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EDITORIAL

Proposed Air Pollutant Standards

The U.S. Environmental Protection Agency's (EPA's) intention to tighten National Ambient Air Quality Standards for ozone and fine particles has encountered widespread opposition. Critics include members of the Clinton Administration, important Democrats and Republicans in Congress, and local, state, and city officials. The eventual cost of implementing the EPA proposal would be many hundreds of billions of dollars.

The current ozone standard—promulgated in 1990—states that an area must control pollutant emissions if the daily maximum 1-hour averaged ozone concentration exceeds 0.12 part per million (ppm) more than three times in 3 years. In spite of strenuous efforts, many areas are still not in compliance. The proposed regulatory level of 0.08 ppm averaged over 8 hours would make many large rural areas noncompliant (*Science*, 9 May 1997, p. 916). An estimate of cost outlays necessary to achieve the 1990 standard nationwide is $23 billion to $53 billion per year. Alicia Munnell of the federal Council of Economic Advisers has projected the additional costs of meeting the new ozone standard to be $60 billion per year.*

The main beneficiaries from tighter ozone standards would be individuals doing heavy work or exercise outdoors and those with impaired resistance to ozone's effects. How many people would benefit is uncertain. The EPA's 1996 estimate of the number of beneficiaries has changed. For example, the number of asthmatics benefiting has been decreased by as much as a factor of 3. Projected numbers of beneficiaries in other impaired groups have also been reduced substantially.* Knowledge about the health impairments arising from intake of airborne particulate matter (PM) of specific size and chemical composition is primitive. The physiological mechanisms of these impairments are relatively unknown. Epidemiologic studies indicate an association of increased morbidity and mortality with enhanced levels of particulate matter. However, such studies are plagued by confounders such as previous exposure to cigarette smoke; the coincidental presence of high levels of toxic gases, such as CO, NO_x, and SO_2; and extreme weather.* Many epidemiologic studies dealt with individuals who had experienced more pollution than is now prevalent. The levels of total suspended particles dropped 79 percent from 1970 to 1995.

Since 1987, monitoring devices have been designed to select particulate matter with diameters of 10 millimeters and smaller (PM_{10}). Most of the PM_{10} emitted is so-called fugitive emissions that come from paved and unpaved roads. Other constituents are wind-blown soil and particles, including pollen from agricultural and forested areas. Only 6 percent of the total PM_{10} emitted consists of particles emitted by a combination of industrial processes and combustion of fuel at electrical utilities and in transportation.

The EPA has proposed continuing the current PM_{10} standard and has also proposed that a $PM_{2.5}$ standard be used in an effort to attain tighter control on the effects of particulate matter. The agency proposed this change despite the fact that only fragmentary knowledge is available about the constituents of $PM_{2.5}$. In contrast to PM_{10}, which has been monitored at 1737 sites, $PM_{2.5}$ has been monitored at only 51 locations.* Data from this partial coverage of the country reveal large variations in PM_{10} versus $PM_{2.5}$ makeup in different regions and in the constituents of $PM_{2.5}$ in a given region. Sulfates predominate in the East and organic carbon in the West. Nitrates are a major contributor to $PM_{2.5}$ in Los Angeles. Many unidentified substances are present at all locations. How can the EPA minimize the effects of particulates if it does not know what they are or which, if any, have deleterious physiological effects? How can the EPA produce reliable estimates of benefits and costs?

What is needed now is more scientific information. Roger McClellan, a member and former chairman of the EPA Clean Air Science Advisory Committee, has proposed that instead of sudden action on $PM_{2.5}$, a 5-year research program be conducted. Such a program would expand efforts to characterize airborne particles as to their size and chemistry. It would also include studies to understand the mechanisms by which airborne particles of varied size and chemical composition can cause disease. A useful program could be conducted for $250 million and would have a much higher probability of leading to positive health benefits than would multi-hundred-billion-dollar regulatory edicts.

Philip H. Abelson

*K. W. Chilton, "Has the Case Been Made for New Air Quality Standards?" (Center for the Study of American Business Policy Brief 181, Washington University, St. Louis, MO, April 1997).