



Focus on Ozone Air Pollution

From the Department of Ecology's Air Quality Program

Background

Ozone at ground level is different from the "good" ozone in the upper atmosphere that protects us from the sun's harmful rays. At ground level, ozone is a key component of smog and can pose risks to human, animal, and plant life. Ground level ozone comes from the interaction of ultraviolet rays from sunlight with emissions from motor vehicles, industry, solvents, and gasoline fumes. It is formed on warm, sunny days when gases or vapors of chemicals called volatile organic compounds mix in the air with nitrogen oxides. Most ozone pollution occurs in late spring, summer and early fall, when the days are longer and there is enough sunlight to heat the chemicals.

Most of the air pollutants that form ozone come from many small sources spread over a wide area. Nearly two-thirds of these emissions are from motor vehicles. Vehicle use is growing faster than population in Washington as land use, development, and transportation patterns have fostered continued reliance on cars for basic transportation.

Industry is a smaller contributor to the ozone problem, but is still a significant source. The commercial, industrial, and residential use of solvents adds to ozone pollution as well. Dry cleaners, gas stations, auto body paint shops, cleaning of mechanical and electronic parts, outdoor burning, and house painting are examples of activities that commonly generate pollutants that form ozone.

Health and environmental effects of ozone

Ozone can pose serious health problems. It can irritate and inflame the breathing passages in the lungs, throat, nose, and sinuses. It can reduce resistance to infections, colds, and other diseases. It can cause harmful changes in breathing passages, reduce the lung's working ability, and worsen existing conditions such as asthma, bronchitis, and emphysema. Ozone can cause coughing, wheezing, chest tightness, dry throat, headaches, and nausea. People exposed to ozone can experience fatigue, shortness of breath, or pain during deep breaths. Those at greatest risk are those who exercise heavily during periods of peak ozone concentrations, children, the elderly, and those with existing lung or immune system problems.

Breezes often blow pollution from urban areas toward rural areas and the mountains. By the time this "urban air" arrives, ozone has often reached its highest concentrations. In fact, the Department of Ecology's ozone monitoring program has recorded its highest readings in the Cascade foothills. Because of the way ozone moves through the air, people downwind from urban areas during clear weather can be exposed to unhealthy concentrations of ozone.

Ozone can also harm vegetation. The downwind areas that experience high ozone concentrations include some of western Washington's agricultural areas. The U.S. Forest Service and the National Park Service report that ozone has damaged trees, moss, and lichens in Mt. Rainier National Park and in Cascade forests and wilderness areas. Damage to materials attributed to ozone includes cracking of rubber products, weakening of textiles, changes in dyes, and premature cracking of paint.

Setting and meeting ozone standards

EPA sets health-based standards for specific air pollutants. When an area does not meet the standard(s) for a pollutant, EPA declares the area "nonattainment" for that pollutant. An area can be redesignated attainment if EPA approves a maintenance plan for that area to maintain the air quality standard for at least 10 years, and satisfy other requirements of the federal Clean Air Act.

For ozone, EPA originally set a one-hour standard. EPA later set an eight-hour standard that was determined to better protect human health.

The one-hour standard

According to the one-hour ozone standard, when ozone levels in an area exceeded 0.12 parts per million, averaged over one hour, the area could be declared nonattainment. EPA designated the central Puget Sound and Vancouver areas nonattainment for the one-hour ozone standard. EPA later approved maintenance plans for these areas and redesignated them attainment as maintenance areas.

The eight-hour standard

In 1997, EPA set an eight-hour ozone standard (0.08 parts per million, averaged over eight hours) in order to better protect human health. Implementation of this standard was delayed by lawsuits and the lack of rules for implementing it. EPA began implementing the eight-hour standard in April 2004. The central Puget Sound and Vancouver areas were designated attainment for this standard. The rest of the state was either attainment or unclassifiable, which means there was no monitoring data available to show whether the area met the standard.

Which standard applies now?

Both standards apply to Washington until June 15, 2005. On that date, EPA will revoke the one-hour standard and leave the eight-hour standard as the sole ozone standard. Washington must submit maintenance plans to EPA for the central Puget Sound and Vancouver areas by June 15, 2007. These plans must demonstrate that these areas can continue to maintain the new eight-hour standard until 2014. Population growth and increased motor vehicle use will continue to make meeting the standard a challenge in these areas.

Controlling ozone

The Washington Clean Air Act adopted in 1991 required the Department of Ecology to decrease the amount of ozone in the air around us through motor vehicle emission checks, reduction of traffic and the use of single-occupancy vehicles, research into and use of alternative fuels and a permit program for industrial facilities. In addition to these activities, Ecology and local air pollution control agencies have been pursuing strategies to control nitrogen oxides and volatile organic compounds, the main ingredients of ozone. These strategies include gasoline vapor controls, regulation of volatile organic compounds and toxic chemicals, and review of permit applications of potential major air pollution sources.

For more information

Publications and information about other major pollutants, as well as on other air quality issues and activities, are available online at <http://www.ecy.wa.gov/programs/air/airhome.html> , or by calling Tami Dahlgren at the Department of Ecology's Air Quality Program, (360) 407-6830.

If you need this information in an alternate format, please contact Tami Dahlgren at (360) 407-6800. If you are a person with a speech or hearing impairment, call 711, or 1-800-833-6388 for TTY.