STATE OF COLORADO

John W. Hickenlooper, Governor
Christopher E. Urbina, MD, MPH
Executive Director and Chief Medical Officer

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
Located in Glendale, Colorado

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

http://www.cdphe.state.co.us

Colorado Department
of Public Health
and Environment

INDOOR AIR QUALITY AFTER A WILDFIRE

Once the immediate danger of a wildfire has passed, people have questions about indoor air quality in unburned homes in or near the fire zone. A major concern is the potential for toxins and other contaminants in the soot and ash that may be deposited in homes from nearby burned structures, and the health and safety of families reoccupying these homes. The Colorado Department of Public Health and Environment ("Department") has developed this guidance document to assist residents and local public health officials in addressing potential indoor air issues within homes impacted by wildfires. In developing this document, the Department has coordinated with indoor air quality officials across the country, and has compiled a list of recommendations and considerations for addressing potential indoor air quality issues during clean-up and re-occupancy.

Ash/Debris handling at burned home sites: The Department has produced a guidance document titled "Wildfire Recovery Guidance for Cleanup of Damaged or Destroyed Buildings." That document is available here: http://www.cdphe.state.co.us/Wildfires/WildfireRecoveryGudianceBldgs.pdf All debris and ash should be handled in a manner that will minimize potential exposure to both the people handling the material and those in the surrounding area. Materials must be thoroughly wetted to minimize dust from being generated as the ash and debris is handled, then packaged inside a 6-mil plastic sheeting liner. This is done to contain the ash and debris as it is transported from the site to the landfill.

Indoor Air Quality issues in adjacent home sites: The Department recommends that residents stay inside as much as possible until adjacent structure sites have been cleaned. Limit the outdoor time of children and pets and do not let them play around burned structures. Take off your shoes and wipe off pets' paws before they enter your home.

Continue to keep doors and windows shut as much as possible. Even if a house does not have air conditioning, most furnace systems - through which the conditioned air passes - can run continuously on the "fan only" setting. Make sure the system filter is clean; if not, or if it is the less efficient fiberglass filter type, replace it with a more efficient pleated filter. Replace filters as they become clogged; some sources recommend replacing filters once a month for up to a year after the surrounding area has been cleaned. Local hardware and general merchandise stores should be able to assist you in finding the appropriate filters for your home.

Most window air conditioners and swamp coolers do not filter the air before it is discharged into the home. There may be some reduction of particulates when the air passes through the wet media on a swamp cooler, but it is much less than what will be captured by a filter on a furnace or centralized air conditioning system. We recommend limiting the use of this individual type of equipment, if possible. Be aware of heat issues if your home is not air conditioned and limit activities during hot weather.

Ash and soot on the ground and vegetation in the vicinity will continue to generate smoke odors and airborne particles when disturbed by air movement. Until the ash and soot is diluted and absorbed by the environment, use indoor mechanical air filtration (such as centralized air conditioning with furnace filters) to help minimize the effects.

If you choose to add an air purifying system (an individual or whole house unit) in addition to your furnace/AC unit, there are several things to consider. No air purifier will remove all pollutants from the air. The most common unit air purifiers are designed to remove particles, and will not eliminate odors caused by the smoke. The addition of a charcoal pre-filter may assist with odor removal. A High Efficiency Particulate Air (HEPA) filter is at least 99.97% efficient in removing particulate. Important factors to look for are "true" HEPA filters, not "HEPA type" filters, and making sure that the unit is sized correctly for the rooms you plan to use it in. Most portable units will state on the package the unit's airflow rate, the room size it is suitable for, its particle removal efficiency, and perhaps its Clean Air Delivery Rate, or CADR. The CADR is a rating that combines efficiency and airflow. Room air cleaner units should be sized to filter at least two or three times the room volume per hour. Room volume is calculated by multiplying the floor dimensions (length times width) times the ceiling height.

The use of ultraviolet (UV) light in air purifiers does not effectively help to remove smoke from the air. The Department advises the public to avoid exposure by not using air cleaners that produce ozone. For additional information, please review the US Environmental Protection Agency document: "Ozone Generators That Are Sold As Air Cleaners," available at: http://www.epa.gov/iaq/pubs/ozonegen.html

When cleaning smoke/soot from a home, the following steps are recommended:

- Use a hose or pressure washer on the exterior of the home, drive and walkways, patios, decks, outdoor furniture and automobiles. Rinse off furnace air intakes and air conditioning units. Do not use leaf blowers to clean outdoor surfaces.

- Wash all interior surfaces with mild soap or other appropriate cleaning solutions and rinse thoroughly. Include the inside of closets, cabinets and drawers, if necessary. Wet wiping and damp mopping is preferable to dry sweeping. Change wash water frequently.

- If vacuuming, take care to ensure that the vacuum cleaner is equipped with HEPA filtration. Vacuums without adequate filtration will permit particulate to pass through the bag or filter and redistribute it throughout the home.

- Launder or dry clean all affected clothing. It might be necessary to rinse a load several times.

- Clean all impacted household items with mild soap. Change wash water frequently and rinse thoroughly.

- Steam clean affected carpets, upholstered furniture and mattresses - changing water/solution frequently.

- It may be necessary to "blow out" the interior of electronic equipment, such as computers, stereos and televisions; as well as refrigerator condenser coils whose electrostatic charge might have attracted particulate.

- If aerial fire retardant or firefighting foam residue is present on the house or automobiles, use a mild detergent and brushes to scrub and dilute the dried residue and flush it from the surfaces and rinse with clean water.

Persons engaged in these cleaning activities may wish to wear respiratory protection. A disposable particulate respirator that has been certified by the National Institute for Occupational Safety and Health (NIOSH) to ensure that it can filter out potentially harmful particles, will offer some protection if properly worn. Commonly available one-strap paper dust masks, which are designed to keep larger particles out of the nose and mouth, typically offer little protection. The same is true for bandanas (wet or dry) tied over the mouth and nose. Filter material rated "N95" will capture at least 95% of very small particles, while filter material rated "P100" filters out at least 99.97%. Please seek advice from your physician regarding use of respirators if you have pre-existing heart and lung conditions. Other personal protection may include protective clothing and gloves to avoid skin contact and eye protection.

Cleaning and recovery activities should be guided by common sense. Be aware that there are companies that might attempt to take advantage after any disaster. Use reputable local businesses, seek recommendations from your insurance company, and check with your local Better Business Bureau.

Answers to commonly asked questions:

Is there anyone who will test the air quality or settled dust in my home? Ash and debris from burned structures may contain more toxic substances than forest fire ash, because of the many synthetic and other materials present in homes and buildings. It would be almost impossible to determine what a burned structure contained and then sample for all those possibilities in the air or settled dust in a nearby home. Even then, sampling could only show what was present when and where the sample was collected. Airborne concentrations could change dramatically due to activities taking place inside or outside of the home. Therefore, the recommendation is to thoroughly clean the home, avoid stirring up dust that may be present on surfaces (sending it back up into the air) and to keep as much ash and soot from re-entering the home as possible. If you have specific health concerns, we encourage you to contact your personal physician.

A company wants to use an ozone generator in my home to remove the smoke odors. Is this safe? Please see the U.S. Environmental Protection Agency document: "Ozone Generators That Are Sold As Air Cleaners" available at: http://www.epa.gov/iaq/pubs/ozonegen.html

An excerpt from this document is as follows: *High concentrations of ozone in air, **when people are not present**, are sometimes used to help decontaminate an unoccupied space from certain chemical or biological contaminants or odors (e.g., fire restoration). However, little is known about the chemical by-products left behind by these processes (Dunston and Spivak, 1997). While high concentrations of ozone in air may sometimes be appropriate in these circumstances, **conditions should be sufficiently controlled to insure that no person or pet becomes exposed**. Ozone can adversely affect indoor plants, and damage materials such as rubber, electrical wire coatings, and fabrics and art work containing susceptible dyes and pigments (U.S. EPA, 1996a).*

What should I consider before deciding to have the air ducts in my home cleaned? Please see the U.S. Environmental Protection Agency document: Should You Have the Air Ducts in Your Home Cleaned available at: http://www.epa.gov/iaq/pdfs/airducts.pdf

An excerpt from this document is as follows: *Air duct cleaning service providers may tell you that they need to apply a chemical biocide to the inside of your ducts as a means to kill bacteria (germs) and fungi (mold) and prevent future biological growth. They may also propose the applications of a "sealant" to prevent dust and dirt particles from being released into the air or to seal air leaks. You should fully understand the pros and cons of permitting application of chemical biocides or sealants. While the targeted use of chemical biocides and sealants may be appropriate under specific circumstances, research has not demonstrated their effectiveness in duct cleaning or their potential adverse health effects. No chemical biocides are currently registered by EPA for use in internally-insulated air duct system.*

Additional Information on Wildfire recovery can be found on many web pages, including:

U.S. Department of Health and Human Services
http://sis.nlm.nih.gov/enviro/wildfires.html

FEMA
http://www.fema.gov/news/newsrelease.fema?id=4046

Texas and California put out specific information on dealing with Wildfire debris. These documents are linked for your information.
http://www.tceq.texas.gov/response/smoke/wildfires
http://www.calepa.ca.gov/Disaster/Fire/

Individuals with additional questions may contact the Department's Indoor Environment Program at 303-692-3100 or IAQ@state.co.us