OKLAHOMA’S Smoke Management Plan

Smoke Management Guidelines and Regulations for Oklahoma
Mr. Ron Curry, Regional Administrator  
U.S. Environmental Protection Agency – Region VI (6 PD-L)  
1445 Ross Avenue, Suite 1200  
Dallas TX 75202-2733

RE: Oklahoma Smoke Management Plan Certification

Dear Mr. Curry:

The Oklahoma Department of Agriculture, Food, and Forestry (ODAFF) and the Oklahoma Department of Environmental Quality (DEQ) are pleased to present the Oklahoma Smoke Management Plan (SMP) to the U.S. Environmental Protection Agency (EPA). The SMP is being submitted pursuant to the guidelines set forth by EPA in the Interim Air Quality Policy on Wildland and Prescribed Fires (April, 1998).

Recognizing the benefits of prescribed and wildland fires to forest management, wildlife management, and agriculture, the SMP was developed by ODAFF and DEQ in cooperation with federal and private stakeholders in an effort to mitigate smoke emissions from prescribed and wildland fires. These measures protect the public, Oklahoma’s forest protection areas, Class I areas, and smoke sensitive areas while permitting fire to be utilized as a viable land management tool.

This letter certifies the agencies hereby agree to implement and maintain the SMP by utilizing a Memorandum of Agreement between ODAFF and DEQ, which was executed on February 28, 2013 and accompanies this document.

If you have any questions or require additional information, please contact Cheryl Bradley at 405-702-4218.

Jim Reese  
Commissioner of Agriculture  
Department of Agriculture, Food, and Forestry

Steve Thompson  
Executive Director  
Department of Environmental Quality

2/28/13  
Date

2-28-13  
Date
MEMORANDUM OF AGREEMENT
Between
Oklahoma Department of Agriculture, Food and Forestry
Forest Services Division
and
Oklahoma Department of Environmental Quality
Air Quality Division

This Memorandum of Agreement (hereinafter referred to as MOA) was made and entered into on the 28th day of February, 2013, by and between the Oklahoma Department of Agriculture, Food and Forestry, Forest Services Division (hereinafter referred to as ODAFF) and Oklahoma Department of Environmental Quality, Air Quality Division (hereinafter referred to as DEQ).

This MOA is for the express purpose of developing and implementing the Smoke Management Plan (SMP) to reduce the effects of smoke emissions from prescribed and wildland fire on sensitive and protected areas, Class I areas, and the public.

General Provisions
The agencies, ODAFF and DEQ, in cooperation with federal and private partners, have developed a Smoke Management Plan, dated February 28th, 2013.

- Recognizing the critical importance of prescribed fire for resource management and the resulting benefits to forestry, wildlife management and agriculture; and

- Recognizing the importance of minimizing the public health and environmental impacts of smoke intrusion into populated areas from prescribed fires

Therefore, in consideration of the mutual benefits to each party, the signatory parties agree to develop, implement, and maintain the Smoke Management Plan, dated February 28th, 2013. This Agreement shall become effective as soon as signed by all parties. Any party has the right to terminate this agreement upon a six (6) month notice.

ODAFF Responsibilities
1) ODAFF will continue to implement and enforce the Oklahoma Forestry Code, Title 2-16 as written.
2) ODAFF will continue to review Burn Notification Plans, consult with the applicants, and promptly make burn or no-burn decisions for fire managers and landowners.
3) ODAFF will notify DEQ of long range plans utilizing prescribed fire.
4) ODAFF will work with DEQ providing methods to minimize smoke, discuss the benefits of smoke management, and provide information to assist DEQ’s efforts in the development of a brochure for public education and outreach.
DEQ Responsibilities

1) DEQ will continue to enforce Title 252:100-13 of the Oklahoma Administrative Codes as written.
2) DEQ will add informational material regarding the SMP to their website.
3) DEQ will track data from air quality monitors that may be influenced by prescribed or wildland fires.
4) DEQ will issue public health advisories when ambient ozone and particulate matter (PM) concentrations are expected to reach or exceed Air Quality Index (AQI) values level orange or higher.
5) DEQ will continue to provide forecasting and monitoring data, AQIs, and health advisories on the agency website.
6) DEQ will work with ODAFF to create a brochure, which will provide methods to minimize smoke, discuss the benefits of smoke management, provide contact information, and include helpful forms.

Signatures

Jim Reese
Commissioner of Agriculture
Department of Agriculture, Food, and Forestry

Date

Steve Thompson
Executive Director
Department of Environmental Quality

Date
# TABLE OF CONTENTS

**EXECUTIVE SUMMARY** .......................................................................................................................... 2

I. **Introduction** ........................................................................................................................................... 4  
   a. Purpose and Objectives .......................................................................................................................... 4  
   b. Scope and Applicability .......................................................................................................................... 4  
      i. Lawful Burning .................................................................................................................................. 5  
      ii. Burning Operations Subject to SMP ............................................................................................... 5  
   c. Oklahoma Forest Protection Areas, Class I Areas, and Smoke Sensitive Areas .................................. 5  
      i. Oklahoma’s Forest Protection Area ................................................................................................. 5  
      ii. Class I Areas ................................................................................................................................. 5  
      iii. Smoke Sensitive Areas ................................................................................................................. 5  
   d. Relationship Between the SMP and the Oklahoma Air Quality Regulations ....................................... 5  
      i. Open Burning (OAC 252:100-13) ................................................................................................. 5  
      ii. Prescribed Burning (TITLE 2-16) ................................................................................................. 6  
   e. Relationship Between the SMP and Federal Air Quality Regulations .............................................. 6  
      i. Visibility ......................................................................................................................................... 6  
      ii. National Ambient Air Quality Standards (NAAQS) ..................................................................... 6  
      iii. Exceptional Events Rule .............................................................................................................. 7

II. **OKLAHOMA SMOKE MANAGEMENT PROGRAM** ............................................................................. 8  
   a. Burn Authorization and Burn Plans ....................................................................................................... 9  
   b. Minimizing Air Pollutant Emissions ...................................................................................................... 9  
   c. Public Education and Awareness ........................................................................................................ 10  
   d. Surveillance and Enforcement ............................................................................................................. 11  
   e. Program Evaluation ............................................................................................................................. 11  
   f. Wildland Fires Managed for Resource Benefits .................................................................................. 11

III. **Reference Material** .............................................................................................................................. 12  
   a. Acronyms and Abbreviations .............................................................................................................. 12  
   b. Online Sources .................................................................................................................................... 12  
   c. Contact Information ............................................................................................................................ 13  
   d. Appendices .......................................................................................................................................... 14  
      A – Glossary ........................................................................................................................................ 15  
      B – Title 2-16, Oklahoma Forestry Code ............................................................................................. 18  
      C – 252:100-13-7, Allowed open burning ......................................................................................... 22  
      D – Oklahoma Forest Protection Areas ............................................................................................... 23  
      E – Smoke Sensitive and Class I Areas ............................................................................................... 24  
      F – Notification Requirements and Considerations for Safe and Lawful Prescribed Burning in Oklahoma .................................................................................................................. 25  
      G – Oklahoma Ambient Air Monitoring Network .............................................................................. 36  
      H – Oklahoma Airsheds ...................................................................................................................... 37
Oklahoma Smoke Management Program

Executive Summary
Oklahoma Forestry Services (OFS), a division of the Oklahoma Department of Agriculture, Food, and Forestry (ODAFF), is the state regulatory agency responsible for the oversight of forest and rangeland fire management programs, and the Department of Environmental Quality (DEQ), the state air regulatory agency, have developed the Oklahoma Smoke Management Plan (SMP) to protect the health and welfare of Oklahomans from the impacts of smoke from wildland and prescribed fire.

Since Oklahoma regulates prescribed burning through ODAFF and open burning through DEQ, the SMP is carried out through a Memorandum of Agreement (MOA) between these agencies. In this MOA, ODAFF and DEQ agree to develop and implement the SMP to reduce the effects of smoke emissions from prescribed and wildland fire in the State of Oklahoma.

The Oklahoma SMP does not supersede the provisions of the Oklahoma Forestry Code, 2 O.S. §§ 16-1 to 16-83 or DEQ’s open burning rule (OAC 252:100-13). The SMP does not alter the burner’s duty to comply with any city or county ordinances related to smoke management and vegetation burning. The SMP is designed so land managers and land owners who utilize the program also achieve compliance with associated provisions of the Oklahoma Forestry Code, resulting in liability protection for those choosing to comply. In accordance with 2 O.S. § 16-28 C, land managers who use prescribed burning in Oklahoma protected areas in the eastern part of the state, are required to submit a copy of the prescribed burning notification plan to the local representative of the Oklahoma Forestry Services nearest to the land to be burned.

The SMP is designed to protect public health, minimize smoke intrusions, meet the requirements of the United States Environmental Protection Agency (EPA)’s Interim Air Quality Policy on Wildland and Prescribed Fires (1998), the Federal Clean Air Act (42 U.S.C. §§ 7401-7671q) and the Regional Haze Rule, 40 C.F.R. 51 Subpart P. The SMP contains all the basic components required by EPA’s Interim Air Quality Policy on Wildland and Prescribed Fires. They are:

1. A process for granting approval to conduct prescribed burns;
2. Methods for minimizing air pollutant emissions by considering alternative treatments and/or reducing fuel levels before burning;
3. The outlining of smoke management practices for each burn, such as burning only during favorable weather conditions to minimize smoke intrusions;
4. Plans to notify the public and reduce smoke intrusions should they occur;
5. Public education and awareness programs;
6. Surveillance and enforcement procedures for ensuring that the smoke management plans are effective; and
7. Procedures for periodically evaluating smoke management plans.

There are three major sections comprising the SMP. The first section provides background on the SMP including applicability, the relationship between the SMP and state and federal regulations, and areas in Oklahoma where special policy applies. The second section describes the programs and processes in the SMP and the third section contains appendices to assist users of the SMP.

In a cooperative effort, ODAFF, DEQ and state and federal stakeholders held a series of meetings to seek input regarding prescribed fire, safety, and air quality concerns to develop the SMP for Oklahoma. The MOA will activate the implementation of the program and will require the cooperation among ODAFF, DEQ, and the stakeholders to ensure success of the program. The program is voluntary, except in forest protected areas in eastern Oklahoma. The SMP does not presently apply to open burning of agricultural waste, crop residue, or land in the United States Department of Agriculture (USDA) Conservation Reserve Program (CRP).
Oklahoma Statute includes provisions for liability protection for owners wishing to set fire to his or her land in order to conduct prescribed burning. In order to comply, burners shall notify neighbors and local authorities 60 days prior to the burn as well as the local fire department 48 hours prior to the burn. When a prescribed burn is planned inside a designated Forest Protection Area (Appendix D), the burn manager must also provide a copy of the prescribed burning notification plan to the nearest Forestry Services Division office at least 4 hours before setting the fire. Since the procedure is currently in place, the SMP is not introducing any further requirements on landowners and managers and helps provide liability protection during the burn.

In addition to notification requirements, land owners and managers that utilize prescribed burns are responsible for the smoke produced during the burn. Landowners and managers will be providing useful information to the agencies that are overseeing the program by submitting a prescribed burning notification plan prior to a prescribed fire. This process helps the prescribed burn operation to be organized, smoke impacts minimized, and ensures conditions are safe and properly monitored before, during, and after the burn.

The Clean Air Act (CAA) establishes standards to protect the public and the environment from adverse health and welfare effects of air pollution. These standards, known as National Ambient Air Quality Standards (NAAQS), define the maximum permissible concentrations for certain pollutants, known as criteria pollutants. Ozone precursors and particulate matter (PM) are criteria pollutants as well as components of smoke emissions. As the state’s lead agency for air quality planning, DEQ maintains a network of monitors, which measure the concentration of criteria pollutants in the ambient air. The collected data is used to calculate daily reports called the Air Quality Index (AQI). DEQ issues health advisories using near real time data if the AQI indicates unhealthy levels for ozone or PM.

Developing a plan for burns can help keep the impact of smoke on the environment within acceptable NAAQS levels. If there is evidence that fire significantly contributed to a violation of the NAAQS, EPA has indicated they will exercise discretion when a state has implemented an approved SMP in accordance with the Exceptional Events Rule. Therefore, instead of designating an area as non-attainment after a violation of one of the standards, EPA will request the State to review the adequacy of the SMP and revise the plan as needed. A nonattainment designation for any area not only reflects a health concern, but also becomes a business and economic development concern. Attaining the standard will likely require many emission reduction measures. Thus, a nonattainment designation will result in both direct and indirect costs to both citizens and businesses.

Prescribed burning is an effective land management tool that can help landowners accomplish a variety of objectives. In order to conduct a safe burn, the proper precautionary measures should be established. Following the guidelines established in the SMP should ensure burns are safe and effective, and protect the health and welfare of the citizens. Wise use of the SMP will aid in the continued use of prescribed burning as a viable management tool in Oklahoma. ODAFF and DEQ are committed to the success of the SMP. The SMP will be updated and revised as technology and research improve or new NAAQS standards are implemented.
I. Introduction
Periodic burning is beneficial to many of Oklahoma's native plant and animal communities for maintenance of ecological integrity. Prescribed fire is an effective, low cost, land management tool that is essential to the perpetuation, restoration, and management of native plant communities and the wildlife species that inhabit them. Additionally, prescribed fire assists in decreasing the severity of wildfires by reducing the amount of vegetation or fuel in the environment. This practice helps to minimize adverse impacts on public health and safety. It is essential to encourage the use of best smoke management practices by private and public landowners who choose prescribed burning as a land management tool in order to reduce the impacts of smoke on air quality and protect the health of citizens of Oklahoma.

In general, SMPs establish procedures and requirements for minimizing the impact of emissions and managing smoke dispersion from wildland and prescribed fires. The goals of SMPs are to reduce the impacts and public safety hazards from smoke in downwind areas, prevent deterioration of air quality and violations of federal regulations, and to address visibility issues in smoke sensitive areas. SMPs also address the treatment of fire emissions to meet other federal CAA requirements, such as prevention of significant deterioration (PSD) and conformity of federal activities with State Implementation Plans (SIPs).

A series of informational meetings were held to seek input regarding prescribed fire, safety, and air quality concerns with state and federal stakeholders. From this collaboration, ODAFF and DEQ developed the SMP to protect the health and welfare of Oklahomans from the impacts of smoke caused by wildland and prescribed fire. Since ODAFF regulates prescribed burning and DEQ regulates open burning, implementation of the SMP is being facilitated with an MOA between these two agencies. The specific responsibilities set in the MOA demonstrate the commitment and support the agencies have for the success of the program.

Effective implementation and maintenance of the SMP will require the cooperation among ODAFF, DEQ, and the stakeholders in the state of Oklahoma. At this time, the program is voluntary in the state of Oklahoma with the exception of forest protected areas in eastern Oklahoma. The SMP does not presently apply to open burning of agricultural waste, crop residue, or land in the United States Department of Agriculture Conservation Reserve Program (CRP).

Terms used in the SMP consist of definitions from the EPA Interim Fire Policy, CAA, state statute and agency rules. A glossary is included as Appendix A of this document.

a. Purpose and Objectives
The purpose of an SMP is to mitigate the nuisance and public safety hazards (e.g. on roadways and at airports) posed by smoke intrusions into populated areas, prevent deterioration of air quality and National Ambient Air Quality Standards (NAAQS) violations, and address visibility impacts in mandatory Class I Federal areas.

The objectives in developing the SMP are to prevent smoke resulting from prescribed and wildland burning from being carried into or accumulating in designated areas or other areas sensitive to smoke, provide maximum opportunity for essential land management burning while minimizing emissions, coordinate with other state smoke and fire management agencies and citizens, protect public health, and encourage the reduction of emissions.

b. Scope and Applicability
This program applies to all wildland and prescribed fires managed to achieve resource benefits on publicly and privately owned wildlands regardless of the cause of ignition or purpose of the fire. The SMP does not apply to activities in the Oklahoma Forestry Code (Appendix B) such as: fire training, elimination of hazards, burning at residential, commercial, or industrial sites; recreational and ceremonial burning; waste incineration, or open burning of land clearing waste or construction debris, or other open burning activities as in OAC 252:13-7 (Appendix C). In accordance to EPA’s Interim Fire Policy, the SMP does not apply to open burning of agricultural waste, crop residue, or CRP lands. In addition, variances from the recommended SMP
parameters may occur when site-specific measures are planned to mitigate potential effects of individual prescribed burns on public health, visibility, or safety issues. Variances must be pre-approved by ODAFF.

i. **Lawful Burning**

According to 2 O.S. §16-24.1, it is lawful for a landowner to set fire to croplands, rangelands, or forestlands for the purposes of managing and manipulating plant species present and destroying detrimental or unwanted plants, plant parts, shrubs, or trees. According to 2 O.S. §16-28.2, prescribed burns within the bounds of the law using vegetative fuels are a property right. OAC 252:100-13-7 allows open burning for: fire training; elimination of hazards; recreational and ceremonial fires; land management and land clearing operations for the purpose of managing forests, crops, or game if 500 feet upwind of occupied residence; burning of domestic refuse; hydrocarbon burning; open-pit incineration; and yard brush burning.

ii. ** Burning Operations Subject to SMP**

In order to participate in the SMP, burning operations such as those stated in 2 O.S. §16-24.1, which are performed in order to manage, manipulate, and destroy vegetative material for the purposes of fire hazard elimination and land and resource management, must create and submit prescribed burn notification plans. However, as stated in Section I (b) of this document, this SMP does not apply to agricultural waste, crop residue, or land in the CRP program.

c. **Oklahoma Forest Protection Areas, Class I Areas, and Smoke Sensitive Areas**

i. **Oklahoma’s Forest Protection Area**

Oklahoma has 3 Forest Protection Areas (Appendix D), which cover 6.2 million acres in the eastern portion of the state. The 3 areas are portions or all of the following counties:

- **Northeast Area**—Adair, Cherokee, Delaware, Mayes, Ottowa, and Sequoyah
- **East Central Area**—Haskell, Latimer, Le Flore, Pittsburg
- **South East Area**—Atoka Choctaw, McCurtain, Pushmataha

Land owners and managers conducting burns in these areas are required to provide a copy of the prescribed burning notification plan to the nearest Forestry Services Division office and to notify them at least 4 hours before setting the fire.

ii. **Class I Areas**

Oklahoma has one mandatory Class I area, the Wichita Mountains Wilderness, which is owned by the U.S. Department of Interior and managed by the U.S. Fish and Wildlife Service. The Wichita Mountains Wilderness Area consists of 8,900 acres in Comanche County in southwest Oklahoma. Emissions from fires and resultant air pollutants in Oklahoma have the potential to affect Class I areas in surrounding states. The states that may potentially be affected include Arkansas (Caney Creek, Upper Buffalo), Colorado (Spanish Peaks, Great Sand Dunes), Missouri (Hercules Glades), and New Mexico (Bandelier, Pecos, and Wheeler Peak). A map depicting the Wichita Mountains Wilderness is located in Appendix E.

iii. **Smoke Sensitive Areas**

According to OAC 252:100-13-9, smoke sensitive areas include any and all:

- Roadways
- Rail tracks
- Air fields
- Cities or towns, regardless of population size

d. **Relationship Between the SMP and the Oklahoma Air Quality Regulations**

i. **Open Burning (OAC 252:100-13)**

Under the SMP, all prescribed burns, including land management and land clearing operations and the elimination of hazards when those hazards are in the form of excess vegetative matter, must be carried out in accordance with OAC 252:100-13, the Open Burning Rule.
The Open Burning regulations provide several definitions for the SMP, most notably “open burning”, which is defined such that any wildfire, wildland, and prescribed burns are considered to be open burning and therefore regulated under the Open Burning Rule. Prescribed burning is therefore prohibited unless conducted in accordance with the conditions and requirements contained in OAC 252:100-13-5, -7, and -9.

Since the definition of wildland and prescribed burning is applicable to only vegetative fuels, the following burn activities are to be done in accordance only with OAC 252:100-13: fire training; elimination of hazards when those hazards are not composed of vegetative matter; burning of domestic refuse; hydrocarbon burning; and open pit incineration when the substance being incinerated is not vegetative. Since prescribed burning is defined as burning for land management purposes, recreational and ceremonial fires or yard brush burning are to be carried out in accordance only with OAC 252:100-13. In addition, no material may be collected or transported from an offsite location to be burned. Waste can only be burned on the location where it was generated.

ii. Prescribed Burning (TITLE 2-16)
The Oklahoma Forestry Code, 2 O.S. §§ 16-1 to 16-83, provides several definitions for the SMP, most notably “prescribed burning,” defining prescribed burns as application of fire by owner to forestland, cropland, or rangeland for management purposes using naturally occurring vegetative fuel. Agricultural burning is considered prescribed burning as well as burns done on both publicly and privately owned lands. In order to receive liability protection, prescribed burns must comply with the Oklahoma Forestry Code, 2.O.S. § 16-30. The SMP includes the requirements set forth for prescribed burns in the Oklahoma Forestry Code. Thus, compliance with the SMP is intended to result in compliance with the associated provisions of the Oklahoma Forestry Code.

Unplanned ignitions, both natural and man-caused that are managed and allowed to burn are considered Wildfires Managed for Resource Benefits under the SMP and are subject to Section II (g) of this plan. If natural or unintentional fires are not managed for resource benefits, they are considered wildfires, which are not subject to the SMP.

The SMP utilizes the system outlined in 2 O.S. §16-28 for notification and approval of applicable prescribed burns. Section 16-26 of Title 2 of the Oklahoma Statutes prohibits burn approval during drought conditions. Because 2 O.S. §16-28.2(F)(2) defines prescribed burns that are consistent with the requirements of 2 O.S. §16-28.2 as a property right, the decision to deny a burn is made only after the determination that public health and safety is at risk. OFS provides guidelines and a Prescribed Burn Plan in their Notification Requirements and Considerations for Safe and Lawful Prescribed Burning in Oklahoma, which can be found in Appendix F of this document.

e. Relationship Between the SMP and Federal Air Quality Regulations
i. Visibility
The Clean Air Act (CAA), addresses sources and air pollutants which “…may reasonably be anticipated to cause or contribute significantly to impairment of visibility…” 42 U.S.C. § 7491(b)(2). The CAA also requires states to prepare a SIP for regional haze, which impacts federal Class I Areas. Utilization of the SMP will reduce smoke emissions contributing to decreased visibility and increased regional haze, thus aiding Oklahoma in meeting the visibility and regional haze requirements of the CAA.

ii. National Ambient Air Quality Standards (NAAQS)
The CAA requires EPA to set National Ambient Air Quality Standards (40 CFR part 50) for pollutants considered harmful to public health and the environment. Two types of NAAQS are identified for regulation. The first are Primary standards, which provide public health protection, including protecting the health of "sensitive" populations such as older adults, children, and people with heart or lung disease (including asthma), who are more vulnerable to the adverse health effects of air pollution.
Next are Secondary standards, which provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

EPA has set the maximum permissible concentrations for six principal pollutants, which are called "criteria" pollutants. They are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM₂.₅), and sulphur dioxide (SO₂). Currently, Oklahoma does not have any non-attainment areas. However, should an area of our state violate the NAAQS, certain measures must be implemented that mitigate the air quality issues. These measures can add regulatory burdens that curtail economic development and are costly to industry, regulators, and citizens.

Vegetative burning produces various chemical compounds including: nitrogen oxides (NOₓ), volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter (PM). Ozone is not directly produced by fires, but is a result of components of combustion (NOₓ and VOCs in the presence of sunlight). Both PM and ozone are "criteria" pollutants, therefore, are regulated by NAAQS. Implementation of the SMP will reduce the emission and production of PM and ozone, which will support Oklahoma in meeting the NAAQS and maintaining attainment status.

As the state’s lead agency for air quality planning, DEQ maintains a network of monitors, which routinely measures the concentrations of criteria pollutants in ambient air around the state (Appendix G). DEQ provides daily air quality forecasts to the public called the Air Quality Index (AQI) from the data collected by the monitors. The AQI is calculated using the previous day’s monitoring and weather condition data and color-coded according to the AQI value. When real time air quality data reaches an unhealthy (orange) level for sensitive groups, DEQ issues a health advisory.

Oklahomans can register to receive advisories by email or check the agency website. The forecasting gives sensitive groups the ability to plan and take precautions when pollutant levels are expected to reach unhealthy levels. Monitoring data, daily AQIs, and health advisories are maintained on the DEQ website and the link is provided in the Online Sources in section III (b) of this document.

EPA has indicated that the National Ambient Air Quality Standard (NAAQS) for ozone and fine particulate matter will be lowered in the very near future. Ozone and PM produced by smoke from land management fires may jeopardize Oklahoma’s ability to comply with new lower standards. Violations could result in areas of Oklahoma being designated as non-attainment by EPA, which would indicate air quality is a public health concern. A nonattainment designation would also be detrimental to business and economic growth in the affected area. In order to avoid these issues, it is important to consider methods that mitigate the impact of smoke caused by prescribed burning.

### iii. Exceptional Events Rule

Under certain circumstances, unusual or naturally occurring events, such as prescribed fires or wildfires, can affect air quality and are classified as exceptional events. In 2007, EPA finalized the Exceptional Events Rule to establish criteria used to determine if air quality monitoring data has been influenced by an exceptional event. The rule provides procedures used to identify, evaluate, interpret, and use monitored air quality data. When exceedances or violations of the NAAQS occur, states may request EPA exclude the data directly related to the event. States provide information to demonstrate these occurrences by flagging the data for EPA. The documentation is submitted for EPA to review and determine if there is a clear causal relationship between the affected data and the event.

If an Oklahoma ambient air quality monitor registers an exceedance of ozone or PM that is the result of a prescribed or wildfire, DEQ will notify EPA by a letter of intent to flag the data that was collected during the time the smoke impacted the monitor. After notice and opportunity for public comment, DEQ will submit documentation to justify exclusion of the data. The demonstration includes verification of the event, data from the monitors, meteorological data, and identification of the spatial area affected by the event. After considering the evidence provided by DEQ, EPA determines whether
or not to concur with each flag on a case by case basis and notifies the state of its decision. EPA has
agreed to exclude data influenced by wildland or prescribed fire emissions from use in determining
exceedances of the NAAQS when a state satisfactorily demonstrates the fire event is an exceptional
event, and when the state demonstrates that exceedances or violations of applicable standards would
not have occurred “but for” the influence of exceptional events. An exceptional event means an event
that:

• Affects air quality;
• Is not reasonably controllable or preventable;
• Is an event caused by human activity that is unlikely to recur at a particular location or
  a natural event; and
• Is determined by EPA to be an exceptional event.

In exchange for States and tribes pro-actively implementing an SMP, EPA will exercise discretion by
not designating an area as non-attainment if there is convincing evidence that wildland fires,
prescribed fires, or wildland fires managed for resource benefits caused or significantly contributed to
a measured exceedance of an applicable standard. EPA will request the State to review the adequacy
of the SMP, and to make appropriate improvements in order to mitigate future air quality impacts. In
addition, EPA indicates in the Exceptional Events Rule that it will exclude data from use in
determinations of exceedances if a State demonstrates that emissions from a prescribed fire caused that
exceedance and the State has certified to EPA that it has adopted and is implementing a Smoke
Management Program.
Oklahoma Smoke Management Program

a. Burn Authorization and Burn Plans
ODAFF serves as the implementing authority for the SMP. ODAFF is granted the authority to control prescribed burning in Oklahoma, as cited in the Oklahoma Forestry Code, 2 O.S. §§ 16-1 to 16-8, and has the authority to fulfill all responsibilities required of the SMP implementing authority.

The SMP implementing authority will review burn notification plans, consult with the applicants, if necessary, and promptly make burn or no-burn decisions for fire managers and landowners who choose to participate in the program. To prevent property right infringement, valid reasons regarding public health and safety will be expressed by the implementing authority if an application to burn is denied. When authorizing a prescribed burn, the implementing authority shall consider all open burning activities (land clearing, construction wastes, agricultural wastes, etc.) allowed within an airshed so that no single airshed is overburdened by excessive smoke emissions. A map of Oklahoma airsheds with descriptions of each zone is attached as Appendix H.

To obtain authorization to burn, a landowner must submit a prescribed burning notification plan as required in 2 O.S. §16-28.2 within 60 days prior to the anticipated burn. In addition, pursuant to 2 O.S. §16-28.2, within 60 days of the anticipated burn the landowner must notify in writing all landowners of adjoining land that a burn will take place. If the landowner is burning a large, consolidated tract of land with multiple adjacent owners, only those owners adjoining land within one (1) mile of the proposed burn area must be notified. At the time of notification, the landowner doing the burning must provide each adjoining landowner with the proposed date, location, and a telephone number at which the landowner doing the burning can be reached. In addition, the landowner must complete a notification plan to be submitted to the nearest rural fire department. Additionally, if the land to be burned is within the Forest Protection area, a copy must be submitted to the nearest Forestry Services Division representative.

Within 48 hours prior to performing the burn, the landowner must notify the nearest rural fire department to which the notification plan was sent. At least four hours prior to the burn, landowners burning land within the Forest Protection area must also obtain oral or written approval from the Forestry Services Division representative to which a copy of the prescribed burning notification plan was sent.

Federal, state, and local wildland managers should notify air quality managers of long-range plans to use fire for resource management. For the purpose of this SMP, a long-range plan is one that will be in place for ten years or longer.

Notification Requirements and Considerations for Safe and Lawful Prescribed Burning in Oklahoma (Appendix F) provides guidelines, relevant statutes, and the elements of a burn notification plan, including smoke management components.

Persons responsible for managing fires should be adequately trained in fire and smoke management as established by current standards and determined by ODAFF. In order to comply with the SMP, fire managers must follow the burn plan, including the fire prescription and smoke management components, or provide an adequate explanation justifying any deviations from the plan.

b. Minimizing Air Pollutant Emissions
The burn notification plan should document the steps taken before, during, and after the burn to reduce smoke impacts. The plan should include smoke management components and weather conditions must be acceptable for dispersion before a burn is authorized. ODAFF and the Prescribed Fire Council, of which ODAFF is a founding member, have many strategies to assist land owners and managers in minimizing smoke impacts.
Another way to reduce smoke issues from a prescribed burn is to determine the best day to burn with regards to weather. Understanding the separate and combined effects of several weather elements on fire behavior is necessary in order to complete a successful burn plan and execute a good prescribed burn. Windspeed, relative humidity, temperature, rainfall, and airmass stability are important weather elements to consider because these factors influence fuel moisture and fire behavior.

An example of an available internet decision support system is a modeling program called OK-FIRE. The model includes both wildfire and prescribed fire applications developed for use by wildland fire managers throughout Oklahoma. OK-FIRE uses the Oklahoma Mesonet, the state’s automated weather station network, and the National Weather Service’s (NWS) 84-hour North American Mesoscale model in order to analyze and forecast current/recent conditions.

The modeling program gives the burn manager the ability to predict weather, fire danger, and smoke dispersion conditions out to three days in the future. By establishing specific weather conditions and goals, land managers can plan to burn on appropriate weather days. The predictive component allows assessment of future fire danger potential, better suppression strategies, and guidance for optimal staff levels. Utilizing this tool helps to determine if weather conditions are appropriate to support a valid burn plan.

If a computer is not available to utilize the OK-FIRE website, contacting the NWS is another resource tool for acquiring weather information. Information can be provided online or by contacting the NWS directly using a telephone line.

In addition, DEQ has plans to produce a brochure or pamphlet that will provide methods by which smoke intrusions can be minimized and will explain the benefits of smoke management. The brochure will request that landowners consider using two or more smoke management methods during their prescribed burn and provide contact information in order to direct questions to landowners, burn managers, and public safety officials.

Links to the websites of the OFS, the PFC, OK-FIRE, and the NWS are located in section III (b) of this document.

c. Public Education and Awareness

Compliance with the prescribed burn practices set forth in the Oklahoma Forestry Code requires that landowners performing a burn inform adjoining landowners within one mile of the burn within 60 days of the prescribed burn and provide those landowners with the burner’s contact information. To help inform the public, land owners and land managers with information, ODAFF will provide a county’s status regarding burn bans and DEQ will issue health advisories when the AQI for PM or ozone reaches level orange (unhealthy for sensitive groups category) or above. ODAFF currently makes efforts to discourage burning on alert days. DEQ issues advisories by posting them on the DEQ website and emailing advisories directly to individuals who request them. A brochure or pamphlet will also be created for distribution among landowners that details methods by which smoke intrusions can be minimized and explains the benefits of smoke management. Information describing the necessary steps for implementing a lawful and successful prescribed burn will be included. The brochure will request that landowners consider using two or more smoke management methods during their prescribed burn and provide contact information to direct questions. The brochure will also include some helpful forms, such as an escape report and burn notification plan, to aid the landowner in the burn and compliance processes. Lastly, information regarding prescribed burns and resource tools will be placed on the ODAFF and DEQ websites.
d. Surveillance and Enforcement
Enforcement of the SMP requirements will be shared between ODAFF and DEQ. ODAFF will continue to enforce the prescribed burning laws set forth in the Oklahoma Forestry Code, 2 O.S. §§ 16-1 to -16-83. Likewise, DEQ will continue to enforce the open burning rule provisions in OAC 252:100-13. If it is later determined that the above actions are insufficient to enforce the SMP, ODAFF and DEQ may elect to perform randomized compliance checks on burners who elect to participate in the SMP.

e. Program Evaluation
A program evaluation will be performed periodically by ODAFF and DEQ as necessary and will be based on observations such as reports of smoke intrusions, nuisance complaints, and monitored air quality impacts. The evaluation will be made available for public review. ODAFF and DEQ will request the participation of all original parties (e.g., wildland owners and managers, air quality managers, the public, state and federal agencies, etc.) and review the:

1. Acres of fires managed for resource benefits planned for the next 5 years;
2. Need to expand the scope of the program to include authorization of other open burning;
3. Need for changes in the SMP; and
4. Evaluate program effectiveness utilizing monitoring data, participation statistics, complaint records, and any other useful information.

In addition, post-burn reports will be required for fires that exceed the parameters set forth in their burn application and/or fires that cause smoke impacts at sensitive receptors. Post-burn reports for escaped fires will describe the incident, describe the contingency plan implemented, and provide recommendations to prevent future smoke-related issues.

f. Wildland Fires Managed for Resource Benefits
Although wildland fires managed for resource benefits are not subject to the same SMP compliance standards as prescribed burning, wildland fires are not exempt from the state SMP.

The initial determination on whether a wildland fire shall proceed as a fire managed for resource benefits lies jointly with the fire manager and ODAFF. The state may instruct the fire manager to revise strategies and/or immediately begin suppression actions if unexpected weather or fuel conditions warrant such action.

For SMP compliance, fire managers that manage a wildland fire for resource benefits shall:

1. Notify ODAFF when implementation is being contemplated.
2. Get concurrence with ODAFF on fire danger, location of the unplanned ignition (latitude and longitude), current and predicted weather, fire behavior, and expected smoke impacts; and
3. Carefully monitor on-going wildland fires managed for resource benefits and keep ODAFF fully informed of the status of these incidents.
III. Reference Material

a. Acronyms and Abbreviations
AQI—Air Quality Index
CAA—Clean Air Act
CFR—Code of Federal Regulations
CO—Carbon Monoxide
CRP—Conservation Reserve Program
DEQ—Oklahoma Department of Environmental Quality
EPA—Environmental Protection Agency
MOA—Memorandum of Agreement
NAAQS—National Ambient Air Quality Standards
NOx—Nitrogen Oxides
OAC—Oklahoma Administrative Code
ODAFF—Oklahoma Department of Agriculture, Food, and Forestry
O₃—Ozone
Pb—Lead
PM—Particulate Matter
PM₁₀—Particulate matter less than 10 micrometers in diameter
PM₂.₅₋₁₀—Particulate matter less than 10 micrometers in diameter and greater than 2.5 micrometers in diameter
PM₂.₅—Particulate matter less than 2.5 micrometers in diameter
PSD—Prevention of Significant Deterioration
SIP—State Implementation Plan
SMP—Smoke Management Plan
SO₂—Sulfur Dioxide
USDA—United States Department of Agriculture
VOCs—Volatile Organic Compounds

b. Online Sources
Blue Sky Framework
http://www.blueskyframework.org
Clean Air Act
http://www.epa.gov/oar/caa/
Federal Class I Areas
Interim Air Quality Policy on Wildland and Prescribed Fires
http://www.epa.gov/ttn/oarpg/t1/memoranda/firefnl.pdf
National Weather Service
http://weather.gov/
OK-FIRE
http://okfire.mesonet.org/
Oklahoma Administrative Code
http://www.oar.state.ok.us
Oklahoma Department of Agriculture, Food, and Forestry
http://www.oda.state.ok.us/
Oklahoma Department of Environmental Quality
http://www.deq.state.ok.us/
Oklahoma Forestry Services
http://www.forestry.ok.gov/
Oklahoma Prescribed Fire Council
http://www.oklahomaprescribedfirecouncil.okstate.edu/
Oklahoma Statutes
http://www.lsrb.state.ok.us/
United States Environmental Protection Agency
http://www.epa.gov/
Wichita Mountains Wildlife Refuge
c. **Contact Information**

Oklahoma Department of Agriculture, Food, and Forestry
Forestry Services Division
2800 North Lincoln Boulevard
Oklahoma City, OK 73105
Mark Goeller, Assistant Director, Eastern
(405) 521-3864
Mark.Goeller@ag.ok.gov

Oklahoma Department of Environmental Quality
Air Quality Division
707 North Robinson Avenue
Oklahoma City, OK 73101
Diana Hinson, Environmental Programs Specialist
(405) 702-4171
Diana.Hinson@deq.ok.gov
Appendices
Appendix A

Glossary

“Airshed” means a geographical area within which the air frequently is confined or channeled, with all parts of the area thus being subject to similar conditions of air pollution.

“Air quality” means 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 and by visibility in mandatory Federal Class I areas.

“Ambient air” means the portion of the atmosphere, external to buildings, to which the general public has access.

“Burner” means person or entity that utilizes prescribed burning as a land management tool.

“Class I Area” means an area set aside under the Clean Air Act 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 in size and were in existence prior to the 1977 CAA Amendments.

“Combustible materials” means any substance which will readily burn and shall include those substances which, although generally considered incombustible, are or may be included in the mass of the material burned or to be burned.

“Domestic refuse” means combustible materials or refuse that normally result from the function of life at a residence, such as a kitchen garbage, untreated lumber, cardboard boxes, packaging, clothing, grass, leaves, and branch trimmings. It does not include such things as tires, non-wood construction debris, furniture, carpet, electrical wire, and appliances.

“Escaped fire” means a fire that has exceeded preplanned initial attack capabilities of fire management direction.

“Exceptional Events” are events for which the normal planning and regulatory process established by the CAA is not appropriate.

“Fire training” means a fire purposely set as a part of an organized program of drills for the training of firefighting personnel or for testing firefighting materials or equipment, which is part of a recognized training program.

“Forest” means a tract of land that is at least ten percent (10%) stocked by trees of any size, whether of commercial or noncommercial species, or formerly having tree cover and not currently developed for non-forest use, including woodlands, woodlots, windbreaks, and shelterbelts.

“Fuel” means combustible vegetative matter such as grass, trees, shrubs, limbs, branches, duff, and stumps.

"Land clearing operation" means the uprooting, cutting, or clearing of vegetation in preparation for the construction of buildings, the development of residential, commercial, agricultural, or industrial...
properties, and for the construction and maintenance of right-of-ways. It does not include the clearing of vegetation such as trimmings, fallen limbs, branches, or leaves, or other wastes from routine property maintenance activities.

“Long-range plans to use fire” means fire plans intended to be used for ten years or more.

“National Ambient Air Quality Standards” means 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 in the ambient air. See 42 U.S.C. § 7407.

“Nuisance” means 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.

"Open burning" means the burning of combustible materials in such a manner that the products of combustion are emitted directly to the outside atmosphere.

“Owner” means the possessor of a fee interest, a tenant, lessee, occupant, or other person in lawful control of land.

“Particulate matter” means any airborne finely divided material, except uncombined water, which exists as a solid or liquid at standard conditions (e.g., smoke, dust, mist, fumes, or smog).

“Prescribed burning” means the controlled application by the owner of croplands, rangelands, or forestlands of fire to naturally occurring vegetative fuel under specified environmental conditions and following appropriate precautionary measures, which causes the fire to be confined to a predetermined area and accomplish land management objectives.

“Prevention of Significant Deterioration” means a requirement of the Federal 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.

"Products of combustion" means all particulate and gaseous air contaminants emitted as a result of the burning of refuse and combustible materials.

“Regional haze” means concentrations of fine particles in the atmosphere extending up to hundreds of miles across a region and promoting noticeably hazy conditions and widespread visibility impairment.

"Refuse" means garbage, rubbish, domestic refuse and all other wastes generated by a trade, business, industry, building operation, or household.

“Smoke Management Program” means a program that establishes a basic framework of procedures and requirements for managing smoke from fires that are managed for resource benefits. The purposes of SMPs are to mitigate the nuisance and public safety hazards 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.

“Smoke Sensitive Area” means an area in which smoke from outside sources is not acceptable because of health or safety reasons. Reduction in visibility or deterioration of breathable air quality can have direct impacts on local populations.
“State Implementation Plan” means a plan that is a CAA required document in which states adopt emission reduction measures necessary to attain and maintain NAAQS and meet other requirements of the CAA.

“Variance” means a deviation from the parameters set forth in the SMP, which must be pre-approved by ODAFF.

“Volatile Organic Compounds” means chemical organic compounds which participate in atmospheric photochemical reactions which are measured by a reference method, an equivalent method, or an alternative method.

“Wildfires” means any fire that is not controlled on forests, grasslands, unimproved fields, or croplands.

“Wild lands” means 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 are subject to further discussion.

“Wildland fire” means 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.

“Wildfires Managed For Resource Benefits” means unplanned wildland fire ignitions that are managed to achieve resource benefits.

"Yard brush" means cut or broken branches, leaves, limbs, shrubbery, or tree trimmings. It does not include refuse, grass clippings, in-ground tree stumps, or any non-vegetative material.
Appendix B

O.S. Title 2, Section 16
Oklahoma Forestry Code
(Pertinent Sections)

- 2 O.S. § 16-2, Definitions
  As used in the Oklahoma Forestry Code:

  1. "Director" means the Director of Forestry of the Oklahoma Department of Agriculture, Food, and Forestry;

  2. "Division" means the Forestry Division of the Oklahoma Department of Agriculture, Food, and Forestry;

  3. "Established property line" means any boundary line which has been:

     a. recognized by adjoining land owners as a boundary and uncontested for at least fifteen (15) years including, but not limited to, fence lines, roads, and natural features,

     b. established by a registered land surveyor, or

     c. uncontested for at least fifteen (15) years;

  4. "Forest rangers" means all employees of the Forestry Division who have responsibilities in forest protection, including laborers, mechanics, and other employees who assist in forest protection;

  5. "Forest" means a tract of land that is at least ten percent (10%) stocked by trees of any size, whether of commercial or noncommercial species, or formerly having tree cover and not currently developed for nonforest use, including woodlands, woodlots, windbreaks, and shelterbelts;

  6. "Logging or timber harvesting operations" means the cutting or harvesting of and removal of timber from a site, leaving the root mass intact;

  7. "Owner" means the possessor of a fee interest, a tenant, lessee, occupant, or other person in lawful control of land;

  8. "Prescribed burning" means the controlled application by the owner of croplands, rangelands, or forestlands of fire to naturally occurring vegetative fuel under specified environmental conditions and following appropriate precautionary measures, which causes the fire to be confined to a predetermined area and accomplish land management objectives;

  9. "Timber" means live and dead trees and the profit in any live and dead trees including, but not limited to, bark, foliage, wood, vines, firewood, crossties, and shrubbery;

  10. "Timber owner" means any person who owns the right to cut or harvest timber at the time the timber is to be cut or harvested, or who legally owns the severed timber;
11. "Wildfires" means any fire which is not controlled on forests, grasslands, fields, or croplands; and

12. "Wild lands" means any undeveloped lands regardless of kind of vegetative plant cover including forests, prairies, marshes, and swamps.

2 O.S. § 16-24.1, Burn Ban

A. It shall be lawful for an owner of croplands, rangelands, grasslands, forestlands, or other wild lands to set the croplands, rangelands, grasslands, forestlands, or other wild lands on fire for the purposes of:

1. Managing and manipulating plant species present whether grass, weeds, brush, or trees; and

2. Destroying detrimental or unwanted plants, plant parts, shrubs or trees on the croplands, rangelands, grasslands, forestlands, or other wild lands; and

3. Cedar tree eradication.

B. The provisions of this section shall not be construed to exempt or release a person from civil liability for damages or injury incurred as a result of the burn or for criminal liability as imposed pursuant to the Oklahoma Forestry Code.

• 2 O.S. § 16-28.2, Requirements for Prescribed Burning

A. 1. The provisions of this section apply to a prescribed burn.

2. Any owner wishing to set fire to land in order to conduct a prescribed burn shall comply with the provisions of this section.

B. 1. Within sixty (60) days prior to conducting a prescribed burn, the owner of land to be burned shall orally or in writing notify all landowners whose lands adjoin the owner’s land to be burned.

2. If any landowner is burning on a large, consolidated tract of land in which there are multiple adjacent owners, only those owners with adjoining land within one (1) mile of the proposed burn area must be notified.

3. The owner shall include in the written notice or shall orally notify the adjoining landowners of the proposed date and location of the burn and a telephone number where the owner can be reached for information regarding the prescribed burn.

C. In addition to notification of adjoining property owners pursuant to subsection B of this section, the owner of the land to be burned shall complete the prescribed burn notification plan specified in subsection D of this section and shall submit such plan to the rural fire department nearest the land to be burned. If the land to be burned is in a protection area, the owner shall also submit a copy of the notification plan to the local office or local representative of the Forestry Division nearest to the land to be burned.

D. Any person wishing to conduct a prescribed burn shall complete this form, distributed by the Oklahoma Department of Agriculture, Food, and Forestry, which shall be in substantially the following form:
PRESCRIBED BURN NOTIFICATION PLAN

| Name_______________________________________ | Phone____________________________ |
| Address_______________________________________ | County___________________________ |
| City, State, Zip______________________________________________________________________________ |
| Ranch name, if any______________________________________________________________ |
| Area to be burned_______________________________________________________________ |
| Approximate acres to be burned____________________________________________________ |

Written distance description of location:
________________________________________________________________________
________________________________________________________________________

Projected time frame_____________________________________________________________

Date of previous burn:
_____________________________________________________________________________

Objectives to be accomplished through the prescribed burn:
_________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Contact information:
_____________________________________________________________________________________
_____________________________________________________________________________________

Rural Fire Department:
Name:                                             Location:                                      Phone
_____________________________________________________________________________

Forestry District Office (for protection areas)
_____________________________________________________________________________________

Adjoining landowners:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

The original copy of the form must be filed with the rural fire department nearest to the land to be burned. If conducting a prescribed burn within a protection area, a copy of the prescribed burn notification plan must be filed with the local office or local representative of the Forestry Division nearest to the land to be burned. A copy of the plan shall be retained by the owner of the land to be burned.

E. 1. Whether the land is located within or outside a protection area, the owner of land to be burned shall, within forty-eight (48) hours of conducting a prescribed burn, notify the rural fire department receiving a copy of the prescribed burn notification plan that the prescribed burn will be conducted.

2. Within a protection area, the owner of land to be burned shall also, within the time period required by Section 7 of this act, notify the local office or local representative of the Forestry Division receiving a copy of the prescribed burn notification plan.
F. A prescribed burn conducted pursuant to provisions of this section shall:

1. Be considered in the public interest and shall not constitute a public or private nuisance; and

2. Be considered a property right of the property owner if vegetative fuels are used.

G. 1. Any owner conducting a prescribed burn who is found by a court of law to have caused damages or injury as a result of accident or by ordinary negligence shall only be civilly liable for actual damages resulting from the prescribed burn.

2. Any owner conducting a prescribed burn who is found by a court of law to have committed gross negligence in conducting the prescribed burn may be found to be both civilly liable for the amount of damage done by the fire, and criminally liable pursuant to paragraph 3 of this subsection.

3. Any owner setting or causing to be set on fire land as authorized by this section, and as a result of gross negligence permitting the fire to spread beyond the control of the owner or beyond the bounds of the owner’s land, shall be deemed guilty of a misdemeanor, and upon conviction thereof, be fined a sum not more than Five Hundred Dollars ($500.00), or imprisonment in the county jail for a period not more than six (6) months.

- 2. O.S. § 16-30, Civil Liability

Any person violating any of the provisions of the Oklahoma Forestry Code shall be liable for all damages caused by any violation; damages shall be recoverable in any court of competent jurisdiction.
Appendix C
OAC 252:100-13-7. Allowed open burning

When not prohibited by law or ordinance, the following types of burning are allowed, provided the conditions and requirements in 252:100-13-9 have been met:

1. **Fire training.** Open burning of human-made structures for the purpose of fire training is allowed as provided for in Oklahoma Clean Air Act, 27A O.S., § 2-5-106.1. Industrial and commercial facilities and fire training schools conducting on-site live burn fire training are not subject to this provision.

2. **Elimination of hazards.** Provided prior authorization is obtained from the local fire chief, open burning is allowed for the elimination of:
   - A fire hazard that cannot be abated by any other means.
   - A dangerous or hazardous material when there is no other practical or lawful method of abatement or disposal if authorization is also received from the DEQ prior to such burning.

3. **Recreational and ceremonial fires.** Open burning is allowed for camp fires and other fires used solely for recreational purposes, ceremonial occasions, or non-commercial preparation of food.

4. **Land management and land clearing operations.** Open burning is allowed for the following land management and land clearing operations.
   - Fires purposely set to forest, crop or range lands for a specific reason in the management of forests, crops or game, in accordance with practices recommended by the Oklahoma Department of Wildlife Conservation, the Oklahoma State Department of Agriculture, and the United States Forest Service.
   - Fires purposely set for land clearing operations if conducted at least 500 feet upwind of any occupied residence other than those located on the property on which the burning is conducted, except that such burning must be conducted in open-pit incinerators in counties or areas that are or have been designated nonattainment.

5. **Burning of domestic refuse.** Where no collection and disposal service is reasonably available, domestic refuse may be burned on the property where the waste is generated.

6. **Hydrocarbon burning.** Open burning of hydrocarbons is allowed for:
   - The disposal of spilled hydrocarbons or the waste products of oil exploration, development, refining or processing operations which cannot be feasibly recovered or otherwise disposed of in a legal manner. Notice must be given to the DEQ prior to such burning.
   - The disposal of waste hydrocarbons through a flare. The owner or operator shall be required to use a smokeless flare if a condition of air pollution is determined to exist by the DEQ.

7. **Open-pit incinerator.** Except for hazardous material, any combustible material or refuse that is allowed to be burned under this Subchapter may be burned in an open-pit incinerator that is properly designed and operated for the control of smoke and particulate matter. The owner or operator of the open-pit incinerator shall not accept any material owned by other persons and shall not transport any material to the property where the open-pit incinerator is located in order to burn the material.

8. **Yard brush.** Yard brush may be burned on the property where the waste is generated.
Appendix D

Oklahoma Forest Protection Areas
Appendix E

Smoke Sensitive Areas

According to OAC 252:100-13-9, smoke sensitive areas include any and all:

- Roadways
- Rail tracks
- Air fields
- Cities or towns, regardless of population size

Class I Areas

In accordance with the federal Regional Haze Rule, smoke sensitive areas also include Mandatory Class I areas. Currently the only Mandatory Class I Area in Oklahoma is the Wichita Mountains, a map of which appears below.
NOTIFICATION REQUIREMENTS AND CONSIDERATIONS FOR SAFE AND LAWFUL PRESCRIBED BURNING IN OKLAHOMA

Guidelines, State Law and the Burning Notification Plan

Oklahoma Department of Agriculture Forestry Services
Prescribed burning is an effective land management tool that can help landowners accomplish a variety of objectives. But there are also risks and liabilities associated with burning so it must be used with appropriate caution. Landowners and managers must understand their responsibilities under Oklahoma law and how to plan and conduct a burn safely. By following some basic guidelines and exercising caution and common sense, your burns will be safe and effective, your neighbors and the public will be protected and prescribed burning will remain a viable management tool in Oklahoma.

The information that follows is intended to acquaint you with basic prescribed burning considerations and the law. It does not contain enough detail to enable you to plan and conduct a burn, but presumes you are already experienced, trained or knowledgeable about the use of fire. There are other sources of information, training and technical assistance available that provide details about prescribed burning.

Disclaimer. The Oklahoma Department of Agriculture provides this information as a public service and is in no way liable for the actions of those who undertake prescribed burning activities. Landowners must become experienced and knowledgeable about the use of prescribed fire before actually planning and conducting a burn themselves.

Controlled Fire or Wildfire. There is a big difference between a prescribed burn and a wildfire. Prescribed burns are conducted on a designated area under specific conditions for a defined objective, and are extinguished. A wildfire is a fire that is out of control. A “safe burn” is measured by your ability to successfully plan, organize and conduct a burn on a defined area to accomplish specific objectives, while safeguarding the burning crew, your equipment, your neighbors and the public at large. “Safe burns” are no accident.

Liability. You are responsible for your fire. Title 2, Sections 16-28 and 16-28.2 of the Oklahoma Forestry Code provide some liability protection for landowners conducting prescribed burns under certain conditions (see next pages). To obtain this protection however, the owner or manager is responsible for planning the burn, providing proper notification to neighbors and local authorities, conducting the burn according to the plan, providing adequate equipment and manpower to control the fire and confine it to his or her property and preventing downwind impacts. In terms of liability, the law distinguishes between fires that escape by accident and those that escape due to negligence.

Safety Considerations. Your responsibilities related to safety are: (1) Identify sensitive places around and downwind of the area you plan to burn and manage your smoke to avoid causing problems downwind from the burn. Errant smoke can impact your neighbors and local communities, close airports or roadways and create significant safety hazards. (2) Provide personal protective gear for your crew and communicate with them effectively before and during the fire to ensure their safety. (3) Use an appropriate firing technique to minimize risk. (4) Provide an adequate amount of equipment in good working order to manage the fire and handle emergencies.
Plan the Burn. Your responsibility is to take the time necessary to thoughtfully plan your burn well in advance of the actual burn date. The first step in burning is to identify the area to be burned and your objective for burning it. Other key factors you must consider include fuel type and amount (loading), proximity to roads, houses and communities, topography, size of burn and natural barriers. All other considerations in your plan — firing technique, equipment and crew needs, control lines, desired weather conditions, season, safety considerations — will depend upon these key factors.

Notification Requirements. Your responsibility is to notify your neighbors and local authorities before conducting a burn. For your burn to be lawful, State law requires all burners to: notify all adjoining landowners within 60 days of the burn; provide a Prescribed Burning Notification Plan to the local rural fire department; and notify the fire department within 48 hours of actually conducting the burn. Inside the designated Forest Protection Area (see map), you must also provide a copy of the Notification Plan to the nearest Forestry Division office and notify them at least 4 hours before setting the fire.

Control Lines. Your responsibility is to keep your planned fire to a defined area by using roads, natural features and firelines. Control lines must be wide enough, frequent enough and located properly to enable you to keep your fire within the planned area. For most burning, a basic fireline consists of a strip of mineral soil 6 to 8 feet wide. As the fuel load becomes heavier and more volatile, or when you use more aggressive firing techniques, you will need more frequent and wider firelines to maintain control.

Weather Considerations. Your responsibility is to understand the most important weather factors that will affect your burn and the conditions under which your burn can be conducted safely. Knowledge of weather is the key to successful prescribed burning and is required for proper management of smoke produced by your fire. Major weather factors include wind, relative humidity, rainfall and soil moisture, fuel moisture and atmospheric stability. Use Mesonet data, obtain an accurate fire weather forecast from the National Weather Service and use a weather kit to monitor local conditions.

Equipment/Crew Needs. Your responsibility is to provide an adequate amount of people and equipment to maintain control of the fire once it is set. This might include a pumper with at least 100 gallons of water and 50 feet of hose, drip torches, hand tools, radio communication and heavy equipment for fire suppression if needed.

Some General Burning Rules. As the burn date approaches, your responsibilities are:

- Check the burn unit several days in advance, including all control lines and structures.
- Obtain a weather forecast that includes, at a minimum, predicted wind speed and direction, temperature, relative humidity, time of next major wind shift and stability of the atmosphere.
- Notify all neighboring landowners, the rural fire department and the Forestry Division if needed.
- Have equipment available and operational.
- Make sure all personnel know their duties and how the burn will be conducted.
- Stay within fire prescriptions that were developed to meet your objectives.
- Burning under one or more of the following Red Flag Conditions is discouraged: highly variable winds or gusts greater than 20 mph, relative humidity below 20%, air temperature above 100 degrees F, or wind shift or frontal passage expected within 12 hours.

Information Resources. Circular E-927 "Using Prescribed Fire in Oklahoma" by the Cooperative Extension Service is an excellent reference on the use of fire in Oklahoma. It is available at cost from the OSU Cooperative Extension Service. Information is also available from local offices of the Natural Resource Conservation Service.
Oklahoma Laws Pertaining to Burning

The following laws are excerpted from Title 2 of the Oklahoma Statutes (The Oklahoma Forestry Code), as amended by the Legislature in 2001. These sections govern the lawful and unlawful use of fire in Oklahoma. Sections 16-28 and 16-28.2 define procedures for lawfully using prescribed fires that afford some reduction in criminal liability should your fire escape (amendments are expected in 2002).

SECTION 16-24.1 (Lawful Burning)
A. It is lawful for an owner of croplands, rangelands or forestlands to set the croplands, rangelands or forestlands on fire for the purposes of: (1) Managing and manipulating plant species present whether grass, weeds, brush or trees; and (2) Destroying detrimental or unwanted plants, plant parts, shrubs or trees on croplands, rangelands or forestlands.
B. The provisions of this section shall not be construed to exempt or release a person from civil liability for damages or injury incurred as a result of the burn or for criminal liability as imposed pursuant to the Oklahoma Forestry Code.

SECTION 16-26. (Unlawful Burning)
A. It is unlawful for any person to carelessly or willfully burn or cause to be burned or to set fire to or cause any fire to be set to any forest, grass, crops, or woodlands not owned by, duly authorized by the owner or manager, or in the lawful possession of, the person setting the fire or burning the lands or causing the fire to be burned.
B. Any person who carelessly violates this section is guilty of a misdemeanor punishable by a fine of not more than $500, by imprisonment for not more than one year, or both. Any person who willfully violates this section is guilty of a felony punishable by a fine of not more than $1,000, by imprisonment for not more than three years, or both.
C. Any person who carelessly or willfully burns, causes to be burned, sets fire, or causes to be set, any forest, grass, croplands, or woodlands not owned by, duly authorized by the owner or manager, or in lawful possession of, shall be liable in a civil action to any person injured or damaged by a fire to the amount of the injury or damages.

SECTION 16-28. (Procedure to Lawfully Burn Land)
A. It is unlawful for any person either willfully or carelessly to burn, cause to be burned, to set fire to, or cause fire to be set to any forest, grass, croplands, rangeland, woods, wild lands, or marshes by an owner of such property, except under the following circumstances:
(1) In protection areas, notification to burn shall be made by the owner to the local office or local representative of the Forestry Division at least four hours in advance and verbal or written approval obtained. In addition to the notification requirements of this paragraph, any owner conducting a prescribed burn in a protected area shall comply with the provisions of Section 16-28.2;
(2) Outside protection areas, in order for prescribed or controlled burning to be lawful, an owner shall take reasonable precaution against the spreading of fire to other lands by providing adequate firelines, manpower, and fire fighting equipment for the control of the fire, shall watch over the fire until it is extinguished and shall not permit fire to escape to adjoining land; or
(3) Any owner wishing to conduct a prescribed burn outside protection areas shall comply with the provisions of Section 16-28.2.
B. Nothing in this section shall relieve the person from the obligation to confine the fire to the owner's, agent's or tenant's land.
C. The Oklahoma Forestry Code shall not apply to trimming or cutting of trees by public or private utilities for the purpose of eliminating interference with utility lines, poles, or other utility equipment.
D. (1) Except as otherwise provided by Section 16-28.2, any person:
(a) who, whether by accident, neglect or intent, causes or allows damage or injury to occur to any ranch, buildings, improvements, hay, grass, crops, fencings, timber, marsh, or other property of another person by any fire described and conducted pursuant to this section, shall be civilly responsible for such damage or injury so caused pursuant to Section 16-30 of this title, and
(b) who carelessly violates this section is guilty of a misdemeanor punishable by a fine of not more than $500, by imprisonment for not more than one year, or both.
(2) In addition, to civil liability, any person who willfully violates this section is guilty of a felony punishable by a fine of not more than $1,000, by imprisonment for not more than three years, or by both.
E. Fire set under the provisions of this section shall not be allowed to spread beyond the control of the person setting the fire and shall be subdued and extinguished.
SECTION 16-28.2. (Prescribed Burning Provisions)

A. (1) The provisions of this section apply to prescribed burning.
   (2) Any owner wishing to set fire to his or her land in order to conduct a prescribed burning shall comply with the provisions of this section.

B. Within 60 days prior to conducting a prescribed burn, the owner of land to be burned shall orally or in writing notify all landowners whose lands adjoin the owner’s land to be burned. The owner shall include in the written notice or shall orally notify the adjoining landowners of the proposed date and location of the burn and a telephone number where the owner can be reached for information regarding the prescribed burning.

C. In addition to notification of adjoining property owners pursuant to Subsection B of this section, the owner of the land to be burned shall complete the prescribed burning notification plan specified in subsection D of this section and shall submit such plan to the rural fire department nearest the land to be burned. If the land to be burned is in a protection area, the owner shall also submit a copy of the notification plan to the local office or local representative of the Forestry Division nearest to the land to be burned.

D. Any person wishing to conduct a prescribed burn shall complete this form, distributed by the State Department of Agriculture, which shall be in substantially the following form:

PRESCRIBED BURNING NOTIFICATION PLAN (The notification plan shall contain the following information):

- Name and Telephone Number
- Mailing Address, County, City, State, and Zip Code
- Ranch Name (if any)
- Description of area to be burned
- Approximate acres to be burned
- Written description of location
- Projected time frame
- Date of previous burn
- Objectives to be accomplished through the prescribed burn
- Contact information
- Rural fire department name, location, and telephone number
- Forestry District office (for protection areas)
- Adjoining landowners

You need to file the original copy of the form with the rural fire department nearest the land to be burned. If you are conducting a prescribed burn within a protection area, you also need to file a copy of the notification plan with the local office or local representative of the Forestry Division nearest to the land to be burned. A copy of the plan shall be retained by the owner of the land to be burned.

E. (1) Whether the land is located within or outside a protection area, the owner of land to be burned shall, within 48 hours of conducting a prescribed burn, notify the rural fire department receiving a copy of the prescribed burning notification plan that the prescribed burn will be conducted.
   (2) Within a protection area, the owner of land to be burned shall also, within the time period required by Section 18-28 of Title 2 of the Oklahoma Statutes, notify the local office or local representative of the Forestry Division receiving a copy of the prescribed burning notification plan.

F. Prescribed burning conducted pursuant to provisions of this section shall:
   (1) Be considered in the public interest and shall not constitute a public or private nuisance; and
   (2) Be considered a property right of the property owner if naturally occurring vegetative fuels are used.

G. (1) Any owner conducting a prescribed burn who is found by a court of law to have caused damages or injury as a result of accident or by ordinary negligence shall only be civilly liable for actual damages resulting from the prescribed burn.
   (2) Any owner conducting a prescribed burn who is found by a court of law to have committed gross negligence in conducting the prescribed burning may be found to be both civilly liable for the amount of damage done by the fire, and criminally liable pursuant to paragraph 3 of this subsection.
   (3) Any owner setting or causing to be set on fire his or her land, and as a result of gross negligence permitting the fire to spread beyond the control of the owner or beyond the bounds of the owner’s land, shall be deemed guilty of a misdemeanor, and upon conviction thereof, be fined a sum not more than $500, or imprisonment in the county jail for a period not more than six months.
The prescribed burn described below is to be conducted according to the information provided here and the Oklahoma Forestry Code (Title 2, Sections 16-28 and 16-28.2 of the State Statutes). File the original copy of the Notification Plan with the local rural fire department, and keep a copy for your records. Inside the designated Forest Protection Area in eastern Oklahoma (refer to list of Forestry offices), also provide a copy to the Forestry Division representative.

---

## Burn Unit Name and Description

<table>
<thead>
<tr>
<th>Unit Name:</th>
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<table>
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<th>Legal Description:</th>
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<table>
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<tr>
<th>Location Description (attach map):</th>
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<table>
<thead>
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<th>Acreage:</th>
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<th>Site description:</th>
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<th>Sensitive areas:</th>
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<th>Fuel Model:</th>
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<table>
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<tr>
<th>Complexity Analysis Rating (attach Complexity Analysis Worksheet):</th>
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## Landowner Information

<table>
<thead>
<tr>
<th>Name:</th>
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<table>
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<th>Address:</th>
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<table>
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<th>County:</th>
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<table>
<thead>
<tr>
<th>Contact Number(s):</th>
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<tr>
<td></td>
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</tbody>
</table>
PRESCRIPTION

Burn objectives:

Preferred burn window:

Desired fire behavior:

Conditions needed: | Range | Ideal |
---|---|---|
Temperature
Relative humidity
1 hr. fuel moisture
10 hr. fuel moisture
1,000 hr. fuel moisture
Mid-flame wind speed
Wind direction

BEHAVE run results:

Burn area fuel model(s): Adjacent area fuel model(s):

<table>
<thead>
<tr>
<th></th>
<th>Head Fire</th>
<th>Backing Fire</th>
<th>Head Fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of spread (ch/hr or ft/min)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Heat/unit area (BTU/ft²)</td>
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<td></td>
<td></td>
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<tr>
<td>Fireline intensity (BTU/ft/sec)</td>
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<tr>
<td>Flame length (ft)</td>
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</tbody>
</table>

Smoke management* - Category Day desired for day of burn:

* Follow guidance found in Oklahoma’s Voluntary Smoke Management Guidelines publication. Attach Smoke Trajectory map to plan.

Firebreak Types (include locations on map):

Adjacent fuels:
### PROJECT RESOURCES

<table>
<thead>
<tr>
<th>Prescribed Fire Burn Boss:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum number of personnel required:</td>
</tr>
<tr>
<td>Minimum number of Ignition/Holding personnel:</td>
</tr>
<tr>
<td>Minimum required Suppression resources (Number, Type &amp; Kind):</td>
</tr>
<tr>
<td>Other personnel:</td>
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</table>

### LOGISTICS

<table>
<thead>
<tr>
<th>Weather monitoring:</th>
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<tbody>
<tr>
<td>Public notifications:</td>
</tr>
<tr>
<td>Fire Department Name/Number:</td>
</tr>
<tr>
<td>Law Enforcement Name/Number:</td>
</tr>
<tr>
<td>Forestry Services Area Office Name/Number (if applicable):</td>
</tr>
<tr>
<td>Ignition plan (attach map):</td>
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<tr>
<td>Contingency plans:</td>
</tr>
<tr>
<td>Fire out-of-prescription:</td>
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<tr>
<td>Minor escapes (slop overs):</td>
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<tr>
<td>Moderate escapes:</td>
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<tr>
<td>Major escape:</td>
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**BURN PLAN REVIEW AND APPROVAL**

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<tr>
<th>Role / Rating</th>
<th>Signature</th>
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<tr>
<td>Plan Preparer</td>
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<tr>
<td>Burn Boss</td>
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</table>

**TECHNICAL REVIEW**

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<tr>
<th>Role / Rating</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>Low Complexity Rating 7-11: Reviewer with equal or higher NWCG Qualification</td>
<td>RxB Signature</td>
<td>Date</td>
</tr>
<tr>
<td>Moderate Complexity Rating 12-19: Area Forester</td>
<td>RxB Signature</td>
<td>Date</td>
</tr>
<tr>
<td>High Complexity Rating 19+: Prescribed Fire Management Task Force</td>
<td>RxB Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

Low Rating: Complexity Rating 7-11: Equal or Higher NWCG Qualification
Moderate Rating: Complexity Rating 12-19: Area Forester
High Rating: Complexity Rating >19 Prescribed Fire Management Task Force

* Prescribed burns with the following characteristics are referred to the Prescribed Fire Management Task Force regardless of Complexity Analysis Rating:
  - Burns exceeding 1,000 acres in size
  - Burns with especially high visibility (e.g. within a large metro area)
  - Burns with a predicted NFDRS burning index above 45
  - Burns occurring Outside of Protection Area
Burn Day Checklist (Go/No Go):

- Notifications made
- All equipment present and in working order
- Personnel on-site with proper personal protective equipment
- Personnel briefed on procedures and contingencies
- Personnel briefed on communications and safety zones
- Test burn produces desired activity
  (Activity based on prescription)
- Backup resources available
- Weather within prescription
  Time: ____________
  Wind speed: ____________ Direction: ____________
  Temperature: ____________ RH: ____________
- First aid kits fully stocked

Emergency medical services: ________________________________
  Name ________________________________ Phone ________________________________

I certify that all items on the checklist are "go" for the burn:

________________________________________ Date: ____________

Prescribed Fire Burn Boss
POST-BURN EVALUATION

Weather
Pre-burn
Time: 
Temperature: 
Relative humidity: 
Wind speed: 
Direction: 

Post-burn
Time: 
Temperature: 
Relative humidity: 
Wind speed: 
Direction: 

Fire behavior
Rate-of-spread: 
Flame lengths: 

Circumstances of any erratic fire behavior:

Smoke dispersal during burn:

Percent of area burned:

Amount of fuel consumed:

Any public interest during burn – pro or con:
Appendix G

Oklahoma Ambient Air Monitoring Network
Appendix H

Oklahoma Airsheds

It is the nature of airsheds to fluctuate over time. Unlike other delineations, airsheds are not static and often have no distinct dividing border between them. For these reasons, the following map is provided as basic guidance only and meteorological conditions should be monitored and analyzed on a case-by-case basis for proper smoke management. The six airsheds depicted below represent common air movement patterns across the state and are based on observation and monitoring data generated by the DEQ. For ease of use, boundaries have been approximated to the nearest county line.

Oklahoma lacks any true airsheds; air mixes readily from zone to zone.

**Zone 1** comprises Cimarron and Texas Counties. This zone consists mostly of High Plains short-grass prairie and ranks as the highest and coolest (for its latitude). On account of its high elevation, it receives westerly winds more frequently than other zones. The wet season runs May through August, but the rain falls mostly as high-based thunderstorms, and humidity does not suffice to prevent cool nights, even in mid-summer. Winters run September through May; although mostly mild and dry, they feature occasional wind-driven snowstorms. Production includes dry-land and irrigated winter wheat, grain sorghum, cattle ranching, hog production. Some areas have stubby Western pines and junipers, and the foothills of the Rocky Mountains begin just west of this zone. The Southwestern monsoon typically brings afternoon thunderstorms during the summer no farther east than this zone; even so, heavy rainstorms occur only sporadically with great inter-annual variability, usually interspersed with lengthy dry periods even during the wet season. Nevertheless, this zone receives precipitation during August comparable to that in Zone 6.

**Zone 2** contains mostly counties adjoining the Texas Panhandle. This zone lies at considerably lower elevation than Zone 1 does and experiences correspondingly warmer temperatures. Elevation varies considerably. Wind blows mostly from the south and occasionally lifts and carries blowing dust and sand. This zone receives less precipitation than Zone 3 does with a more pronounced winter dry season. Unlike Zone 1, this zone experiences a midsummer dry season and a secondary wet season during autumn, but these seasons occur less regularly found in Zone 3. Agricultural production consists primarily of cattle ranging and winter wheat, but the lack of moisture and sandy soils challenge farmers more than they do in Zone 3. This zone contains numerous buttes and some higher ridges between river valleys, but even these higher areas lie mostly lower than the High Plains of Zone 1. This
zone often finds itself behind dry lines in springtime severe-weather situations, experiencing a desiccating hot, dry wind on many afternoons.

**Zone 3** contains wide-open, gently rolling prairie hosts moderately tall grass and some scrub with trees in river valleys and naturally moister areas. It lacks sufficient moisture for forests to flourish on wide scales. Strong southerly winds typically sweep the prairie, which produces cattle and winter wheat in large quantities and other crops and livestock in smaller quantities. The winds occasionally reverse to northerly, especially during winters. Dry weather usually prevails, but thunderstorms dump heavy rain (and hail) during the spring, especially May and June. Summers often feature more intense heat than the other zones experience, searing sun, little rain, and strong southerly breezes. The secondary wet season follows in autumn, and cooler temperatures allow the soils to absorb moisture from any rainfalls. Winter typically features mild, dry weather with strong southerly winds, alternating with strong northerly winds, occasionally intense cold, and infrequent snowfall. This zone contains the Wichita Mountains and some other isolated high points and steep terrain; however, these features nowhere form an unbroken line of sufficient height to impede wind flow.

**Zone 4** contains most of Oklahoma City and Tulsa and the “Cross Timbers” region of short, scrubby trees between these cities; it represents a transition zone between the subtropical humid climates of the American South and the semiarid climates of the American Southwest. Open areas mostly support cattle grazing and crop cultivation. The Arbuckle and Jack Fork Mountains lack sufficient height or continuity to impede wind flow. This zone generally features lighter winds, more humidity, and less intense daytime heat than does Zone 3. Annual precipitation generally averages double that common in Zone 2, and humid air masses from the Gulf of Mexico invade this zone more frequently than they invade zones farther west—and these intrusions usually last longer. The winter features much less precipitation than it does in Zones 5 and 6, and the spring wet season typically starts in March, much earlier than in Zone 3. Much of the precipitation in spring occurs as thunderstorms, although mesoscale convective complexes sometimes produce heavy rains that continue for several hours. Summers feature hot, humid conditions, although they lack the excessive mugginess common in swampy regions like Louisiana and do not lack the dearth of rainfall common to Zone 3. Autumn features a secondary wet season with thunderstorms, cold fronts, and tropical moisture plumes. Zone 4 bulges somewhat to the west because during summer, the wind often features an easterly component south of Oklahoma City but curves slightly to the west as it gains latitude.

**Zone 5** contains the lush forests of and surrounding the Ozark Mountains. This region features a subtropical humid climate typical of the American South or a climate that nearly so qualifies. Although this zone lacks the pronounced winter dry season of the zones farther west, less precipitation falls during winter than during the other seasons; this precipitation, however, usually satisfies the lower evapotranspiration demand. Wintertime precipitation sometimes takes the form of heavy snow or ice. The heaviest rains occur during the spring; however, because of its terrain, this zone lacks the summer dry season characteristic of all other zones except Zone 1. Summertime heat usually occurs less intensely here than in other zones except Zones 1 and 6. The Ouachita Mountains usually block wind flow from Zone 6 to Zone 5; hence, the mean flow channels up the Arkansas River from Little Rock through Fort Smith toward Muskogee before turning northward. Wind also mixes between Zone 5 and Zone 4. Mountain winds and other terrain effects locally complicate wind flow in this zone, especially during periods of weak dynamic forcing.

**Zone 6** lies upwind of the Ouachita Mountains in a southerly wind regime. The crest of the Ouachita Mountains forms the northern border of Zone 6 and directly blocks southerly and northerly winds. This mountain blockage creates an area of climatological light winds, especially in the eastern parts of the zone. With the prevailing nocturnal calmness, cold nights occur frequently despite the relatively high humidity. The Ouachita Mountains also block the advance of cold air from the north, and the Kiamichi Mountains in the western part of the zone block cold air from the west less effectively. This zone therefore experiences a classic subtropical humid climate characteristic of the American South and features thick forests of tall, rapidly growing, straight-trunked trees, its most valuable legal agricultural product. The terrain features both flat, swampy areas and steep slopes of rocky soils. The shape of the mountains usually but not always prevents ice and snow storms from reaching this corner of the state. Winter lacks the dryness of the other zones and instead features occasionally intense rains as a result of orographic enhancement of synoptic precipitation systems. August ranks as the driest month of the year but still features more moisture than August does in Zones 2, 3, and 4. Although this zone contains the lowest elevations in the state, its ample humidity usually prevents the intense heat characteristic of the other zones.