

residential proximity to major roads in the Netherlands. Examining a cohort of 55 to 69 year-olds from 1986 to 1994, the study indicated that long-term residence near major roads, an index of exposure to primary mobile source emissions (including diesel exhaust), was significantly associated with increased cardiopulmonary mortality.²³ Other studies have shown children living near roads with high truck traffic density have decreased lung function and greater prevalence of lower respiratory symptoms compared to children living on other roads.²⁴ A recent review of epidemiologic studies examining associations between asthma and roadway proximity concluded that some coherence was evident in the literature, indicating that asthma, lung function decrement, respiratory symptoms, and other respiratory problems appear to occur more frequently in people living near busy roads.²⁵ As discussed later, nonroad diesel engine emissions, especially particulate, are similar in composition to those from highway diesel vehicles. Although difficult to associate directly with PM_{2.5}, these studies indicate that direct emissions from mobile sources, and diesel engines specifically, may explain a portion of respiratory health effects observed in larger-scale epidemiologic studies. Recent studies conducted in Los Angeles have illustrated that a substantial increase in the concentration of ultrafine particles is evident in locations near roadways, indicating substantial differences in the nature of PM immediately near mobile source emissions.²⁶

Also, as discussed in more detail later, in addition to its contribution to ambient PM inventories, diesel PM is of special concern because diesel exhaust has been associated with an increased risk of lung cancer. As also discussed later in more detail, we concluded that diesel exhaust ranks with other substances that the national-scale air

toxics assessment suggests pose the greatest relative risk.

b. Current and Projected Levels

There are NAAQS for both PM₁₀ and PM_{2.5}. Violations of the annual PM_{2.5} standard are much more widespread than are violations of the PM₁₀ standards. Emission reductions needed to attain the PM_{2.5} standards will also assist in attaining and maintaining compliance with the PM₁₀ standards. Thus, since most PM emitted by diesel nonroad engines is fine PM, the emission controls proposed today should contribute to attainment and maintenance of the existing PM NAAQS. More broadly, the proposed standards will benefit public health and welfare through reductions in direct diesel PM and reductions of NO_x, SO_x, and NMHCs which contribute to secondary formation of PM. The reductions from these proposed rules will assist States as they implement local controls as needed to help their areas attain and maintain the standards.

i. PM₁₀ Levels

The current NAAQS for PM₁₀ were established in 1987. The primary (health-based) and secondary (public welfare based) standards for PM₁₀ include both short- and long-term NAAQS. The short-term (24 hour) standard of 150 µg/m³ is not to be exceeded more than once per year on average over three years. The long-term standard specifies an expected annual arithmetic mean not to exceed 50 µg/m³ averaged over three years.

Currently, 29 million people live in PM₁₀ nonattainment areas. There are currently 58 moderate PM₁₀ nonattainment areas with a total population of 6.8 million. The attainment date for the initial moderate PM₁₀ nonattainment areas, designated by operation of law on November 15, 1990, was December 31, 1994. Several additional PM₁₀ nonattainment areas were designated on January 21, 1994, and the attainment date for these areas was December 31, 2000. There are an additional 8 serious PM₁₀ nonattainment areas with a total affected population of 22.7 million. According to the Act, serious PM₁₀ nonattainment areas must attain the standards no later than 10 years after designation. The initial serious PM₁₀ nonattainment areas were designated January 18, 1994, and had an attainment date set by the Act of December 31, 2001. The Act provides that EPA may grant extensions of the serious area attainment dates of up to 5 years, provided that the area requesting the extension meets the requirements of

section 188(e) of the Act. Four serious PM₁₀ nonattainment areas (Phoenix, Arizona; Coachella Valley, South Coast (Los Angeles), and Owens Valley, California) have received extensions of the December 31, 2001, attainment date and thus have new attainment dates of December 31, 2006.²⁷ While all of these areas are expected to be in attainment before the emission reductions from this proposed rule are expected to occur, these reductions will be important to assist these areas in maintaining the standards.

ii. PM_{2.5} Levels

The need for reductions in the levels of PM_{2.5} is widespread. Figure II-1 at the beginning of this air quality section highlighted monitor locations measuring concentrations above the level of the NAAQS. As can be seen from that figure, high ambient levels are widespread throughout the country.

The NAAQS for PM_{2.5} were established by EPA in 1997 (62 FR 38651, July 18, 1997). The short term (24-hour) standard is set at a level of 65 µg/m³ based on the 98th percentile concentration averaged over three years. (This air quality statistic compared to the standard is referred to as the "design value.") The long-term standard specifies an expected annual arithmetic mean not to exceed 15 µg/m³ averaged over three years.

Current PM_{2.5} monitored values for 1999–2001, which cover counties having about 75 percent of the country's population, indicate that at least 65 million people in 129 counties live in areas where annual design values of ambient fine PM violate the PM_{2.5} NAAQS. There are an additional 9 million people in 20 counties where levels above the NAAQS are being measured, but there are insufficient data at this time to calculate a design value in accordance with the standard, and thus determine whether these areas are violating the PM_{2.5} NAAQS. In total, this represents 37 percent of the counties and 64 percent of the population in the areas with monitors with levels above the NAAQS. Furthermore, an additional 14 million people live in 41 counties that have air quality measurements within 10 percent of the level of the standard. These areas, although not currently violating the standard, will also benefit from the additional reductions from this rule in order to ensure long term maintenance.

Our air quality modeling performed for this proposal also indicates that similar conditions are likely to continue

²⁷ EPA has also proposed to grant Las Vegas, Nevada, an extension until December 31, 2006.

²³ Hoek, G; Brunekreef, B; Goldbohm, S; *et al.* (2002) Association between mortality and indicators of traffic-related air pollution in the Netherlands: a cohort study. *Lancet* 360(9341): 1203–1209.

²⁴ Brunekreef, B; Janssen NA; de Hartog, J; *et al.* (1997) Air pollution from traffic and lung function in children living near motor ways. *Epidemiology* (8): 298–303.

²⁵ Delfino RJ. (2002) Epidemiologic evidence for asthma and exposure to air toxics: linkages between occupational, indoor, and community air pollution research. *Env Health Perspect Suppl* 110(4): 573–589.

²⁶ Yifang Zhu, William C. Hinds, Seongheon Kim, Si Shen and Constantinos Sioutas Zhu Y; Hinds WC; Kim S; *et al.* (2002) Study of ultrafine particles near a major highway with heavy-duty diesel traffic. *Atmos Environ* 36(27): 4323–4335.