areas would be designated as nonattainment for the 8-hour standard by 2000 and would submit their nonattainment SIPs by 2003. The Act allows up to 10 years plus two 1-year extensions from the date of designation for areas to attain the revised NAAQS.

Regional Strategy

Ozone is a pollutant that travels great distances and it is increasingly clear that it must be addressed as a regional problem. For the past 2 years the EPA has been working with the 37 most eastern States through the Ozone Transport Assessment Group (OTAG) in the belief that reducing interstate pollution will help all areas in the OTAG region attain the NAAQS. A regional approach can reduce compliance costs and allow many areas to avoid most traditional nonattainment planning requirements. The OTAG was sponsored by the Environmental Council of States, with the objective of evaluating ozone transport and recommending strategies for mitigating interstate pollution. The OTAG completed its work in June 1997 and forwarded recommendations to the EPA. Based on these recommendations, in September 1997, the EPA will propose a rule requiring States in the OTAG region that are significantly contributing to nonattainment or interfering with maintenance of attainment in downwind States to submit SIPs to reduce their interstate pollution. The EPA will issue the final rule by September 1998.

If the States choose to establish a regional emission cap-and-trade system, modeled on the current acid rain program, reductions can be obtained at a lower cost. The EPA will encourage and assist the States to develop and implement such a program. Most important, based on the EPA's review of the latest modeling, a regional approach, coupled with the implementation of other already existing State and Federal Clean Air Act requirements, will allow the vast majority of areas that currently meet the 1-hour standard but would not otherwise meet the new 8-hour standard to achieve healthful air quality without additional local controls.

Areas in the OTAG region that would exceed the new standard after the adoption of the regional strategy, including areas that do not meet the current 1-hour standard, will benefit as well because the regional NO_X program will reduce the extent of additional local measures needed to achieve the 8-hour standard. In many cases these regional reductions may be adequate to meet CAA progress requirements for a number of years, allowing areas to defer additional local controls.

Transitional Classification

For areas that attain the 1-hour standard but not the new 8-hour standard, the EPA will follow a flexible implementation approach that encourages cleaner air sooner, responds to the fact that ozone is a regional as well as local problem, and eliminates unnecessary planning and regulatory burdens for State and local governments. A primary element of the plan will be the establishment under Section 172(a)(1) of the CAA of a special ''transitional'' classification for areas that participate in a regional strategy and/or that opt to submit early plans addressing the new 8-hour standard. Because many areas will need little or no additional new local emission reductions to reach attainment, beyond those reductions that will be achieved through the regional control strategy, and will come into attainment earlier than otherwise required, the EPA will exercise its discretion under the law to eliminate unnecessary local planning requirements for such areas. The EPA will revise its rules for new source review (NSR) and conformity so that States will be able to comply with only minor revisions to their existing programs in areas classified as transitional. During this rulemaking, the EPA will also reexamine the NSR requirements applicable to existing nonattainment areas, in order to deal with issues of fairness among existing and new nonattainment areas. The transitional classification will be available for any area attaining the 1-hour standard but not attaining the 8-hour standard as of the time the EPA promulgates designations for the 8-hour

standard. Areas will follow the approaches described below based on their status.

(1) Areas attaining the 1-hour standard, but not attaining the 8-hour standard, that would attain the 8-hour standard through the implementation of the regional NO_X transport strategy for the East.

Based on the OTAG analyses, areas in the OTAG region that can reach attainment through implementation of the regional transport strategy would not be required to adopt and implement additional local measures. When the EPA designates these areas under section 107(d), it will place them in the new transitional classification if they would attain the standard through implementation of the regional transport strategy and are in a State that by 2000 submits an implementation plan that includes control measures to achieve the emission reductions required by the EPA's rule for States in the OTAG region. This is 3 years earlier than an attainment SIP would otherwise be required. The EPA anticipates that it will be able to determine whether such areas will attain based on the OTAG and other regional modeling and that no additional local modeling would be required.

(2) Areas attaining the 1-hour standard but not attaining the 8-hour standard for which a regional transport strategy is not sufficient for attainment of the 8-hour standard.

To encourage early planning and attainment for the 8-hour standard, the EPA will make the transitional classification available to areas not attaining the 8-hour standard that will need additional local measures beyond the regional transport strategy, as well as to areas that are not affected by the regional transport strategy, provided they meet certain criteria. To receive the transitional classification, these areas must submit an attainment SIP prior to the designation and classification process in 2000. The SIP must demonstrate attainment of the 8-hour standard and provide for the implementation of the necessary emissions reductions on the same time schedule as the regional transport reductions. The EPA will work with affected areas to develop a streamlined attainment demonstration. By submitting these attainment plans earlier than would have otherwise been required, these areas would be eligible for the transitional classification and its benefits and would achieve cleaner air much sooner than otherwise required.

(3) Areas not attaining the 1-hour standard and not attaining the 8-hour standard

The majority of areas not attaining the 1-hour standard have made substantial progress in evaluating their air quality problems and developing plans to reduce emissions of ozone-causing pollutants. These areas will be eligible for the transitional classification provided that they attain the 1-hour standard by the year 2000 and comply with the appropriate provisions of section (1) or (2) above depending upon which conditions they meet.

Areas not Eligible for the Transitional Classification

For these areas, their work on planning and control programs to meet the 1-hour standard by their current attainment date (e.g., 2005 for Philadelphia and 2007 for Chicago) will take them a long way toward meeting the 8-hour standard. While the additional local reductions that they will need to achieve the 8-hour standard must occur prior to their 8-hour attainment date (e.g., 2010), for virtually all areas the additional reductions needed to achieve the 8-hour standard can occur after the 1-hour attainment date. This approach allows them to make continued progress toward attaining the 8-hour standard throughout the entire period without requiring new additional local controls for attaining the 8-hour standard until the 1-hour standard is attained. These areas, however, will need to submit an implementation plan within 3 years of designation as nonattainment for the new standard for achieving the 8-hour standard. Such a plan can rely in large part on measures needed to attain the 1-hour standard. For virtually all of these areas, no additional local control measures beyond those needed to meet the requirements of Subpart 2 and needed in response to the regional

transport strategy would be required to be implemented prior to their applicable attainment date for the 1-hour standard. Nonattainment areas that do not attain the 1-hour standard by their attainment date would continue to make progress in accordance with the requirements of Subpart 2; the control measures needed to meet the progress requirements under Subpart 2 would generally be sufficient for meeting the control measure and progress requirements of Subpart 1 as well.

IMPLEMENTATION OF PARTICULATE MATTER STANDARDS

As required under the Act, within the next 5 years the EPA will complete the next periodic review of the PM criteria and standards, including review by the CASAC. As with all NAAQS reviews, the purpose is to update the pertinent scientific and technical information and to determine whether it is appropriate to revise the standards in order to protect the public health with an adequate margin of safety or to protect the public welfare. Although the EPA has concluded that the current scientific knowledge provides a strong basis for the revised PM_{10} and new $PM_{2.5}$ standards, there remain scientific uncertainties associated with the health and environmental effects of PM and the means of reducing them.

The following steps discussed below and in Appendix 1, Interagency Research Program, will address these concerns. First, recognizing the importance of developing a better understanding of the effects of fine particles on human health, including their causes and mechanisms, as well as the species and sources of $PM_{2.5}$, the EPA will continue to sponsor research, particularly in these areas. Second, the Administrator of the EPA will promptly initiate a new review of the scientific criteria on the effects of airborne particles on human health and the environment. Within 90 days, the EPA will develop and provide to CASAC a plan and proposed schedule for this review to assure that the review is completed within 5 years. The plan and schedule will be published in the **Federal Register**. Thus, by July 2002, the Agency will have determined, based on data available from its review, whether to revise or maintain the standards. This determination will have been made before any areas have been designated nonattainment under the $PM_{2.5}$ standards and before imposition of any new controls related to the $PM_{2.5}$ standards.

Implementation of New $PM_{2.5}$ NAAQS

As set forth in the EPA's final action regarding PM, the EPA is establishing a new indicator for fine particles (i.e., $PM_{2.5}$) and promulgating new $PM_{2.5}$ standards. Monitoring and planning will be required before control measures to address these standards would be required. Therefore, the first priority for implementing them is establishment of a comprehensive monitoring network to determine ambient fine particle concentrations across the country. The monitoring network will help the EPA and the States determine which areas do not meet the new air quality standards, what are the major sources of $PM_{2.5}$ in various regions, and what action is needed to clean up the air. The EPA and the States will consult with affected stakeholders on the design of the network and will then establish the network, which will consist of approximately 1,500 monitors. All monitors will provide for limited speciation, or analysis of the chemical composition, of the particles measured. At least 50 of the monitors will provide for a more comprehensive speciation of the particles. The EPA will work with states to deploy the $PM_{2.5}$ monitoring network. Based on the ambient monitoring data we have seen to date, these would generally not include agricultural areas. The EPA will fund the cost of purchasing the monitors, as well as the cost of analyzing particles collected at the monitors to determine their chemical composition.

Because the EPA is establishing standards for a new indicator for PM (i.e., $PM_{2.5}$), it is critical to develop the best information possible before attainment and nonattainment designation decisions are made. Three calendar years of Federal reference method monitoring data will be used to determine

whether areas meet or do not meet the $PM_{2.5}$ standards. Three years of data will be available from the earliest monitors in the spring of 2001, and 3 years of data will be available from all monitors in 2004. Following this monitoring schedule and allowing time for data analysis, Governors and the EPA will not be able to make the first determinations as to which areas should be designated nonattainment until at least 2002, 5 years from now. The Clean Air Act, however, requires that the EPA make designation determinations (i.e., attainment, nonattainment, or unclassifiable) within 2 to 3 years of revising a NAAQS. To fulfill this requirement, in 1999 the EPA will issue ''unclassifiable'' designations for $PM_{2.5}$. These designations will not trigger the planning or control requirements of part D of Title I of the Act.

When the EPA designates $PM_{2.5}$ nonattainment areas pursuant to the Governors' recommendations beginning in 2002, areas will be allowed 3 years to develop and submit to the EPA pollution control plans showing how they will meet the new standards. Areas will then have up to 10 years from their redesignation to nonattainment to attain the $PM_{2.5}$ standards with the possibility of two 1-year extensions.

In developing strategies for attaining the $PM_{2.5}$ standards, it is important to focus on measures that decrease emissions that contribute to regional pollution. Available information indicates that nearly one-third of the areas projected not to meet the new $PM_{2.5}$ standards, primarily in the Eastern United States, could come into compliance as a result of the regional SO_2 emission reductions already mandated under the Clean Air Act's acid rain program, which will be fully implemented between 2000 and 2010. Similarly, the Grand Canyon Visibility Transport Commission, consisting of Western States and tribes, committed to reducing regional emissions of $PM_{2.5}$ precursors (sulfates, nitrates, and organics) to improve visibility across the Colorado Plateau.

As detailed $PM_{2.5}$ air quality data and data on the chemical composition of $PM_{2.5}$ in different areas become available, the EPA will work with the States to analyze regional strategies that could reduce $PM_{2.5}$ levels. If further cost-effective regional reductions will help areas meet the new standard, the EPA will encourage States to work together to use a cap-and-trade approach similar to that used to curb acid rain. This acid rain program delivered environmental benefits at a greatly reduced cost.

Given the regional dimensions of the $PM_{2.5}$ problem, local governments and local businesses should not be required to undertake unnecessary planning and local regulatory measures when the problem requires action on a regional basis. Therefore, as long as the States are doing their part to carry out regional reduction programs, the areas that would attain the $PM_{2.5}$ standards based on full implementation of the acid rain program would not face new local requirements. Early identification of other regional strategies could also assist local areas in completing their programs to attain the $PM_{2.5}$ standards after those areas have been designated nonattainment.

The EPA will also encourage States to coordinate their $PM_{2.5}$ control strategy development and efforts to protect regional visibility. Visibility monitoring and data analysis will support both $PM_{2.5}$ implementation and the visibility program.

Implementation of Revised PM_{10} NAAQS

In its rule, the EPA is revising the current set of PM_{10} standards. Given that health effects from coarse particles are still of concern, the overall goal during this transition period is to ensure that PM_{10} control measures remain in place to maintain the progress that has been achieved toward attainment of the current PM_{10} NAAQS (and which provides benefits for $PM_{2.5}$) and protection of public health.

To ensure that this goal is met, the existing PM_{10} NAAQS will continue to apply until certain critical actions by the EPA, and by States and local agencies, have been taken to sustain the progress already made. For areas

not attaining the existing PM_{10} NAAQS when the revised standards go into effect, those standards remain in effect until the EPA has completed a section 172(e) rulemaking to prevent backsliding. The EPA will propose this rulemaking in the Fall of 1997. For areas attaining the existing PM_{10} NAAQS, the EPA will retain the existing PM_{10} NAAQS until the State submits and the EPA approves the section 110 SIP which States are required to submit within 3 years of a NAAQS revision. Once those areas have an approved SIP, the EPA will take action so the standard no longer applies. In addition, the EPA will take action within 3 years to designate areas for the revised PM_{10} standards.

COST-EFFECTIVE IMPLEMENTATION STRATEGIES

There is a strong desire to drive the development of new technologies with the potential of greater emission reduction at less cost. It was agreed that $10,000 per ton of emission reduction is the high end of the range of reasonable cost to impose on sources. Consistent with the State's ultimate responsibility to attain the standards, the EPA will encourage the States to design strategies for attaining the PM and ozone standards that focus on getting low cost reductions and limiting the cost of control to under $10,000 per ton for all sources. Market-based strategies can be used to reduce compliance costs. The EPA will encourage the use of concepts such as a Clean Air Investment Fund, which would allow sources facing control costs higher than $10,000 a ton for any of these pollutants to pay a set annual amount per ton to fund cost-effective emissions reductions from non-traditional and small sources. Compliance strategies like this will likely lower the costs of attaining the standards through more efficient allocation, minimize the regulatory burden for small and large pollution sources, and serve to stimulate technology innovation as well.

ADDITIONAL FUTURE ACTIVITIES AND COORDINATION WITH OTHER FEDERAL DEPARTMENTS AND AGENCIES

The approaches outlined above for implementation of the current and new ozone standards will be developed in the future in much greater detail. In order to ensure that the final details are practical, incorporate common sense, and provide the appropriate steps toward cleaning the air, input is needed from many stakeholders such as representatives of State and local governments, industry, environmental groups, and Federal agencies. The EPA will continue seeking such advice from a range of stakeholders and, after evaluating their input, propose the necessary guidance to make these approaches work. Moreover, the EPA will continue to work with a number of Federal agencies to ensure that those agencies comply with these new standards in cost-effective, common sense ways. The guidance and rules (e.g., revisions to NSR and conformity) will be completed by the end of 1998.

The EPA will continue to work with the Small Business Administration (SBA) because small businesses are particularly concerned about the potential impact resulting from future control measures to meet the revised PM and ozone standards. The EPA, in partnership with SBA, will work with the States to include in their SIPs flexible regulatory alternatives that minimize the economic impact and paperwork burden on small businesses to the greatest possible degree consistent with public health protection.

The EPA and the Department of Defense will continue to work towards assuring that the CAA's general conformity provisions are applied appropriately so as to maintain the air quality benefits of this requirement consistent with the Department's goals for cost-saving consolidation of the defense infrastructure and the economic viability for civilian use of former military bases, in support of base realignment and closure activities.

In addition, understanding that critical training using smoke and obscurants must continue to ensure the training and readiness of the military, the EPA will work with the Department of Defense to develop a policy that ensures that a local area will not be redesignated to nonattainment solely on the basis of the use of obscurants or smoke for such purposes. While there is a need to keep the public informed of violations of air quality standards, if any were to occur, there is no need to curtail the training or limit it to certain weather conditions.

The EPA will also work closely with the Department of Agriculture and the Agriculture Air Quality Task Force on any agricultural issues associated with the ozone and PM standards. By establishing new standards for particulate matter smaller than 2.5 micrometers in diameter ($PM_{2.5}$), as opposed to tightening the existing standards for particles smaller than 10 micrometers (PM_{10}), the EPA is actually focusing regulatory attention away from farming and tilling issues. Indeed, soils and agriculture comprise a much smaller portion of the $PM_{2.5}$ problem than they do of the PM_{10} problem. The EPA will issue guidance to the States to ensure that in meeting the $PM_{2.5}$ standards they focus their control strategies on sources of fine particles, rather than coarse particles (those particles larger than $PM_{2.5}$).

Finally, the EPA will continue to work with the interagency group addressing fire and air quality issues. The EPA recognizes the inevitability of fire, and the important role of fire in natural systems. The interagency group will develop policies and practices to assure compatibility between fire and air quality programs consistent with public health, safety, and environmental protection.

Appendix 1

Interagency Research Program

The EPA has concluded that the current scientific knowledge provides a strong basis for the revised ozone and PM_{10} standards and the new $PM_{2.5}$ standards. However, for both pollutants there exist uncertainties about the health effects and their causes that can benefit from further study. The complex chemistry of their formation and the potential for the regional transport of their precursor pollutants and ozone and PM also needs to be better understood to design effective control strategies to reduce their concentrations in the ambient air. The research program is structured to prioritize those projects that ensure research activities are focused on high-priority topics and that the research carried out by various agencies is both complementary and timely. The EPA will reach out to form partnerships with the private sector and State and local governments in performing the research wherever possible.

Particulate Matter Research

As discussed elsewhere, the EPA will complete another full scientific and technical review of the PM standards by 2002. Simultaneous with the planning for the current criteria review in 1993, the EPA began a process of increasing emphasis on PM research. As discussed above, commenters on the proposed PM NAAQS also expressed significant concerns about the science. The steps discussed below are intended to address the concerns raised by the commenters.

Based on the recently completed comprehensive scientific review, the EPA is again reassessing its research priorities to address the most recent understanding of these uncertainties with the development of two documents, entitled PM Research Needs for Human Health Risk Assessment and ORD PM Research Program Strategy. These documents are designed to highlight significant health research needs and EPA/ORD's strategy to address a subset of those needs as well as research needs for implementing the standards. Both documents were reviewed by the Clean Air Scientific Advisory Committee (CASAC) in a November 1996 meeting, and are currently undergoing revisions to address CASAC comments.

These documents, in turn, will help to guide an expansion of an ongoing government-wide effort to target and coordinate Federal research on particulate matter. The EPA, in partnership with other Federal agencies, will develop a greatly expanded coordinated interagency PM research program. The program will contribute to expanding the science associated with particulate matter health effects, as well as developing improved monitoring methods and cost-effective mitigation strategies. For example, the Department of Health and Human Services is conducting research on respiratory disease and could undertake surveillance of PM-related health effects. Significant emphasis will be placed on coordinating research on health effects, biological mechanism causing effects, monitoring, source-receptor relationships, speciation of PM, identification of sources, control technologies and regional transport for particulate matter with corresponding research on ozone and other related pollutants including regional haze. To assist State and local efforts in completing planning requirements and reducing PM, the EPA will work cooperatively with the Department of Agriculture, Department of Defense, Department of Energy, Department of Transportation, and other affected Federal agencies to refine existing, limited analytical models for PM_{10} and to develop new reliable predictive models for $PM_{2.5}$.

Tropospheric (Ground Level) Ozone Research

To ensure that the ozone NAAQS and their implementation continue to be based on the best available science, the EPA will continue its research efforts on tropospheric or ground level ozone. As with the setting and implementation of virtually all health-based environmental standards, there remain scientific uncertainties associated with the effects of ozone and the means of reducing them. The EPA has participated in an intergovernmental

public/private partnership called the North American Research Strategy for Tropospheric Ozone (NARSTO) that involves a coordinated effort to identify and address key issues in the emissions, transport, and mitigation of photochemical pollutants. Further, with the completion of the ozone Criteria Document, the EPA has reassessed the uncertainties and research needs on the health and ecological effects of ozone at workshops held in March and May 1997, respectively. The EPA is currently developing a health and ecological effects research needs document for ozone, which will be submitted for review by CASAC.

In addition, the EPA will continue broader efforts to coordinate Federal research on tropospheric ozone. The public/private NARSTO partnership is a model cooperative effort already begun in the area of atmospheric processes and risk management. NARSTO's membership spans government, utilities and other industries, and the academic community—all following a single national research agenda. The EPA will also work in partnership with other Federal agencies to address research needs on ozone health and ecological effects. For example, the Department of Health and Human Services is conducting research on respiratory disease and could undertake surveillance of ozone-related health effects. These research efforts will be coordinated to ensure research activities are focused on high-priority topics and that the research carried out by various agencies is complementary. Significant emphasis will be placed on coordinating both health effects, monitoring, source-receptor, and control technologies for ozone with corresponding research on particulate matter and other related pollutants subject to significant regional transport.

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