

INTERIM  
AIR QUALITY POLICY ON  
WILDLAND AND PRESCRIBED  
FIRES

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LIST OF WHITE PAPERS AVAILABLE ON THE WORLD WIDE WEB

Background on the Role of Fire

What Wildland Fire Conditions Minimize Emissions and Hazardous Air Pollutants and Can Land Management Goals Still Be Met?

Air Monitoring for Wildland Fire Operations

Emissions Inventories for SIP Development

Estimating Natural Emissions From Wildland and Prescribed Fire

## **I. PURPOSE**

This policy statement has been prepared in response to plans by some Federal, tribal and State wildland owners/managers to significantly increase the use of wildland and prescribed fires to achieve resource benefits in the wildlands.<sup>1</sup> Many wildland ecosystems are considered to be unhealthy as a result of past management strategies. The absence of fire effects has allowed plant species (e.g., trees and shrubs) that would normally be eliminated by fires to proliferate, vegetation to become dense and insect infestations to go unchecked. Wildland owners/managers plan to significantly increase their use of fires to correct these unhealthy conditions and to reduce the risk of wildfires to public and fire fighter safety. The largest increases are expected mainly on Federal lands in western States in ecosystems where fires would naturally occur every few years (35 years or less) if not suppressed. Fire has continued to be a management tool used by many public and private wildland owners/managers in the southeastern States. However, Federal land managers in the southeast also plan to significantly increase their use of fire above current annual levels.

This policy statement integrates two public policy goals, (1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility. This document provides guidance on mitigating air pollution impacts caused by fires in the wildlands and the wildland/urban interface. It identifies the responsibilities of wildland owners/managers and State/tribal air quality managers to work together to coordinate fire activities, minimize air pollutant emissions, manage smoke from wildland and prescribed fires managed for resource benefits, and establish emergency action programs to mitigate the unavoidable impacts on the public. This policy is not intended to limit opportunities by private wildland owners/managers to use fire so that burning can be increased on publicly owned wildlands. Thoughtful use of fire by private, public and Indian wildland owners/managers within SMP's is promoted to maintain healthy wildland ecosystems. Neither is this policy intended to

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<sup>1</sup>This document contains EPA policy and, therefore, does not establish or affect legal rights or obligations. It does not establish a binding norm and it is not finally determinative of the issues addressed. In applying this policy in any particular case, the EPA will consider its applicability to the specific facts of that case, the underlying validity of the interpretations set forth in this memorandum, and any other relevant considerations, including any that may be required under applicable law and regulations.

imply that States/tribes should relax existing SMP's or limit a State's/tribe's ability to regulate fires managed for resource benefits.

The EPA used a deliberative process involving a multi-stakeholder workgroup to develop recommendations for this policy. The workgroup did not reach consensus on all of the issues raised. The EPA addressed all of the recommendations and concerns raised by the stakeholders to the extent possible. The multi-stakeholder workgroup also produced several "white papers" on a number of topics previously identified in earlier drafts of the policy as Appendices to the policy. These papers will be published as a separate document and can also be found on EPA's TTN2000 website:

<http://134.67.104.12/html/o3pmrh/pbissu.htm>, and on the Western States Air Resources Council (WESTAR) website: [http://www.westar.org/proj\\_frame.html](http://www.westar.org/proj_frame.html). A list of these papers is provided in the Table of Contents.

## **II. SCOPE AND APPLICABILITY**

The EPA does not directly regulate the use of fire within a State or on Indian lands. The EPA's authority is to enforce the requirements of the CAA. The CAA requires States and tribes to attain and maintain the NAAQS adopted to protect public health and welfare. This policy recommends that States/tribes implement SMP's to mitigate the public health and welfare impacts of fires managed for resource benefits. While SMP's will also mitigate nuisance smoke intrusions, nuisance issues have been left for the individual air quality agencies to address.

This policy applies to all wildland and prescribed fires managed to achieve resource benefits on public, Indian and privately owned wildlands, regardless of the cause of ignition (e.g., lightning, arson, accidental, land management decision, etc.) or purpose of the fire (e.g., natural, resource management, hazard reduction, etc.).

Federal land management agencies sometimes manage naturally ignited fires to achieve resource benefits. Planning for naturally ignited fires is obviously limited, but the agencies require fire management plans to be included in land use plans for an area before a naturally ignited fire can be managed for resource benefits. Fires ignited in areas without fire management plans are

unwanted or wildfires. The interface between this policy and the Natural Events Policy<sup>2</sup> regarding ambient PM<sub>10</sub> concentrations caused by wildfires is addressed in section VII.

This policy does not apply to other open burning activities, such as burning at residential, commercial or industrial sites; open burning of land clearing waste or construction debris. It also does not apply to open burning of agricultural waste, crop residue or land in the USDA Conservation Reserve Program. The EPA is working with the USDA Agriculture Air Quality Task Force to develop equitable policies for emissions from activities that could be classified as agricultural burning.

This policy addresses the impacts of air pollutant emissions from fires managed for resource benefits on public health and welfare. The primary indicators of public health impacts used are ambient air quality impacts above the NAAQS for fine particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers (PM<sub>2.5</sub>), and particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>). There are both 24-hour (daily) and annual NAAQS for PM<sub>2.5</sub> and PM<sub>10</sub>. Emissions of nitrogen oxides (NO<sub>x</sub>), VOC, and CO from fires can also impact the NAAQS for NO<sub>2</sub>, O<sub>3</sub>, and CO. However, the actions required to reduce VOC and CO emissions are the same as those recommended in this document to mitigate impacts on the PM<sub>2.5</sub>, and PM<sub>10</sub> NAAQS. Emissions of NO<sub>x</sub>, on the other hand, can increase under some of the burning conditions used to decrease emissions of other pollutants.

The effects of fire emissions on the public welfare aspects of the NAAQS for PM are addressed in terms of visibility impairment and regional haze. The policy also addresses the treatment of fire emissions to meet other CAA requirements, such as prevention of significant deterioration (PSD) and conformity with SIP's or TIP's.

### **III. BACKGROUND**

#### **A. The Role of Fire in the Wildlands**

The role of fire in North American ecosystems has been undergoing change since people began to play a more active role in managing their natural resources. Native Americans actively used fire to alter vegetative patterns, to ease travel, or for hunting purposes. Prior to European

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<sup>2</sup>See memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation to EPA Regional Offices titled Areas Affected by PM<sub>10</sub> Natural Events, May 30, 1996.



settlement, fire played a natural role as a necessary disturbance phenomena, keeping fuel density in check as well as insects and the diseases they carry, thereby maintaining North American wildlands in a healthy state. After European settlement and the introduction of grazing herds of cattle and sheep, and the practice of fire suppression, public land management agencies have recognized that not allowing fire to play its natural role in our wildlands has had unintended negative effects. When forests and grasslands are not allowed to burn naturally (lightning serving as the principal source of ignition) the result can be heavy accumulation of dead vegetation which provides fuel for unwanted fires (wildfires). Because of this unhealthy build-up of fuels, the risk of catastrophic wildfires is much greater as evidenced by several recent fires in our national forests and other publicly owned lands. These fires put firefighters and the general public in danger while destroying millions of acres of forests and costing millions of dollars to suppress. The lack of fire also has unintended ecological effects, leading to the loss of habitat for rare species and the decline of ecosystems. Fire exclusion can lead to an alteration in natural community types, and an important loss of biodiversity. Many plant and animal species are on the decline because they exist in fire-dependent habitats that haven't burned in decades. This situation has led to a rethinking of Federal land management and fire management policy.

**B. Changes in Fire Management Policy**

In 1995, a Federal Wildland Fire Management Policy and Program Review was conducted in response to the unhealthy condition of our public wildlands, and the increase in unplanned fires that occurred in 1987, 1988, 1992 and again in 1994. As a result of this review, the five principal Federal fire/land management agencies [the Forest Service (FS) under the Department of Agriculture; and the Bureau of Land Management (BLM), National Park Service (NPS), Fish and Wildlife Service (FWS), and the Bureau of Indian Affairs (BIA) under the DOI] agreed on need for several changes to existing fire/land management practices. Their recommendations include the reintroduction of fire (allowing it to play its natural role) into Federal land management programs in “an ongoing and systematic manner, consistent with public health and environmental quality considerations.” The goals of this change in land management policy are to reduce unnatural fuel densities that contribute to increasing unplanned fire hazards, and to restore wildland ecosystems to their healthy natural states. The Federal agencies previously mentioned

began increasing the use of fire in their most vulnerable wildlands in 1997. Annual treatment targets for all Federal land management agencies will be increased to more than 5 million acres per year by 2005.

### **C. Air Quality Considerations**

Burning wildland vegetation causes emissions of many different chemical compounds such as small particles,  $\text{NO}_x$ , CO and organic compounds. The components and quantity of emissions depends in part on the types of fuel burned, its moisture content, and the temperature of combustion. Complex organic materials may be absorbed into or onto condensed smoke particles. Tests indicate that, on average, 90 percent of smoke particles from wildland and prescribed fires are  $\text{PM}_{10}$ , and 70 percent are  $\text{PM}_{2.5}$ .

Historically, EPA's NAAQS for PM have tended to focus emission control efforts on "coarse" particles--those larger than  $\text{PM}_{2.5}$ . Before 1987, EPA's PM standards focused on "Total Suspended Particles," including particles as large as 100 micrometers in diameter. The EPA revised the standards in 1987 to focus control on  $\text{PM}_{10}$  in response to new science showing that it was the smaller particles capable of penetrating deeply into the lungs that were associated with the most adverse health effects. For comparison, a human hair is about 70 micrometers in diameter.

The most recent review of health studies focused attention on the need to better address the "fine" fraction particles -  $\text{PM}_{2.5}$ . These more recent studies provide consistent and coherent, "evidence that serious health effects (mortality, exacerbation of chronic disease, increased hospital admissions, etc.) are associated with exposures to ambient levels of PM found in contemporary urban airsheds even at concentrations below current U. S. PM standards" (Criteria Document-U.S. EPA 1996a, p. 13-1). PM concentrations currently found in many communities are associated with adverse health effects in the general population, including increased mortality and morbidity, altered lung function, increased respiratory symptoms, aggravated respiratory and cardiovascular disease. Sensitive sub-populations, such as children, the aged and those with existing cardiopulmonary or infectious respiratory disease, may experience effects at lower levels of PM than the general population, and the severity of effects might be greater. These studies are the basis for the July, 1997 promulgation of new NAAQS for  $\text{PM}_{2.5}$ , which are designed to

protect public health, with an adequate margin of safety.

Fine particles are also a major cause of visibility impairment in such places as national parks that are valued for their scenic views and recreation.

**D. Visibility Impairment**

Visibility conditions are affected by scattering and absorption of light by particles and gases. The fine particles most responsible for visibility impairment are sulfates, nitrates, organic compounds, soot and soil dust. Fine particles are more efficient per unit mass than coarse particles at scattering light. Light scattering efficiencies also go up as humidity rises, due to water adsorption on fine particles, which allow the particles to grow to sizes comparable to the wavelength of light. There are distinct regional variations in visibility between eastern and western States, due, to generally higher relative humidities in the East. Naturally occurring visual range in the East may be between 105 to 190 kilometers, while natural visual range in the West is between 190 to 270 kilometers.

Visibility is an important public welfare consideration because of its significance to enjoyment of daily activities in all parts of the country. Protection of visibility as a public welfare consideration is addressed nationally through the secondary PM NAAQS which are equivalent to the primary PM NAAQS. Visibility protection is particularly important in the 156 mandatory Class I Federal areas, "Areas of Great Scenic Importance," and is addressed for these areas by the special provisions of Sections 169A and 169 B of the CAA.

The effects of smoke from wildland and prescribed fires on air quality will be discussed throughout this document. The term air quality, as used in this document, refers to ambient concentrations of pollutants (primarily PM in locations accessible to the general public), and, where applicable, to impacts on visibility in mandatory Class I Federal areas. Thus, wherever this document discusses the need for wildland owners/managers to consider the impacts of their actions on air quality, this may include consideration of the effects of their actions on visibility in mandatory Class I Federal areas.

Existing requirements to consider effects on visibility which are reasonably attributable to a single nearby source or small number of sources are contained in the regulations published by EPA in 1980 at 40 CFR 51.300 (Protection of Visibility). Additional regulations are currently

being developed to address impairment of visibility that is more regional in its character and origins (“regional haze”). This interim policy may be revised to be made consistent with the regional haze rules when they become final.

Please refer to the white paper, “Background on the Role of Fire,” for more complete background information. See Section I to obtain a copy.

#### **IV. DESCRIPTION OF POLICY**

The EPA’s policy regarding wildland and prescribed fires managed for resource benefits is that owners/managers of public, private and Indian wildlands should collaborate with State/tribal air quality managers (air regulators) to achieve their goals of: (1) allowing fire to function in its natural role in the wildlands, and (2) protecting public health and welfare by minimizing smoke impacts. The EPA urges air quality managers to participate in public land use planning activities which involve selecting appropriate resource management treatments, including the use of fire, and to help identify air quality criteria for fire management plans. Air quality managers are urged to help evaluate the potential impacts of alternative resource treatments and assure that air quality concerns (also visibility and regional haze concerns, where appropriate) are adequately addressed in the public land use planning process. They are urged to solicit information from private and Indian wildland owners/managers on plans to use fire for resource management, to encourage them to consider appropriate alternative treatments, and to assist them in evaluating the potential air quality impacts of alternatives to meet particular management objectives.

Wildland owners/managers are urged to: (1) notify air quality managers of plans to significantly increase their future use of fire for resource management, (2) consider the air quality impacts of fires and take appropriate steps to mitigate those impacts, (3) consider appropriate alternative treatments, (4) and participate in the development and implementation of State/tribal SMP’s.

The EPA will allow States/tribes flexibility in their approach to regulating fires managed for resource benefits. They are not required to change their existing fire regulations if those regulations adequately protect air quality. However, there are incentives for States/tribes to certify to EPA that they have adopted and are implementing a SMP that includes the basic components identified in this policy. The main incentive is that, as long as fires do not cause or

significantly contribute to daily or annual PM<sub>2.5</sub> and PM<sub>10</sub> NAAQS violations, States/tribes may allow participation by burners in the basic SMP to be voluntary and the SMP does not have to be adopted into the SIP. Another incentive is the commitment by EPA to use its discretion not to redesignate an area as nonattainment when fires cause or significantly contribute (see section VII.B.) to PM NAAQS violations, if the State/tribe required those fires to be conducted within a basic SMP. Rather, if fires cause or significantly contribute violations, States/tribes will be required to review the adequacy of the SMP, in cooperation with wildland owners/managers, and make appropriate improvements.

If States/tribes do not certify that a basic SMP is being implemented, no special consideration will be given to PM violations attributed to fires managed for resource benefits. Rather, EPA will call for a SIP revision to incorporate a basic SMP and/or will notify the governor of the State or the tribal government that the area should be redesignated as nonattainment. The SMP adopted in response to the SIP/TIP call must require mandatory participation for greater than de minimis fires, and must be adopted into the SIP/TIP so that it is Federally enforceable. Also, the SIP/TIP must meet all other CAA requirements applicable to nonattainment areas.

Fire data requirements for SIP's/TIP's are addressed in section VIII of this policy. Guidance for meeting CAA requirements to show conformity of Federal fire activities with SIP's, to address visibility/regional haze impacts, and to address prevention of significant deterioration of air quality are addressed in section IX.

The following are guiding principles for implementing this policy:

- ▶ Air quality and visibility impacts from fires managed for resource benefits should be treated equitably with other source impacts.
- ▶ Land and vegetation management practices should be promoted that are best for wildland ecosystems, yet protect public health and avoid visibility impairment.
- ▶ States/tribes should foster collaborative relationships among wildland owners/managers, air quality managers and the public to develop and implement SMP's.
- ▶ States/tribes will be allowed the flexibility (prior to measuring violations of the PM<sub>2.5</sub> or PM<sub>10</sub> NAAQS attributable to fires managed for resource benefits) to decide when a SMP

is needed and how the program will be designed to prevent adverse air quality impacts.

This does not preclude wildland owners/managers from including smoke management components in burn plans for fires they conduct in the absence of an applicable State/tribal program.

- ▶ All parties (wildland owners/managers, air quality managers and the public) are expected to act in good faith and will be held accountable for implementing their respective parts of fire and SMP's.

## **V. COLLABORATION AMONG LAND AND AIR QUALITY MANAGERS**

Wildland owners/managers and air quality managers can overcome the barriers to achieving their goals of: (1) returning fire to its natural role in the wildlands and (2) protecting air quality and visibility, by working together toward those ends. Wildland owners/managers should notify State/tribal air quality managers if they are planning to significantly increase the use of fire to manage wildland resources. Air quality managers with Federal/State/local public wildlands within their jurisdictions have a responsibility to participate in the public planning processes conducted for the management of those publicly owned lands. To arrive at the best choice of resource treatments and response to fire, it is essential that the air quality impacts of planned land management activities are adequately addressed. Air quality managers, by participating in the public land use planning process, can help select the scope of land uses; help evaluate alternative management tools and help identify when fire is appropriate; and review projected air quality and visibility impacts. Air quality managers should also consult with private wildland owners/managers to determine long-range resource management objectives and help them evaluate the applicability of alternative treatments based on air quality and visibility considerations.

Wildland owners/managers also have a responsibility to participate with the other stakeholders and State/tribal air quality managers in developing rules and SMP's for fires managed for resource benefits. Air quality managers that intend to develop or revise regulations, plans or policies applicable to fires should solicit the early participation of all affected wildland owners/managers in making those revisions.

### **A. Land and Vegetation Management**

Wildlands are managed by Federal, State and local public agencies (referred to in this document as public land management agencies); tribal and BIA authorities; and private land owners. The goals of public land management agencies vary, but are generally to develop, maintain and enhance wildlife habitat; protect endangered plant and animal species; preserve and protect cultural resources, scenic vistas and wilderness; provide for recreation; and to sustain production of natural resources. The goals of private wildland owners/managers may be sustained production of natural resources, preservation of wildlife habitat, improved grazing conditions, etc. The goals of tribal wildland owners/managers are generally similar to public land management agency goals, but may also include aspects of private land owners. Another common goal of all wildland owners/managers is to minimize the potential for catastrophic wildfires that could result from heavy accumulations of vegetative fuels.

## **1. Alternative Treatments**

Wildland owners/managers may have an array of tools, including fire, that can be used to accomplish land use plans, depending on the resource benefits to be achieved. Several factors should be considered when selecting appropriate treatments. Those factors include the costs of treatment, the environmental impacts (e.g., air and water quality, soils, wildlife, etc.), and whether fire must be used to meet management objectives. The best combination of treatments are those that meet management goals with the most favorable environmental impacts at the most reasonable costs.

### **a. Utilization and mechanical treatments**

Mechanical treatments may be appropriate tools when management objectives are to reduce fuel density to reduce a wildfire hazard, or to remove logging waste materials (slash) to prepare a site for replanting or natural regeneration. On-site chipping or crushing of woody material, removal of slash for off-site burning or biomass utilization, whole tree harvesting, and yarding (pulling out) of unmerchantable material may accomplish these goals. Mechanical treatments are normally limited to accessible areas, terrain that is not excessively rough, slopes of 40 percent or less, sites that are not wet, areas not designated as national parks or wilderness, areas not protected for threatened and endangered species and areas without cultural or paleological resources.

**b. Chemical treatments**

When the management objective is to preclude, reduce or remove live vegetation and/or specific plant species from a site, chemical treatments may be appropriate tools. Other potential environmental impacts caused by applying chemicals must also be considered, however.

**c. Fire treatments**

Fire is one of the basic tools relied upon by wildland owners/managers to achieve a myriad of management objectives in fire dependent ecosystems. Most North American plant communities evolved with recurring fire and, therefore, are dependent on recurring fire for maintenance. The natural fire return interval may vary from 1-2 years for prairies, 3-7 years for some long-needle pine species, 30-50 years for species such as California chaparral, and over one hundred years for species such as lodgepole pine and coastal Douglas-fir. When one management objective is to maintain a fire dependent ecosystem the effects of fire cannot be duplicated by other tools. In such cases, fire may be the preferred management tool even when other treatments may be equally effective for meeting other objectives. Fire can also be used to reduce heavy fuel loads and prevent catastrophic wildfires.

When fire is the chosen management tool, a combination of treatment methods may be the best approach to achieving the desired resource benefits with minimum air quality impacts. Combinations of treatments may include mechanically pretreating an area to thin the fuel load prior to the use of fire.

**2. Role of Federal Land Managers (FLM's)**

The major Federal agencies with land management responsibilities include the USDA FS, the DOI NPS, and FWS, BLM, and BIA. These agencies manage national parks, forests, monuments, wilderness areas, prairie grasslands, sea shores, Indian lands, wildlife refuges, etc. The Department of Defense and Department of Energy also manage millions of acres of Federal land at military bases, training centers and for other purposes.

**a. Federal land use and fire management planning**

Federal land use planning is an open process for setting land use and management goals and objectives. The planning process is designed for public participation, and must comply with NEPA. State/tribal air quality managers are given the opportunity to participate in land use



planning as part of normal intergovernmental consultation procedures. It is important for air quality managers to participate in public land use planning decisions to ensure that air quality concerns are adequately addressed. Through the public participation process, issues are identified and alternatives are discussed regarding methods for implementing land management activities such as trail building, improvement of wildlife habitat, timber harvesting, use of fire, etc. The environmental impacts of these activities are analyzed including, among other things, impacts on cultural resources, wildlife, vegetation, soils, riparian areas, wetlands, water quality, air quality, and visibility. Consideration of the air quality impacts of land management activities is essential to arriving at the best choice of treatments and response to fire.

Two or more levels of land use planning are conducted by FLM's to achieve management goals. First, broad scale and long-range land use plans must be developed for administrative units (e.g., forests, parks, refuges, sanctuaries, etc.). The land use plan identifies the scope of actions and goals for the lands and resources administered, and typically covers a 10 to 15-year period.

In addition to land use plans, there are other shorter term (typically 1-5 years) planning efforts where decisions are made concerning specific activities and programs, including the use of fire to achieve resource benefits. These may include programmatic plans, such as FMP's, or specific project plans.

The FMP's are strategic plans that define how wildland and prescribed fires will be managed to meet land use objectives. The FMP's must contain prescriptive criteria which are measurable and will guide selection of appropriate management actions in response to fires. The criteria can relate to suppression actions or describe when fire can be managed to gain resource benefits. This allows the use of a full range of appropriate management responses to fire, which may include: full suppression of a wildland fire; suppression on part of a wildland fire while allowing another portion of the fire to continue playing a natural ecological role and achieve resource benefits; or the use of prescribed fire.

Project plans are strategic plans to accomplish specific actions and goals established in a land use plan. Project plans may involve decisions regarding trade-offs between using mechanical, chemical and fire treatments. When projects include fires treatments, burn plans are also required. Burn plans are operational plans for managing specific fires. Burn plans prepared by

FLM's should include smoke management components to minimize fire emissions and mitigate air quality impacts.

**b. Evaluating environmental impacts**

Federal agencies evaluate the environmental impacts of the tools used for resource management on publicly owned lands using NEPA. They generally consider the impacts on, among other things, plant and animal species in the area, aquatic life, cultural resources, soil conditions, riparian areas, wetlands, water quality, air quality and visibility. Such analyses should be undertaken at both the individual project planning level and at the regional planning level if warranted by the extent of similar activities over a large area.

The impacts of resource management activities, particularly fire, on air quality can vary significantly by region. The impacts can be strongly affected by meteorology; existing air quality; the size, timing and duration of the activity; and other activities occurring in the same airshed at the same time. State/tribal air quality managers can provide technical assistance with evaluating potential air quality impacts, thus aiding FLM's in their selection of tools and evaluation of the environmental impacts.

Air quality and visibility impact evaluations of fire activities on Federal lands should:

- include recent historic (e.g. 10 years) and projected (life of the plan) annual or seasonal emissions from wildland and prescribed fires. Emission projections should be based on estimates provided by wildland owners/managers of acres burned, pre-burn fuel loading by vegetation type and consumption,
- be related to analyses of cumulative impacts of fires on regional and subregional air quality, when possible.
- identify applicable regulations, plans or policies (e.g. burn plans, authorization to burn, conformity, etc.),
- identify sensitive receptors,
- include description of planned measures to reduce smoke impacts,
- identify the potential for smoke intrusions into sensitive areas, and model air quality and visibility impacts, when possible,
- describe ambient air monitoring plans, when appropriate.

### **3. Role of State and Other Public Land Managers**

State and local land management agencies manage publicly owned lands similar to Federal lands. These agencies differ from agency to agency, but can include forestry, conservation, park service, or fish and game agencies, as well as State or local fire protection agencies. Many agencies prepare long-range land use plans as well as project specific plans. The FMP's, similar to those prepared by Federal agencies, may also be prepared. Public land management agencies generally assess the environmental impacts of proposed projects, such as fires managed for resource benefits, although the impacts evaluated vary from agency to agency.

Some State/local wildland managers also have responsibilities for private lands. Such responsibilities may include using fires and other fuels reduction programs aimed at reducing the potential for wildfires in the wildland/urban interface.

Land use planning for State and locally owned wildlands, although somewhat different from the Federal process, also requires preparation of written documents that are subject to public review. State/local wildland managers should notify air quality managers of long-range plans to use fire for resource management. They should consider alternative management tools and evaluate the potential air quality impacts of fires. State/local wildland managers should also participate in the development of State SMP's.

### **4. Role of Private Land Managers**

Private wildland owners/managers may or may not prepare written land use or project plans depending on the organization and the size of the property. States/tribes may or may not require written plans, but activities on privately owned lands must meet all applicable State and Federal environmental requirements. State requirements include any specific SIP requirements applicable to private land owners which are designed to ensure that the State complies with CAA requirements. Private land owners/managers should provide information to the State on long-range plans to use fire for resource management and should participate in the development of State SMP's.

## **5. Role of Indian Land Managers**

Land use plans for Indian wildlands are not subject to review by the general public and are not subject to State regulations. Activities on Indian lands must meet the requirements of the CAA and the TIP, however, if one has been adopted. It is important that Indian wildland managers consider alternative vegetation management tools and consider the air quality impacts of the management practices chosen both on and off of Indian lands. They are encouraged to collaborate with other near-by wildland owners/managers and air quality managers on regional SMP's to assure that fires managed for resource benefits will not cause adverse air quality impacts at sensitive receptors in the region.

## **6. Role of Air Quality Managers**

State air quality managers which have publicly owned wildlands within their jurisdiction, have a responsibility to participate in the public planning process conducted for those lands to be assured that air quality concerns are adequately addressed and they can meet the goals of their SIP's. They can participate in selecting the scope of land uses, identify air quality issues, and participate in evaluating and selecting alternative resource management tools. They can also participate in identifying basic air quality criteria for fire prescriptions. To accomplish this, air quality agencies should heed solicitations of public participation from land managers and contact public land management agencies within their jurisdiction

State/tribal air quality managers should also encourage private and Indian wildland owners/managers to consider alternative treatments and help them evaluate the potential air quality impacts of alternatives to meet particular management objectives.

## **B. Air Quality Management**

State/tribal air quality managers are responsible for adopting plans and rules sufficient to attain and maintain national and State air quality standards, prevent significant deterioration of air quality, remedy existing visibility impairment and prevent future impairment in mandatory Class I Federal areas caused by manmade sources of pollution. This is accomplished mainly by developing SIP's and TIP's. The SIP's/TIP's include all programs and rules required by the CAA to meet and assure maintenance of Federal standards. The SIP's/TIP's are frequently amended as State/tribal rules are revised and new rules are adopted to meet changing CAA requirements. The

EPA has the authority to adopt and implement Federal Implementation Plans (FIP's) to address air quality protection in areas where States or tribes do not adopt plans.

### **1. Role of State/Local Air Quality Managers**

The SIP's are developed in an extensive public process involving workshops and public hearings in which all stakeholders are invited to participate in developing the technical components of the plans including: (1) emission inventories; (2) modeling analyses; (3) attainment demonstrations; (4) transportation and general conformity emission budgets; (5) analyses of air quality data; and (6) control strategy development. State/local air quality managers should solicit information on the planned use of fire for resource management from all wildland owners/managers, just as they obtain information on other emission sources within their jurisdiction, when fires are expected to significantly impact air quality. Air quality managers should also work with adjacent States to mitigate potential impacts from interstate transport of smoke.

### **2. Role of Tribal Air Quality Managers**

Eligible tribes may develop TIP's to administer CAA requirements on Indian lands. The CAA recognizes tribal governments as the most appropriate parties to regulate the environment on Indian lands and grants EPA the authority to approve tribal programs. The EPA has developed strategies for Federally implementing CAA requirements if tribes do not adopt TIP's.

Tribal air quality managers should solicit information on the planned use of fire for resource management within their jurisdiction and the potential for air quality impacts on or from adjacent jurisdictions. They are encouraged to collaborate with other near-by air quality managers to develop regional SMP's which assure that fire activities will not cause adverse air quality impacts at sensitive receptors in the region.

### **3. Role of Public Land Managers**

Public land managers have the responsibility to participate with the other stakeholders and air quality managers in developing SIP's. Public land managers, as experts in what is needed to meet land use and other environmental objectives, need to provide information on the areas that are to be treated with fire, air pollutant emissions estimates, and assistance in developing programs to track emissions, monitor air quality and visibility, and mitigate air quality impacts.

The FLM's of mandatory Class I Federal areas must participate in the development of SIP's for regional haze and visibility impairment. Congress gave FLM's a key consulting role in the administration of visibility protection and "affirmative responsibility to protect air quality related values (including visibility) in mandatory Class I Federal areas." [See section 165 of the CAA.]

## **VI. SMOKE MANAGEMENT PROGRAMS (SMP's)**

The SMP's establish a basic framework of procedures and requirements for managing smoke from fires managed for resource benefits and are typically developed by States/tribes with cooperation and participation by wildland owners/managers. The purposes of SMP's are to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas. Some strong indications that an area needs a SMP are: (1) citizens increasingly complain of smoke intrusions; (2) the trend of monitored air quality values is increasing (approaching the daily or annual NAAQS for PM<sub>2.5</sub> or PM<sub>10</sub>) because of significant contributions from fires managed for resource benefits; (3) fires cause or significantly contribute to monitored air quality that is already greater than 85 percent of the daily or annual NAAQS for PM<sub>2.5</sub> or PM<sub>10</sub>; or (4) fires in the area significantly contribute to visibility impairment in mandatory Class I Federal areas.

If a State/tribe determines that a SMP is needed, they can adopt any type of program they believe will prevent NAAQS violations and address visibility impairment. For example, general fire regulations may establish basic parameters, such as wind speed, direction, location and distance to sensitive receptors, etc., within which fires can be ignited or naturally ignited fire can be allowed to continue to burn. States/tribes may allow wildland owners/managers to voluntarily notify them of fire plans or may require prior authorization. They may also exempt de minimis fires (fires that will cover fewer than X acres or consume less than Y tons of fuel, as established by the State/tribe) from meeting the regulations. Such regulations leave much discretion to wildland owners/managers as to when to ignite fires, and what management strategy to follow with naturally ignited fires. States/tribes may exercise enforcement authorities when wildland owners/managers are found to have ignited the fire outside of the parameters of the rule, or not to

have appropriately responded to air quality impacts caused by naturally ignited fires.

General fire regulations may be adequate for areas where fires managed for resource benefits rarely cause or contribute to air quality problems. However, when plans to use fire on a large scale could cause significant air quality impacts, or several wildland owners/managers within an airshed are expected to use fires concurrently, a more structured SMP requiring cooperation and coordination of fire activities may be required to minimize emissions and mitigate the air quality impacts.

State/tribal air quality managers, public wildland managers, private and Indian wildland owners/managers, and the general public should collaborate in the development and implementation of State/tribal SMP's. The State/tribal air quality manager must certify in a letter to the Administrator of EPA that at least a basic program has been adopted and implemented in order to receive special consideration under this policy of air quality data resulting from fire impacts, as explained in section VII. The SMP does not have to be incorporated into the SIP/TIP or be Federally enforceable, however. The following describes the basic components (A - F) of a certifiable SMP. There is considerable latitude within the components for individual State/tribal preferences.

**A. Authorization to Burn**

The SMP should include a process for authorizing or granting approval to manage fires for resource benefits within a region, State, or on Indian lands and identify a central authority responsible for implementing the program. The process may be as simple as receiving applications for permission to burn and granting approval via telephone or facsimile. The SMP central authority must review fire applications, consult with the applicants, if necessary, and promptly make burn/no burn decisions. When authorizing a fire, the authority should consider all open burning activities (land clearing and construction wastes, agricultural wastes, etc.) allowed within an airshed. The central authority should strive to treat public and private wildland owners/managers equitably when authorizing fires. Neighboring States/tribes are encouraged to create partnerships to coordinate fire projects when inter-jurisdictional impacts are expected, so as to meet air quality and fire management objectives. Fire emissions should be minimized and the air quality impacts should be mitigated regardless of political boundaries.

States/tribes may or may not require written burn plans for de minimis fires, especially if the central authority records pertinent fire information. However, written burn plans are strongly recommended for greater than de minimis fires. Burn plans should be prepared by the wildland owners/managers. The central authority should assist private land owners that cannot prepare their own plans. When written burn plans are required, especially for fires on publicly owned lands, they should include such information as the:

- location and description of the area to be burned,
- personnel responsible for managing the fire,
- type of vegetation to be burned,
- area (acres) to be burned,
- amount of fuel to be consumed (tons/acre),
- fire prescription including smoke management components (discussed below),
- criteria the fire manager will use for making burn/no burn decisions,
- safety and contingency plans addressing smoke intrusions.

The central authority's criteria for authorizing fires should be based on existing air quality and the ability of the airshed to disperse emissions (e.g., meteorological conditions) from all burning activities on the day of the burn. For fires lasting longer than one day, predicted meteorological conditions for several days should be considered to avoid aggravating existing problems. Persons receiving authorization to ignite fires must comply with all applicable local, State, tribal and Federal requirements. Persons responsible for managing greater than de minimis fires should be adequately trained in fire and smoke management. Fire managers should be required to follow the authorized burn plan or explain why it was necessary to deviate from the plan.

**B. Minimizing Air Pollutant Emissions**

The SMP should encourage wildland owners/managers to consider the alternative treatments discussed in section V.A.1., above. Public land managers typically consider and evaluate alternative treatments that may achieve management objectives, their costs and the environmental impacts of each method. States/tribes should assist private land owners to also identify economically feasible treatments that will meet their objectives with minimum air pollutant



emissions. When the use of fire is selected as the best means to accomplish management goals, there are several ways to reduce emissions from a single fire. The approaches fall into four categories and their applicability varies by fuel type, (1) minimize the area burned, (2) reduce the fuel loading in the area to be burned, (3) reduce the amount of fuel consumed by the fire, (4) minimize emissions per ton of fuel consumed. These emission reduction techniques rely almost exclusively on reducing the amount of fuel consumed by a particular fire. The excluded fuels could be consumed by a subsequent fire, however, unless they are removed from the area or biologically decompose. Also, generally these techniques cannot be used to reduce emissions from naturally ignited fires.

Emission reduction techniques are discussed further in the white paper “What Wildland Fire Conditions Minimize Emissions and Hazardous Air Pollutants and Can Land Management Goals Still be Met?” See Section I to obtain a copy.

### **C. Smoke Management Components of Burn Plans**

When burn plans are required they should include the following smoke management components.

#### **1. Actions to Minimize Fire Emissions**

The burn plan should document the steps taken prior to the burn and actions that will be taken during and after the burn to reduce air pollutant emissions. This includes measures that will be taken to reduce residual smoke, such as rapid and complete mop-ups, mop-ups of certain fuels, etc.

#### **2. Evaluate Smoke Dispersion**

The central authority should evaluate dispersion conditions prior to authorizing fires. Burn plans should evaluate potential smoke impacts at sensitive receptors and time fires to minimize exposure of sensitive populations and avoid visibility impacts in mandatory Class I Federal areas. The plan should identify the distance and direction from the burn site to local sensitive receptor areas and to regional/interstate areas where appropriate. Fire prescriptions submitted prior to the day of the fire must specify minimum requirements for the atmospheric capacity for smoke dispersal such as minimum surface and upper level wind speeds, desired wind direction, minimum mixing height, and dispersion index. It may be necessary to purchase

meteorological services from private companies if they are not available from the National Weather Service.

### **3. Public Notification and Exposure Reduction Procedures**

The plan should identify actions that will be taken to notify populations and authorities (e.g., local air quality managers) at sensitive receptors, including those in adjacent jurisdictions, prior to the fire. The plan should also identify contingency actions that will be taken during a fire to reduce the exposure of people at sensitive receptors if smoke intrusions occur. The central authority should perform these functions, if needed, for some private land owners. Appropriate short-term (less than 24-hour) contingency actions may, among other things, include:

- Notifying the affected public (especially sensitive populations) of elevated pollutant concentrations,
- Suggesting actions to be taken by sensitive persons to minimize their exposure (e.g., remain indoors, avoid vigorous activity, avoid exposure to tobacco smoke and other respiratory irritants),
- Providing clean-air facilities for sensitive persons,
- Halting ignitions of any new open burning that could impact the same area,
- Analyzing the fire situation and identifying alternative management responses upon becoming aware that a fire is out of air quality prescription with regard to the air quality criteria, (Federal land management agencies perform a Wildland Fire Situation Analysis)<sup>3</sup>,
- Consulting State/tribal air quality managers regarding appropriate short-term fire management response to abate verified impacts,
- Implementing management responses that will mitigate the adverse impacts to public health,

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<sup>3</sup> A Wildland Fire Situation Analysis (WFSA) is a decision-making process that evaluates alternative fire management strategies considering fire fighter and public safety, risk to property and resources, fire fighting resources available, land management objectives, and environmental, social, economic and political constraints. The environmental and social constraints considered include, among other things, how air quality and/or visibility will be affected at sensitive receptors by each alternative fire management strategy. The positive, neutral or negative effects of each alternative on the criteria above are weighed to select the appropriate management response to the fire. Therefore, while mitigating air quality and visibility impacts must be considered by the FLM when managing a fire that is not within a prescription, they are just two of several important criteria evaluated.

- Reporting the steps taken to mitigate adverse impacts to the public and appropriate State/tribal agencies after they have been completed.

#### **4. Air Quality Monitoring**

The plan should identify how the effects of the fire on air quality at sensitive receptors, and visibility in mandatory Class I Federal areas will be monitored. The extent of the monitoring plan should match the size of the fire. For small fires, visual monitoring of the direction of the smoke plume and monitoring nuisance complaints by the public may be sufficient. Other monitoring techniques include posting personnel on vulnerable roadways to look for visibility impairment and initiate safety measures for motorists; posting personnel at other sensitive receptors to look for smoke intrusions; using aircraft to track the progress of smoke plumes; and continued tracking of meteorological conditions during the fire. For large fires expected to last more than one day, locating real-time PM monitors at sensitive receptors may be warranted to facilitate timely response to smoke impacts. If needed, the central authority may perform these monitoring functions for some private land owners.

For additional information on monitoring wildland fire impacts see the white paper “Air Monitoring for Wildland Fire Operations.” See Section I to obtain a copy.

#### **D. Public Education and Awareness**

The SMP should establish criteria for issuing health advisories when necessary, and procedures for notifying potentially affected populations, including those in adjacent jurisdictions, of planned fires. A program should be implemented to explain the use and importance of fire for ecosystem management, the implications to public health and safety, and the goals of the SMP. Wildland and air quality managers should work with the press to announce pre-fire health advisories, and post-fire results including such things as the management objectives met; smoke intrusions observed, and/or successful minimization of air quality impacts.

#### **E. Surveillance and Enforcement**

The SMP should include procedures to ensure that wildland owners/managers will comply with the requirements of the SMP. Fire managers must follow the burn plan, including the fire prescription and smoke management components, or explain any deviations from the plan. Memorandums of understanding may be used to specify the responsibilities of each State/tribal

agency in implementing the SMP.

**F. Program Evaluation**

The SMP should provide for periodic review by all stakeholders of its effectiveness and revision of the program as necessary. The effectiveness review should be based on observations such as reports of smoke intrusions, nuisance complaints, and monitored air quality impacts. Post-burn reports should be required for fires that exceed their air quality prescription and/or fires that cause smoke impacts at sensitive receptors. Post-burn reports for escaped fires should describe the incident, describe the contingency plan implemented, and provide recommendations to prevent future smoke related problems.

State/tribal SMP's should include procedures for re-evaluating the effectiveness of rules and regulations every 3 to 5 years. Such procedures should involve all the original participants (e.g., wildland owners/managers, air quality managers, the public, etc.) and should review the:

- Acres of fires managed for resource benefits planned for the next 5 years,
- Need to expand the scope of the program to include authorization of other open burning,
- Need for changes in the SMP.

**G. Optional Air Quality Protection**

The following components are not required in a basic SMP, but States/tribes may adopt more stringent SMP's or include additional smoke management requirements. For example, "special protection zones" may be established to provide better protection against smoke impacts. Special protection zones could be buffers (e.g., 10 - 25 miles) around wildland/urban interface areas, nonattainment areas, or mandatory Class I Federal areas. Additional requirements for burns within a special protection zone may include no burning if high pollution levels already exist in the area. Also, special protections may only be required for burns that will last overnight, for multi-day burns or burns during specific seasons.

States/tribes may also establish "performance standards" that would trigger implementation of additional smoke management requirements if exceeded in an area. The performance standards could set limits on the frequency and intensity (e.g., hours/day, PM concentration, visibility impairment) of smoke intrusions. Implementation of performance

standards may require real-time monitoring of air quality. Additional requirements for fires after the performance standards are exceeded may include better dispersion parameters (e.g., increased wind speed, mixing height, dispersion index, etc.).

## **VII. ACCOUNTABILITY**

### **A. Role of State/Tribal Air Quality Managers**

High PM concentrations attributable to fires managed for resource benefits are valid air quality data that can be used to determine the attainment status of the area represented by the data for both the daily and annual NAAQS. State/tribal air quality managers are responsible for monitoring citizen complaints and air quality trends attributable to fires to determine when a SMP is needed to minimize emissions and mitigate air quality impacts. Air quality managers should initiate the collaborative process needed to develop and adopt regulations for a SMP. If the State/tribal air quality manager certifies in a letter to the Administrator of EPA that at least a basic program (described in section VI) has been adopted and implemented, special consideration will be given under this policy to air quality data resulting from fires managed for resource benefits.

#### **1. Wildfires**

High PM concentrations attributable to wildfires (unwanted wildland fires) can be treated as due to a natural event under EPA's Natural Events Policy. The Natural Events Policy provides that when areas violate the PM<sub>10</sub> NAAQS due to a natural event, EPA will: (1) exercise its discretion, under section 107(d)(3) of the CAA, not to redesignate areas as nonattainment if the State develops and implements a plan to respond to the health impacts of natural events; and, (2) redesignate nonattainment areas as attainment by applying appendix K, on a case-by-case basis, to discount [ambient air quality] data in circumstances where an area would attain but for exceedances that result from uncontrollable natural events. The elements of a State/tribal action plan to respond to the health impacts of natural events are described in the Natural Events policy statement. The EPA plans to revise the Natural Events Policy to also cover PM<sub>2.5</sub> NAAQS violations.

#### **2. Fires Managed for Resource Benefits**

High PM concentrations attributable to fires managed for resource benefits will be given special consideration under this policy, as described in section VII.B., if the State/tribe has

certified to EPA that it is implementing a basic SMP. States/tribes should flag monitored values influenced by fires when submitting the data to EPA's Atmospheric Information Retrieval System. They must also document the basis for flagging the data. Supporting information could include the location of fires relative to the monitor, meteorological data such as wind speed and direction, filter analyses indicating heavy carbon deposits, the sample date (collected during the fire season), and the absence of other carbon sources during that period, among other things. The documentation should address the possible influence of other carbon sources such as wood-fired boilers, residential wood combustion and wildfires. The type and amount of documentation should be sufficient to demonstrate that fires managed for resource benefits caused flagged values to be above the level of the annual NAAQS. The documentation should be made available to the public for review. [For example, newspaper announcements, periodic air quality reports, distribution at public meetings.]

When smoke intrusions cause high PM concentrations, air quality managers have two goals: (1) to reduce immediate impacts on public health, and (2) to take appropriate steps to mitigate future impacts. To meet these goals, air quality managers must contact the wildland owner/manager responsible for the fire(s) to determine the cause of the impacts. The air quality manager should verify that contingency actions to reduce exposure are being implemented, and determine whether, (i) the fire was authorized, (ii) a burn plan (including the smoke management components) was followed, (iii) the prescription failed and why.

If requirements of the SMP were not met, the State/tribe can exercise various enforcement authorities to address the problem. If the fire manager complied with the SMP, the adequacy of the requirements should be reviewed. If air quality data are frequently flagged as resulting from failure of the smoke management components of the burn plan, EPA will call on the State/tribe to work with wildland owners/managers to improve future burn plans and the SMP. When a fire managed for resource benefits breaks out of its fire prescription, and cannot be returned to the prescription, the fire manager will treat it as a wildfire for the purposes of suppression. However, any resulting high PM concentrations must continue to be addressed under this policy, and the data can not be treated as due to a wildfire natural event.

**B. Role of the Environmental Protection Agency**

## 1. Impacts with a SMP

If fires managed for resource benefits cause or significantly contribute to violations (see definition) of the daily or annual PM<sub>2.5</sub> or PM<sub>10</sub> NAAQS, the State/tribe must submit the following documentation to EPA to avoid a SIP/TIP call or redesignation of the area to nonattainment:

- ▶ Evidence supporting the finding that flagged air quality values were due to fires managed for resource benefits,
- ▶ Evidence that the fires were subject to a certified State/tribal SMP.

The State/tribe may consider that such fires caused or significantly contributed to violations of the daily NAAQS if 25 percent of all the PM concentrations that are above the level of the daily NAAQS, have been flagged as being due to fire impacts.

The State/tribe may consider that such fires caused or significantly contributed to violations of the annual NAAQS if the sum of the measured concentrations for all days flagged as due to fires, divided by the total number of sample days (fire days plus non-fire days) is greater than or equal to 25 percent of the annual NAAQS (i.e., 4 µg/m<sup>3</sup> for PM<sub>2.5</sub> or 12 µg/m<sup>3</sup> for PM<sub>10</sub>).

If the evidence is convincing, EPA will exercise its discretion under section 107(d)(3) not to redesignate the area as nonattainment. Rather, following the first NAAQS violation based on 3 calendar years of PM air quality data, EPA will call on the State/tribe to review the effectiveness of the SMP in collaboration with wildland owners/managers and make appropriate improvements to mitigate future air quality impacts. The same procedure will be followed if a second NAAQS violation occurs the following year. If fires cause or significantly contribute to a third consecutive NAAQS violation, EPA will call for the SMP to be made part of the SIP/TIP and be Federally enforceable.<sup>4</sup> If the area was designated nonattainment previously, EPA will also call on the State/tribe to review the effectiveness of the SMP and make appropriate improvements.

## 2. Impacts Without a SMP

If a certified SMP has not been implemented, EPA will not give special consideration to the high PM concentrations attributed to fires managed for resource benefits that cause or

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<sup>4</sup>For example, the first violation of the PM<sub>10</sub> NAAQS may be determined using air quality data for calendar years 1997-1999. Subsequently, 1998-2000 data for the same area could show a second violation, and data for 1999-2001 could identify a third violation for the area.

significantly contribute to: (1) violations of a PM<sub>2.5</sub> or PM<sub>10</sub> NAAQS, (2) visibility impairment in mandatory Class I Federal areas, or (3) failure to achieve reasonable progress toward the national visibility goal. Rather, EPA will call for adoption of the basic SMP, described in section VI, as part of the SIP/TIP for PM and visibility. The EPA will also notify the governor of the State or the tribal government that the area should be redesignated as nonattainment. The SMP adopted in response to the SIP/TIP call must require mandatory participation for greater than de minimis fires, must be adopted into the SIP/TIP, and must be Federally enforceable. The SIP/TIP will also have to meet all other CAA requirements applicable to nonattainment areas.

### **3. Interstate Transport of Smoke**

Several key provisions of the CAA address interstate pollutant transport. Section 110(a)(2)(D) provides that a SIP must contain provisions preventing subject sources from contributing significantly to nonattainment problems or interfering with maintenance in any other State. That section also prohibits interference with any SIP required measures under part C to prevent significant deterioration or to protect visibility. Section 169A authorizes EPA to promulgate regulations requiring states that “may reasonably be anticipated to cause or contribute to” visibility impairment in mandatory Class I Federal areas to include in their SIP’s measures necessary to eliminate or reduce such impairment. Section 126 provides that, in response to petitions from government entities regarding significant pollutant transport, EPA may prescribe certain corrective measures. Also, sections 169B, 176A and 184 contain provisions for cooperatively addressing interstate pollution problems by establishing interstate transport regions and commissions to address region wide pollution and visibility concerns. The EPA promulgated a final rule, pursuant to the requirements of section 301(d) of the CAA that authorizes eligible Indian tribes to also implement these provisions.<sup>5</sup> If fires managed for resource benefits in one State (or on Indian lands) cause or significantly contribute to NAAQS violations in another State (or on Indian lands), EPA is authorized to take action under section 110(k)(5) of the CAA to address the problem. If, among other things, EPA finds that a SIP/TIP is substantially inadequate to attain or maintain the NAAQS, it may require the SIP/TIP to be revised to correct the

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<sup>5</sup>See Volume 63 Federal Register 7254, February 12, 1998.



inadequacy (e.g., transported smoke).

### **C. Role of Wildland Owners/Managers**

Wildland owners/managers are responsible for following State/tribal regulations applicable to fires, obtaining authorization to burn, and following the approved burn plan, when one is required. Owners/managers are responsible for taking appropriate actions to control the fire and reduce exposure to smoke when adverse air quality impacts result from a failure of the air quality prescription or an escaped fire.

There is a special need for fires managed by Federal agencies to have burn plans that include smoke management components. Fires managed by Federal agencies are most likely to impact air quality in recreation areas (national parks, forest, etc.) and impair visibility in mandatory Class I Federal areas. The EPA encourages Federal agencies to include smoke management components in all burn plans, regardless of the existence of a State/tribal SMP.

### **VIII. DATA ON WILDLAND and PRESCRIBED FIRES**

Most of a State/tribal program to protect air quality is contained in a SIP or TIP. Since the use of fire for resource management is expected to increase substantially, especially on Federal lands, State/tribal air quality managers will need information to develop potential annual or seasonal air pollutant emission estimates for SIP/TIP planning. As for any source, emissions from fires can be estimated by multiplying the estimated level of activity by an emission factor. The level of activity for fire is the mass of biomass (fuel) consumed, usually expressed in tons. Emission factors expressed in pounds per ton of fuel consumed are available in EPA's publication AP-42 (which is scheduled to be updated). Emission factors are derived from an estimate of overall combustion efficiency (i.e. stoichiometric ratio). The mass of fuel consumed is the product of fire size (acres), pre-burn fuel loading (tons per acre), and fuel consumption (percent of pre-burn loading). An emission inventory can be compiled by the affected air agency for an individual fire, a statistical class of fires, a burn program, or a population of fires in a given area over a period of time based on this information.

Federal land management agencies currently collect data on wildland and prescribed fires, however, no standard reporting format is followed. These raw data are usually limited to the time and approximate location of the fire, fire perimeter area, weather (occasionally) and a

qualitative description of fuels at the point of ignition. The data are not collected for the purpose of calculating air pollutant emissions and are probably inadequate for that purpose.

A National Interagency Fire Statistics Information Project has been initiated to develop an easily accessible system for storing a set of commonly agreed upon fire data. Post-burn data, such as that described above, on future wildland and prescribed fires would be stored in this database. The database will be accessible by air quality managers to estimate past, current, and future emission trends from this source category.

The EPA encourages the Federal land management agencies to develop the fire statistics database and FLM's to report fire data to the system. These fire data will be needed by air quality managers in regions where most wildland and prescribed fires occur on Federal lands. Air quality managers should request similar fire data for wildland and prescribed fires on State, private and Indian wildlands as well as information on other types of open burning to complete their emission inventories.

Statewide emissions from fire use in all 50 states during 1989 have been estimated based on a survey of [Federal, State and private] land owners/managers. [Ref. Peterson/Ward] Also, a spatially resolved inventory of prescribed burning by county for 1990 and by 50km grid for 1995, 2015 and 2040 was prepared for 10 western States as part of the Grand Canyon Visibility Transport Commission's activities. [Ref. Peterson/Lahm] The emission estimates are based on fuel models derived from 14 types of vegetative cover spatially mapped throughout the area and estimates of fuel loadings as either low, medium or high. The procedures followed by Peterson and Lahm to estimate emissions for the western states provide a good model for developing emissions estimates for other areas, also.

Further information on developing emissions estimates and the data required can be found in the white paper "Emission Inventories for SIP Development." See Section I to obtain a copy.

## **IX. MEETING OTHER CLEAN AIR ACT REQUIREMENTS**

### **A. Demonstrate Conformity of Federal Activities**

Activities on Federal lands must meet the requirements of the CAA, including the provisions of section 176(c), that such activities "conform" to the purpose of the applicable SIP. The EPA's Conformity rules, implementing the provisions of section 176(c), only apply to

**Federal** actions taken within a nonattainment or maintenance area. The Transportation Conformity rules govern transit-related activities, and all other type of activities are governed by the General Conformity rules. The rules require a Federal agency to demonstrate, prior to initiating a project, that its action conforms to all applicable requirements in a SIP and will not cause or contribute to NAAQS violations. The General Conformity rules provide Federal agencies with several options for demonstrating conformity. The following options are most typically followed : (1) a modeling demonstration to show that emissions from the project will not increase the frequency or severity of a NAAQS violation, (2) obtaining emission reductions that offset the new project emissions, or (3) showing that the project's emissions are already included in, or accommodated by, the emissions inventory of the SIP for the relevant nonattainment or maintenance area. Federal activities occurring on tribal lands will be addressed by EPA consistent with its Tribal Air Rule and the requirements of the CAA.

The above procedures can be followed to demonstrate conformity of fire projects for a Federal land management agency's administrative units based on the FMP's developed for such units. The demonstration can be made on an annual basis for all burns within the airshed of a nonattainment or maintenance area. Alternatively, the demonstration can be made for each individual fire project conducted at the administrative unit.

In addition to the previously cited methods for demonstrating conformity of Federal fire projects, EPA will pursue, in consultation with the other Federal agencies, adding an alternative method to the General Conformity rules through rulemaking. At a minimum, EPA believes that the alternate method should require a Federal agency to document that its fire projects are managed within a certified SMP. The SMP also must require regional coordination (cooperation of all jurisdictions in an airshed) of burn plan authorization and real-time air quality monitoring at sensitive receptors, when warranted, in addition to the basic program components discussed in section VI.

## **B. Visibility/Regional Haze Requirements**

The EPA's visibility regulations (45 FR 80084, December 2, 1980) protect mandatory Class I Federal areas from manmade impairment that is "reasonably attributable" to a single emission source or small group of sources. FLM's for mandatory Class I Federal areas have a key

consultative role and responsibility to participate in the development of SIP's for visibility impairment that is reasonably attributable to specific sources. In Part C of the CAA which includes the visibility protection mandate, Congress assigned FLM's the "affirmative responsibility to protect air quality related values (including visibility)" in mandatory Class I Federal areas. Under EPA's regulations, States must take appropriate actions to address all sources of visibility impairment, including fires, in response to a FLM's certification of reasonably attributable impairment in mandatory Class I Federal areas.

A new regulatory program to protect mandatory Class I Federal areas from "regional haze" impairment was proposed by EPA on July 31, 1997 (62 FR 41137). After the regional haze rules become final, States will need to address the impacts of fires and other contributing sources on meeting reasonable progress in their control strategy analyses, as well as during periodic progress assessments. The EPA will revisit this section of the Air Quality Policy on Wildland and Prescribed Fires after the final rules for implementing the regional haze program have been promulgated. The EPA will also develop guidance on assessing natural background visibility to aid in implementing the regional haze rules, and will consider the following paper at that time. The white paper "Estimating Natural Emissions From Wildland and Prescribed Fire" presents preliminary options for defining natural wildland and prescribed fire emissions that may or may not be consistent with the final regional haze rules. See Section I to obtain a copy.

### **C. Prevention of Significant Deterioration**

Title I, part C of the CAA requires SIP's to include provisions to prevent the significant deterioration of air quality in areas designated as attainment or unclassifiable for any NAAQS. "Significant deterioration" for any pollutant is defined as an unacceptable incremental increase in ambient concentrations above the baseline concentration for that pollutant in an area. The PSD "increments" have been established for SO<sub>2</sub>, NO<sub>2</sub>, and PM<sub>10</sub>. The EPA adopted NAAQS for PM<sub>2.5</sub>, which became effective on September 16, 1997. However, no increments have yet been promulgated for PM<sub>2.5</sub>.

The SIP's are required to contain emission limits and such other measures as may be necessary to prevent significant deterioration of air quality. See section 161 of the Act. In addition, SIP's are required to include a preconstruction review permit program for new and

modified major stationary sources. See section 165 of the Act. The SIP's must ensure that increases in emissions from all types air pollution sources do not cause the allowable increment for a pollutant to be exceeded.

While fires managed for resource benefits generally are not subject to a preconstruction review and the issuance of a PSD permit, the emissions from such activities may affect the air quality in a PSD area. Under adverse conditions, the combined PM emissions from increased fire activities and from other sources could possibly result in ambient concentrations that exceed the allowable PSD increments for PM. Historically, EPA has often regarded fires managed for resource benefits to be temporary activities.<sup>6</sup> The PM emissions resulting from fire activities differ from the PM emissions generated by most other sources because they are generally short-lived. That is, the burning generally is carried out infrequently at a specific location (once every 5-20 years) and the duration tends to be short (approximately 1-2 days). Even with the proposed increased utilization of fire as a resource management tool, the resulting PM emissions are expected to be relatively uncommon at a particular location and of short duration.

Section 163(c)(1)(C) of the Act authorizes States with approved PSD programs to exclude (with the Administrator's approval) concentrations of PM caused by "construction or other temporary emission-related activities" when determining compliance with the PSD increments. The EPA generally supports the concept of allowing States with approved SIP's to exclude emissions caused by temporary managed fire activities from increment analyses, provided the exclusion does not result in permanent or long-term air quality deterioration. Nevertheless, the decision as to whether PM emissions from fire activities should be counted against the PSD increments for PM is a decision to be made by individual States. The EPA expects States to consider the extent to which a particular type of prescribed burning activity is truly temporary, as opposed to those activities which can be expected to occur in a particular area with some regularity over a period of time.

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<sup>6</sup>See Volume 58 Federal Register 31633, June 3, 1993.

## DEFINITIONS

**Air Quality:** The characteristics of the ambient air (all locations accessible to the general public) as indicated by concentrations of the six air pollutants for which national standards have been established [i.e., particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), carbon monoxide (CO) and lead], and by visibility in mandatory Federal Class I areas. For the purposes of this policy, concentrations of PM are taken as the primary indicators of ambient air quality.

**Air Quality Manager:** The regulatory body responsible for managing the air quality protection program for a State, local or tribal government.

**Air Quality Related Values (AQRV):** Those special attributes of a mandatory Class I Federal area that deterioration of air quality may adversely affect. Some examples of AQRV include: flora and fauna, water, visibility, and odor among others.

**Ambient Air:** That portion of the atmosphere, external to buildings, to which the general public has access.

**Administrative Unit:** A unit of land (Forest, Refuge, Park, etc.) under the administration of a public land management agency.

**AP-42:** The Environmental Protection Agency's (EPA) Compilation of Air Pollutant Emission Factors for stationary point, area, and mobile sources. An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. Emission factors are then used to estimate the magnitude of a source's pollutant emissions.

The plan includes the project objective, fire prescription (including smoke management components), personnel, organization, equipment, etc.

**Class I Area:** An area set aside under the Clean Air Act (CAA) to receive the most stringent protection from air quality degradation. Mandatory Class I Federal areas are (1) international parks, (2) national wilderness areas which exceed 5,000 acres in size, (3) national memorial parks which exceed 5,000 acres in size, and (4) national parks which exceed 6,000 acres and were in existence prior to the 1977 CAA Amendments. The extent of a mandatory Class I Federal area includes subsequent changes in boundaries, such as park expansions.

**De Minimis Fires:** Fires that will cover fewer than X acres or consume less than Y tons of fuel, as established by a State or tribe.

**Federal Implementation Plan (FIP):** A plan (or portion thereof) promulgated by the Administrator, as provided for under the CAA and any applicable EPA regulations, including regulations governing tribal air plans, to fill all or a portion of a gap or otherwise correct all or a portion of an inadequacy in a State or tribal implementation plan (TIP), and which may include enforceable emission limitations or other control measures, means or techniques (including economic incentives, such as marketable permits or auctions of emissions allowances), and provides for attainment of the relevant national ambient air quality standard (NAAQS).

**Federal Land Manager (FLM):** With respect to any lands in the United States, the Secretary of the Federal department with authority over such lands. Generally, the Secretaries delegate their authority to specific elements within each department. For example, the National Park Service and the Fish and Wildlife Service manage those areas under the authority of the Department of the Interior.

**Fire Dependent Ecosystem:** A community of plants and animals that must experience recurring disturbances by fire, in order to sustain its natural plant succession, structure and composition of vegetation, and maintain appropriate fuel loading and nutrient cycling to ensure proper ecosystem function.

**Fire Management Plan (FMP):** A strategic plan that defines a program to manage wildland and prescribed fires, and documents the FMP to meet management objectives outlined in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, burn plans and prevention plans.

**Fuel:** Includes combustible vegetative matter such as grass, trees, shrubs, limbs, branches, duff, and stumps.

**Indian Land:** Indian land in this document refers to Indian country which is (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the

limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. [See 18 U.S.C. 1151.]

**Land Use Plan:** A broad scale, long range plan (e.g., forest plan, refuge plan or resource management plan) that identifies the scope of actions and goals for the land and resources administered by a land owner/manager.

**National Ambient Air Quality Standards (NAAQS):** Standards for maximum acceptable concentrations of pollutants in the ambient air to protect public health with an adequate margin of safety, and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g., visibility impairment, soiling, materials damage, etc.) in the ambient air.

**National Environmental Policy Act (NEPA):** Establishes procedures that Federal agencies must follow in making decisions on Federal actions which may impact the environment. Procedures include evaluation of environmental effects of proposed actions, and alternatives to proposed actions; involvement of the public and cooperating agencies.

**Nuisance Smoke:** Amounts of smoke in the ambient air which interfere with a right or privilege common to members of the public, including the use or enjoyment of public or private resources.

**Particulate Matter (PM):** Any airborne finely divided material, except uncombined water, which exists as a solid or liquid at standard conditions (e.g., dust, smoke, mist, fumes, or smog).

**PM<sub>2.5</sub>:** Particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

**PM<sub>10</sub>:** Particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (including PM<sub>2.5</sub>).

**Prescribed Fire:** Any fire ignited by management actions to meet specific objectives (i.e., managed to achieve resource benefits).

**Prescription:** Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include the meteorological conditions affecting the area under prescription, as well as factors related to the state of the area to be burned such as



the fuel moisture condition and other physical parameters. Other criteria which may be considered include safety, economic, public health, environmental, geographic, administrative, social or legal considerations, and ecological and land use objectives.

**Prevention of Significant Deterioration (PSD):** A requirement in the CAA, which establishes the maximum allowable increases in ambient air concentrations of selected air pollutants above baseline concentrations in areas designated as Class I, Class II, or Class III.

**Project Plan:** A strategic plan for accomplishing specific actions and goals (objectives) established in a land use plan. A project may include several activities such as cutting and hauling trees and shrubs, planting trees, building trails, and fire treatment.

**Regional Haze:** Generally, concentrations of fine particles in the atmosphere extending up to hundreds of miles across a region and promoting noticeably hazy conditions; wide-spread visibility impairment, especially in mandatory Class I Federal areas where visibility is an important value.

**Sensitive Receptors:** Population centers such as towns and villages, camp grounds and trails, hospitals, nursing homes, schools, roads, airports, mandatory Class I Federal areas, etc. where smoke and air pollutants can adversely affect public health, safety and welfare.

**Smoke Management Program (SMP):** Establishes a basic framework of procedures and requirements for managing smoke from fires that are managed for resource benefits. The purposes of SMP's are to mitigate the nuisance and public safety hazards (e.g., on roadways and at airports) posed by smoke intrusions into populated areas; to prevent deterioration of air quality and NAAQS violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with the regional haze rules.

**State Implementation Plan (SIP):** A CAA required document in which States adopt emission reduction measures necessary to attain and maintain NAAQS, and meet other requirements of the Act.

**Suppression:** A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

**Tribal Implementation Plan (TIP):** A document authorized by the CAA in which eligible tribes adopt emission reduction measures necessary to attain and maintain NAAQS, and

meet other requirements of the CAA for lands within tribal jurisdictions.

**Violation of the PM NAAQS:** As revised in 1997, the daily  $PM_{10}$  standard is violated when the 99th percentile of the distribution of 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds  $150 \mu\text{g}/\text{m}^3$  at any monitor within an area. The annual  $PM_{10}$  standard is violated when the arithmetic average of 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds  $50 \mu\text{g}/\text{m}^3$  at any monitor within an area.

The new NAAQS levels for  $PM_{2.5}$  are set at a daily concentration less than or equal to  $65 \mu\text{g}/\text{m}^3$ , and an annual mean concentration of less than or equal to  $15 \mu\text{g}/\text{m}^3$ . The daily standard is violated when the 98th percentile of the distribution of the 24-hour concentrations for a period of 1 year (averaged over 3 calendar years) exceeds  $65 \mu\text{g}/\text{m}^3$  at any monitor within an area. The annual standard is violated when the annual arithmetic mean of the 24-hour concentrations from a network of one or more population-oriented monitors (averaged over 3 calendar years) exceeds  $15 \mu\text{g}/\text{m}^3$ . Compliance with the annual  $PM_{2.5}$  NAAQS is based on population-oriented monitors because the health information, upon which the standard is based, relates area-wide health statistics to area-wide air quality as measured by one or more monitors.

**Volatile Organic Compounds (VOC):** Any organic compound which participates in atmospheric photochemical reactions, which are measured by a reference method, an equivalent method, or an alternative method. Some compounds are specifically listed as exempt due to their having negligible photochemical reactivity. [See 40 CFR 51.100.] Photochemical reactions of VOC's with oxides of nitrogen and sulfur can produce  $O_3$  and PM.

**Wildfire:** An unwanted wildland fire.

**Wildland:** An area where development is generally limited to roads, railroads, power lines, and widely scattered structures. The land is not cultivated (i.e., the soil is disturbed less frequently than once in 10 years), is not fallow, and is not in the United States Department of Agriculture (USDA) Conservation Reserve Program. The land may be neglected altogether or managed for such purposes as wood or forage production, wildlife, recreation, wetlands or protective plant cover. **[The distinction between wildlands, to which the recommendations in this document apply, and agricultural lands is subject to further discussion.]**

**Wildland Fire:** Any non-structural fire, other than prescribed fire, that occurs in the

wildland. Note: Wildland fires include unwanted (wild) fires and naturally ignited fires that are managed within a prescription to achieve resource benefits.

**Wildland Fire Situation Analysis (WFSA)**: A real time decision-making process carried out by federal land management agencies to select an appropriate management response to wildland fire. The WFSA considers fire fighter and public safety, risk to property and resources, fire fighting resources available, land management objectives and environmental, social economic and political constraints. The environmental and social constraints considered include, among other things, how air quality and/or visibility will be affected at sensitive receptors by each alternative fire management strategy.

**Wildland/Urban Interface**: The line, area or zone where structures and other human development meets or intermingles with the wildland.