1) How is the burn/no-burn decision made?
The burn/no-burn decision is a weather forecast. First, current weather conditions are analyzed every morning during the no-burn season. A trained meteorologist examines meteorological data from around the region, including winds, temperatures, dewpoints, changes in temperatures and dewpoints. Cold fronts, jet streams, low pressure systems and high pressure systems are located on weather charts. During this process, a variety of data sources are examined. These sources include vertical temperature profiles recorded by National Weather Service radiosondes; charts/maps of meteorological conditions for constant, standard levels of atmospheric pressure; infrared and water vapor satellite imagery; maps and computer generated analyses of surface weather observations.

Once the current state of the large-scale weather pattern is understood, the meteorologist examines forecast information. Numerical forecast models integrate meteorological observations and then create forecasts using the equations of motion from fluid dynamics. The models are run on supercomputers at the National Center for Environmental Prediction in Silver Spring, Maryland. Forecast charts for standard pressure levels, forecast temperature profiles, and statistical forecasts are created from the raw output of models. That output is evaluated using a combination of experience and education in meteorology (e.g. quasi-geostrophic theory, jet dynamics, polar front theory, etc.). In addition to examining model output, National Weather Service forecasts for both public and aviation interests are also perused for guidance.

2) What weather conditions necessitate a no-burn?
In addition to forecasting, the meteorologist examines past pollution events and the conditions that led to those events. Examples of past pollution events include 8-9 Dec 2005, 11-12 Dec 2005, 2-4 Jan 2007, and 9-11 Jan 2007. Such studying improves the meteorologist's ability to predict stagnant conditions and thus to mitigate pollution levels by calling a no-burn ahead of time. Experience has shown that no-burns are needed for two meteorological scenarios.

A no-burn is needed when a radiation inversion will form rapidly after sunset and the wind is near calm. The timing of the inversion is important because peak wood-burning usually occurs during the evening hours in Albuquerque. Radiation inversions form rapidly after sunset when the air is unusually dry. Calm wind together with an inversion keeps pollution from dispersing, i.e. pollution accumulates. Atmospheric stability within the boundary layer, the depth of late afternoon mixing, and cloud cover also usually play key roles in the decision.

Widespread, deep snow cover is the other scenario that can result in accumulating pollution. Normally, the sun's energy warms the surface and breaks up inversions that form overnight. Snow cover, however, reflects the sun's energy back out to space. The combination of snow cover and light winds can necessitate a no-burn. Cloud cover and fog also play an important role in the development of an inversion during the snow cover scenario.

3) What are the criteria for a no-burn?
Criteria are subjective and based on the experiences of past events. Dewpoint temperatures are a reliable indicator of the dryness of an air mass. When the dewpoint

drops below 10 degrees Fahrenheit, a no-burn may be needed. A wind of at least 7 mph and a couple hours' duration are enough to adequately disperse pollution. A low mixing height prior to sunset is another necessary element for pollution to accumulate. If pollution has accumulated during the night, cloud cover during the following day can prolong elevated levels of pollution.

Pollution levels often spike briefly then drop as a light breeze develops. Wind speeds below 10 mph and cloud cover are the most challenging aspects of the no-burn decision. The forces responsible for light winds are less obvious than the forces which generate stronger winds. Preventing minor, brief spikes in pollution levels from wood burning is an unrealistic vision without banning wood burning altogether.

The Air Division has fine particulate (smoke) monitors next to two neighborhoods where residential wood burning is common. The dry air scenario usually results in brief, but major spikes in pollution levels. Widespread snow cover can result in a pollution episode that lasts a couple of days. Both pollution events are undesirable. The Air Quality Division seeks to prevent both prolonged episodes of fine particulate levels above 40 micrograms per cubic meter and brief episodes exceeding 65 micrograms per cubic meter from residential wood burning. This protects public health and keeps Albuquerque/Bernalillo County well within limits set by the U.S. EPA.

4) How many no-burns will we have this year?
The winter of 2004/05 was unusually wet with almost all of the precipitation falling as rain; no-burns were not needed. The winter of 2005/06 was unusually dry; several exceptionally dry air masses invaded New Mexico and there were no-burns on 6 nights. The large scale weather patterns that result in such extremes can last several weeks or even months.

The winter of 2005/06 was a La Nina year and, as I write this (end of Nov 2007), we now have another La Nina occurring. October 2007 and the first half of November were dry and unusually warm. Beginning on Thanksgiving, Albuquerque experienced a dramatic and sudden shift to colder and somewhat wetter weather that has stayed with us through the end of the November. The point of all this is that we really have no idea ahead of time how many no-burns will occur in a year. The no-burn decision is made one day at a time.

5) Can we have more no-burns? Are no-burns really necessary?
The Division receives calls from people on both sides of the issue. Some people want no-burns every night or virtually every night. Others are furious when the Division calls one no-burn. The no-burn decision does not depend on individual opinions and desires.

The U.S. EPA sets standards for pollution levels. Smoke is a type of fine particle pollution. Studies have found that the health risk is disproportionately greater on days when concentrations are well above standard than on days that are just above the standard. By carefully focusing no-burns on the worst-case meteorological conditions, the Division can effectively protect public health while simultaneously minimizing the burden for those whom the cost of natural gas heat is an economic hardship. The no-burn decision depends on current and expected weather conditions.

6) My neighborhood is the worst. Why isn't there a monitor in my neighborhood?
Monitoring is expensive and paid with taxpayer dollars. The Division has carefully selected 4 sites in a diamond-shape around the Metro area to represent the diverse population and geography of Albuquerque. Two of the fine particle monitors are located near neighborhoods where residential wood burning takes place. These monitors have allowed the Division to pinpoint which meteorological conditions lead to rapid accumulation of pollution.

Furthermore, serious pollution events are rare and appear to be in a class by themselves. In other words, it is **not** the case that there is continuous spectrum of pollution events. There are a few special meteorological circumstances that result in extraordinary pollution levels. Visibility, which is directly proportional to the amount of smoke in the air, is dramatically reduced across the metro area if people are allowed to burn during these conditions. These situations clearly warrant a no-burn and calling a no-burn during those conditions demonstrably protects public health. The Division remains alert for these situations. There is no need to have monitor in every other neighborhood to protect public health.

7) How do you know if the no-burn is effective? In general? For a specific day?
The Division has archived data from two days with similar meteorological conditions. On one of those days people were allowed to burn and pollution reached extraordinary levels. On the other day, a no-burn was put into effect and pollution levels remained low to moderate. So, in general, the no-burn is effective. For evaluating the effectiveness of a specific no-burn, one must examine the meteorological conditions that occurred.

8) Where can I get a further explanation of the technical terms used above?
The American Meteorological Society has a glossary on its website. The URL is http://amsglossary.allenpress.com/glossary. Google's search engine is also helpful with such research.

9) Where can I look at the data used to assess current weather and make the no-burn decision?
http://weather.msfc.nasa.gov/GOES
http://www.wrh.noaa.gov/satellite
http://www.atmo.arizona.edu/index.php?section=weather
http://www.rap.ucar.edu/weather
http://www.nrlmry.navy.mil/sat-bin/epac_westcoast.cgi
http://weather.unisys.com
http://vortex.plymouth.edu/make.html
http://www.nco.ncep.noaa.gov/pmb/nwprod/analysis
http://ggweather.com
http://www.nws.noaa.gov
http://weather.uwyo.edu
http://www.spc.noaa.gov
http://www.srh.noaa.gov/abq