



TEXAS

AIR QUALITY STUDY

AUGUST - SEPTEMBER 2000

QUESTIONS AND ANSWERS ABOUT FINE PARTICLE AIR POLLUTION

TEXAS STATE DOCUMENT
UNIVERSITY OF TEXAS PAN AMERICAN
EDINBURG, TEXAS 79539-2999

WHAT IS FINE PARTICLE AIR POLLUTION?

Fine particles are microscopic bits of dust, soot, mist, and smog. Fine particles—as defined by the EPA—are those particles less than or equal to 2.5 micrometers across. (In comparison, a human hair is about 70 micrometers across.) Because of the small size of these particles, they are capable of reaching the furthest recesses of the human respiratory tract. High concentrations of these particles have been associated with a variety of health problems.

Unlike other air pollutants that are composed of a single compound—such as carbon monoxide, ozone, and sulfur dioxide—fine particles are a complex mixture of many shapes, sizes, and compositions, depending on their emissions sources and/or formation. Particles are produced by many sources and can contain both inorganic and organic components. In general, airborne particles are defined as “fine” and

“coarse,” with the dividing line being about 2.5 micrometers.

Earlier efforts to combat particulate pollution have concentrated on coarse particles. This pollution is formed by such frictional grinding processes as sanding, scraping, and machining, which produce particles that can become suspended in the air. Coarse particles are also produced and resuspended in the air by plowing, lawn mowing, construction, motor vehicle traffic, and dust storms. Natural coarse particles include soil, pollen and mold spores, volcanic dust, and sea salt. Coarse particles generally remain in the atmosphere for only a brief period and are quickly removed by gravity, except during windy conditions.

Fine particles (those less than or equal to 2.5 micrometers across) are emitted from combustion processes and also are formed as secondary by-products of human-made and natural gaseous emissions. Fine particles are primarily composed of sulfate, ammonium ions, organic materials, carbon soot, fine mineral dust, and nitrate. These particles may remain in the air for long periods (days to weeks) and can

contribute to air pollution and visibility problems hundreds or thousands of miles away from their sources.

WHAT CAUSES FINE PARTICLE POLLUTION TO ACCUMULATE IN HARMFUL CONCENTRATIONS?

The concentration of fine particles in the air is determined not only by the amount of particles or particle-forming chemicals emitted, but also by the weather. While windy days can cause nuisance dust problems, it is mainly those hot, sunny, and stagnant days that favor the chemical production and buildup of fine particles in the atmosphere.

WHEN DOES FINE PARTICLE POLLUTION OCCUR?

Fine particle pollution in the eastern half of both Texas and the United States is generally greatest during the warm, summer months, but can occur at any time, depending upon weather and emission conditions.



GI-262

For more information about the Texas 2000 Air Quality Study, see www.utexas.edu/research/ceer/texaqs/ or contact the TNRCC at 512/239-1459 or aqp@tnrcc.state.tx.us.

WHY ARE PEOPLE CONCERNED ABOUT FINE PARTICLE POLLUTION?

The small size of fine particles allows them to be easily drawn deep into the human respiratory tract. Once there, the potential for adverse health effects depends upon the concentration, size, shape, composition, and number of the particles. Research has shown an association between fine

particle exposure and cardiopulmonary effects, respiratory illness, hospital admissions, and mortality. Additionally, these fine particles have a major impact on visibility in our national parks and wilderness areas.

Exposure to outdoor and indoor fine particle air pollution is one of the most pervasive air quality problems in the world. Concern about fine particle air pollution in the United States was underscored by the recent EPA revisions to the National

Ambient Air Quality Standard for particulate matter that added standards for fine particle air pollution.

WHAT ARE SCIENTISTS AND GOVERNMENT AGENCIES DOING ABOUT FINE PARTICLE POLLUTION?

In 1997, the EPA revised the National Ambient Air Quality Standards for particulate matter to include standards for fine particles. The revisions are under litigation. Meanwhile, scientific research is being conducted on many fronts. The EPA and state and local environmental regulatory organizations have recently begun to measure fine particles on a national scale. Several collaborative studies are seeking a much better understanding of the production, accumulation, and movement, or transport, of fine particle air pollution in order to develop effective air quality management strategies. In addition to the Texas 2000 Air Quality Study is the Gulf Coast Aerosol Research and Characterization Program. International efforts are also under way, as health scientists from around the world are investigating the link between fine particles and health risks.

WHAT DO WE KNOW ABOUT FINE PARTICLE POLLUTION IN TEXAS?

Fine particles impair the visibility at Big Bend National Park more than at any other national park in the western half of the United States. Preliminary studies indicate that both Mexico and the United States contribute to this pollution, but the importance of source areas in the two countries remains to be determined.

The state of Texas, the city of Houston, and the Houston Regional Monitoring Corporation worked together to support early monitoring of fine particle air pollution in Texas. The results of this project suggest that some parts of Houston could have trouble meeting the U.S. Environmental Protection Agency's (EPA) 15 microgram per-cubic-meter annual average standard, and that downtown Dallas and El Paso may be on the borderline. The study also suggests that unlike large areas of the South and Northeast United States, rural East Texas would likely meet that standard.

