UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emissions, Monitoring, and Analysis Division
Office of Air Quality Planning and Standards
79 T.W. Alexander Drive, Research Triangle Park, North Carolina 27711

November 15, 2000

TECHNICAL MEMORANDUM

TO: EPA Air Docket A-99-06

FROM: Eric O. Ginsburg, Senior Program Advisor
Emissions Monitoring and Analysis Division, OAQPS

SUBJECT: Summary of 1999 Ambient Concentrations of Fine Particulate Matter

At the beginning of 1999, State environmental agencies began operating a broad network of monitoring stations for the measurement of fine particulate matter (measured as particulate matter having an aerometric diameter less than or equal to 2.5 micrometers, or PM2.5), using the Federal Reference Method for PM2.5 mass established when the PM2.5 national ambient air quality standard was promulgated (62 FR 38763, July 18, 1997). The data that have been submitted to EPA from this network are available in summary form via the internet on EPA's website (http://www.epa.gov/aqspubl1/annual_summary.html). Copies of raw data may be obtained by contacting the Information Management Group, Information Transfer and Program Integration Division within the Office of Air Quality Planning and Standards. Monitors are generally located within metropolitan statistical areas, although some monitors intended to measure upwind PM2.5 concentrations are located outside of metropolitan areas. Monitors in this network report a 24-hour average PM2.5 concentration for each day of successful monitoring.

At present, virtually all States have completed the quality assurance review and certification process. Data which have been certified as valid are considered to be reliable, although for the purposes of characterizing air quality in areas to which people may be exposed, there must also be a sufficient number of valid samples during the period in question. For the purposes of this analysis, we have only included data certified by the States as valid, and have included only data from sites recording eleven or more valid samples in each calendar quarter. These data are not sufficient for determining whether given areas should be designated under the Clean Air Act as attainment or nonattainment with the PM2.5 NAAQS. Under EPA regulations, this would require consideration of 3 years of valid data. However, these data provide a sufficient basis to estimate the number of people who lived in monitored counties in 1999 in which annual average concentrations of PM2.5 equaled or exceeded certain specified values.

The Table M-1 provides a summary of results, based on U.S. Bureau of Census county-based estimated population (http://www.census.gov/population/www/estimates/countypop.htm) and measured 1999 PM2.5 annual average concentrations. Based on this table, over 39 million people live in areas where long term ambient fine particulate matter levels are at or above 16 µg/m3 (37% of the population in the areas with monitors), which is the low end of the range of long term average

PM2.5 concentrations in cities where statistically significant associations were found with serious health effects, including premature mortality (Staff Paper, EPA, 1996).[1]

Several considerations are relevant to this analysis. First, the analysis only includes counties in which there were PM2.5 monitors recording at least eleven valid samples in each of four calendar quarters, thus limiting our consideration to counties containing 107.3 million people, of a total of 272.7 million estimated by the U.S. Bureau of Census (1999). As the efficiency and effectiveness of the States' operation of the network improves, and as the number of valid samples in each county increases over time, a more complete and robust record of air quality is expected to result. Finally, because this analysis is incomplete in that it does not consider populations in counties in which no monitors are located or where the number of valid samples is insufficient for our analyses, we have not been able to consider the air quality in counties in which an additional 165.4 million people live. However, despite these limitations and qualifications, we can nonetheless conclude based on current monitored air quality that millions of people currently live in areas in which PM2.5 concentrations are observed at levels which have been associated with premature mortality and other adverse effects.

cc: J. Anderson, ASD/OTAQ
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Attachment

[1]To protect public health with an adequate margin of safety, EPA established national ambient air quality standards for PM2.5 in 1997 at levels of 15.0 ug/m3, annual average, and 65 ug/m3, 24-hour average. Further information about these standards, including an explanation of their scientific basis and methods for calculating attainment or nonattainment of the standards, can be found at 62 FR 38711, July 18, 1997. These standards are codified at 40 CFR 50.8, and the method for determining when the standards are met is codified at 40 CFR Part 50, Appendix N. The revised standards are now in litigation; however, the scientific evidence that supported the establishment of new PM2.5 NAAQS was not challenged in the U.S. District Court of Appeals decision; in fact, the panel of judges stated that this evidence "amply justifies establishment of new fine particle standards." (May 14, 1999, p. 47) While EPA is not implementing the PM2.5 NAAQS in light of ongoing litigation, we believe that it remains appropriate to recognize the scientific evidence of health effects associated with PM10 and the fine fraction of PM10 in other rulemaking proceedings.

Table M-1
1999 Monitored Population[a] Living in Counties with
Annual Average[b] $PM_{2.5}$ Concentrations at or Above Levels Shown
(39.3% of Total U.S. Population)

Measured 1999 Annual Average $PM_{2.5}$ Concentration (µg/m3) (A)	1999 Population Living in Monitored Counties With This Average Concentration or Higher Concentration (Millions, 1999 Census Estimates of Population) (B)	Percent 1999 Monitored Population Living in Counties With This Average Concentration or a Higher Concentration[c] (C) (C=B/Monitored Population)
21	22.8	21.3%
20	24.4	22.7%
19	26.4	24.6%
18	28.8	26.8%
17	36.3	33.9%
16	39.6	37.0%
15	47.5	44.3%
14	58.1	54.2%
13	67.0	62.4%
12	81.3	75.7%
11	91.3	85.1%
10	95.3	88.9%
5	107.2	99.9%

a Monitored population estimates represent populations living in monitored counties (with community based monitors) with at least 11 monitored readings in each quarter of 1999.
b Annual average represents the monitor reading with the highest average in each monitored county.
c The monitored population (reflected in column C) is 107.3 million based upon the completeness criterion of at least 11 monitored readings per quarter. Total monitored population is 170 million; the Census total county-based estimated 1999 population is 272.7 million.