Focus on **Reducing Smoke from Agricultural Burning**

from Ecology's Air Quality Program

Here are some ideas for reducing smoke when you burn. Some of these ideas come from the Cereal-Grain Residue Open-Field Burning Emissions Study conducted by Air Sciences, Inc. Remember, you are responsible for both air pollution and fire safety on your land.

For a cleaner fire, burn HOT!

Combustion occurs when oxygen joins quickly with other substances, producing flames, heat, carbon dioxide, and water vapor. The three conditions needed to start and maintain a fire are:

- **Fuel:** An organic substance that will burn. Agricultural waste is a solid fuel, ranging from light wheat straw to dense orchard wood, and containing varying amounts of minerals and moisture.

- **Heat:** The kindling temperature is the temperature to which a fuel must be heated to catch fire. Wood ignites at temperatures between 375 and 510 degrees Fahrenheit. Any moisture in or on the fuel will have to be boiled off (at 212 degrees Fahrenheit, or less for volatile plant sap) before the fuel can get hot enough to burn well. Burning at low temperatures creates smoke. Smoke is the result of incomplete combustion.

- **Oxygen:** Not all fuels burn the same way, but all require plenty of oxygen. Smaller pieces of fuel will burn more easily and quickly than large chunks because more fuel surface area is available to interact with oxygen. Carbon monoxide, volatile organic compounds, and soot particles are produced when there is not enough oxygen.

Don't leave your fire unattended. In addition to an unattended fire creating a potential runaway fire hazard, you need to be on hand to maintain a hot fire. Do not walk away until the fire is out and cool. Once the fire is started, feed it continuously, as fast as the fire will consume the fuel.

Field crop burning

Recommended field crop drying times

This depends on the crop and the fuel moisture. For example, for some crops, three days drying time is required for "spread" straw and 10 days is required for "rowed" straw. In general, try the "crackle test:" If the material makes an audible crackle when it is bent sharply, it is dry enough to burn. Several samples should be tested, including some from under the mat, in the center of the mat, and from several places in the field.

FOR MORE INFORMATION, CONTACT

***Ecology's* Eastern Regional Office at (509) 329-3400** for:

Adams, Asotin, Columbia, Franklin, Garfield, Grant, Lincoln, Stevens, Pend Oreille, Walla Walla and Whitman Counties

OR

Ecology's Central Regional Office at (509) 575-2490 for:

Chelan, Douglas, Kittitas, Klickitat, and Okanogan Counties

August 2004 **94-05 (Rev. 8/04)**

Original printed on recycled paper

*Field crop igniting techni*ques

Use an ignition device that **does not produce black smoke.** Some farmers use liquid propane gas powered torches. **Do not use diesel for ignition.**

It is important to burn dry material whenever possible.

Light a test fire. See how well the waste material burns and where the smoke is going. Quit if the fuel is too damp or smoke is blowing toward populated areas.

There are different ways to conduct the burning. A *backing fire* is one that is ignited at the downwind edge of the unit to be burned so that the fire spreads, or backs, into the wind. Backing fires are typically slower moving than head fires. The backward "lean" of the flames over the already burned residue produces relatively little pre-heating of fuels and a narrow fire front. A *head fire* is one that is ignited at the upwind edge of the unit to be burned and is pushed across the unit by the wind. Head fires are typically fast moving and the forward "lean" of the fire over the unburned residue creates forward heating of the fuels and a correspondingly wider fire line front.

For ditch and weed burning, kill the grass or weeds first and allow them to dry. Burn wastes using field crop igniting techniques. Never burn anything other than natural vegetation. In order for drying to occur, the tree material must be completely removed from the soil.

Orchard and vine crop burning

Recommended orchard and vine crop drying times

For prunings and small branches, three weeks is recommended for drying. For large branches and stumps, at least six weeks is recommended. In wet climates, more time is needed.

Orchard and vine crop igniting techniques

Stack your starter pile of brush and wood as tightly as possible, but make sure it has enough air circulating throughout. Parallel piling is best. Ignite by using a propane torch or another commercial lighting device that will raise a large area of the fuel pile to combustion temperature. Add material after your starter pile is fully engulfed. Avoid pushing dirt into the pile with the prunings or tear out material. Keep the pile small enough to control the fire and prevent escape or smoke impact. **Remember, don't use tires or pour diesel oil on the fire to ignite!** Both are illegal.

For more information

Visit Ecology's website at http://www.ecy.wa.gov/programs/air/aginfo/agricultural_homepage.htm .

See page one for contacts for central and eastern Washington.

For Spokane, Benton and Yakima counties, contact your local air authority.