



SCIENCE DISSECTED

April/May 2010

www.rpd.net

What's Air Got to Do With It?

The massive volcanic eruptions in Iceland produced plumes of ash and dust that prompted health warnings and caused widespread disruption of air traffic. The chaos that resulted from the Icelandic eruptions is a reminder of how air pollutants can impact our lives. Natural disasters such as volcanoes and forest fires are not the only events that affect air quality. Everyday human activities, industry, and weather conditions impact air quality as well. Organizations such as the Environmental Protection Agency (EPA) and Clark County's Department of Air Quality and Environmental Management (DAQEM) monitor air quality, issue advisories, and educate the public on the sources and health effects of air pollution. Although many individuals take breathing for granted, the 35 pounds of air that an average adult breathes everyday impacts their health. It is important to know the types of pollutants, their sources, and their health effects.

Monitoring Air Pollution: The Air Quality Index

The EPA and DAQEM collaborate to inform the public about air quality by making it as easy to understand as a weather forecast. The Air Quality Index (AQI) is used to provide information about local air quality and the possible health effects associated with the pollutants. The AQI is calculated for four common air pollutants (ozone, particle pollution, carbon monoxide, and sulfur dioxide) that are regulated by the Clean Air Act. The AQI is a scale that measures from 0 to 500 and is divided into levels of health concerns. In general, an AQI rating under 100 is considered to be satisfactory and over 100 is unhealthy.

AIR QUALITY INDEX	
Air Quality Index (AQI) Values	Levels of Health Concern
0 to 50	Good
51-100	Moderate
101-150	Unhealthy for Sensitive Groups
151-200	Unhealthy
201-300	Very Unhealthy
301 to 500	Hazardous

Figure 1: Air Quality Index

From: http://www.epa.gov/oar/airtrends/2007/dl_graph.html

Did you know?

Air Quality Awareness Week is May 3-7, 2010. Also, the 2010 Summer Science Institute's theme is "*What's Air Got to Do With It?*" and will focus on air quality in Southern Nevada.

Large cities (population over 350,000) are required to report the AQI to the public each day. The AQI can be found in the local weather forecast on TV, in the newspaper, or online. If the AQI exceeds 100 for any of the measured pollutants, then local agencies must report which groups are sensitive to the pollutants. This information helps residents protect their health by limiting strenuous outdoor activities while air quality is poor. Ozone and particulate matter are common air pollutants that trigger air quality warnings in Southern Nevada. For current air quality conditions and forecasts, visit the *AIRNow* website at www.airnow.gov.

Ozone: Good Up High, Bad Nearby

Ozone can be beneficial or harmful depending upon its location in the atmosphere. When ozone is present in the stratosphere (approximately 6-30 miles above Earth), it protects life by shielding some of the harmful ultraviolet rays. Ground-level ozone, which is a main ingredient in urban smog, can trigger a variety of health problems and damage vegetation. The “bad ozone” forms from chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOC). Sources of NO_x and VOC pollutants include emissions from industrial facilities, vehicle exhaust, and gasoline vapors. Ozone concentration increases during the warmer months due to the intensity of the sunlight. Exposure to unhealthy levels of ozone can irritate the respiratory system, reduce lung function, and aggravate asthma. Ozone can also inflame and damage the cells that line the lungs similar to the way the skin responds to a sunburn.

Particle Pollution: Don't be a Dusthole

Particle pollution (a.k.a. particulate matter) is caused by a mixture of liquid and solid particles in the air. Particle pollution can be elevated any time of the year and can be composed of the following: dust particles, pollen, mold spores, metals, organic chemicals, or acids (nitrates and sulfates). Particle pollution is classified according to the size of the substance. Fine particles are less than 2.5 micrometers in aerodynamic diameter and are commonly found in smoke and haze. The coarse particles range from 2.5-10 micrometers and are present in wind-blown dust. Breathing particulate matter under 10 micrometers can pose short and long-term health risks. Short-term symptoms of particle exposure includes temporary irritation of the respiratory track and eyes. Particle pollution is also associated with an increase in heart attacks and susceptibility to respiratory infections.

Related Websites:

EPA's Air Quality Awareness Week (May 3-7, 2010) Website- <http://www.epa.gov/airnow/airaware/>

AirNow Multimedia Links- <http://www.airnow.gov/index.cfm?action=movies.index>

Las Vegas Sun: “Nevada Neighbor Shares Its Air Pollution”- <http://www.lasvegassun.com/news/2009/jun/23/nevada-neighbor-shares-its-air-pollution/>

Good Up High: Too little there.... Many popular consumer products like air conditioners and refrigerators involve CFCs or halons during either manufacture or use. Over time, these chemicals damage the Earth's protective ozone layer.



Bad Nearby: Too much here.... Cars, trucks, power plants and factories all emit air pollution that forms ground-level ozone, a primary component of smog.

Figure 2. Ozone: Good Up High, Bad Nearby

From: <http://www.epa.gov/oar/oaqps/gooduphigh/ozone.pdf>

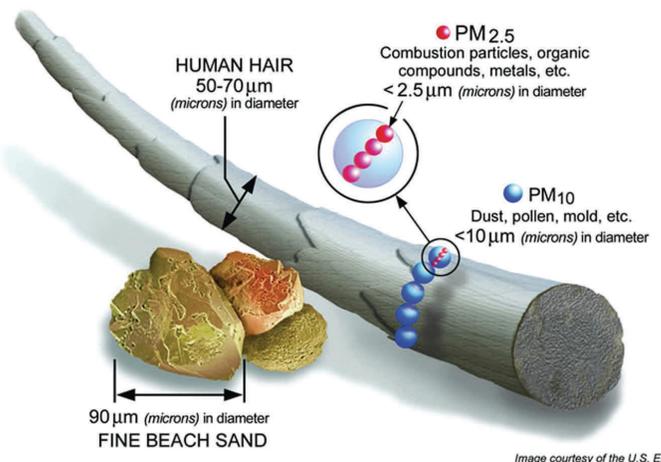


Image courtesy of the U.S. EPA

Figure 3. Comparing Particle Pollution

From: <http://www.epa.gov/airtrends/2010/report/sixcommon.pdf>