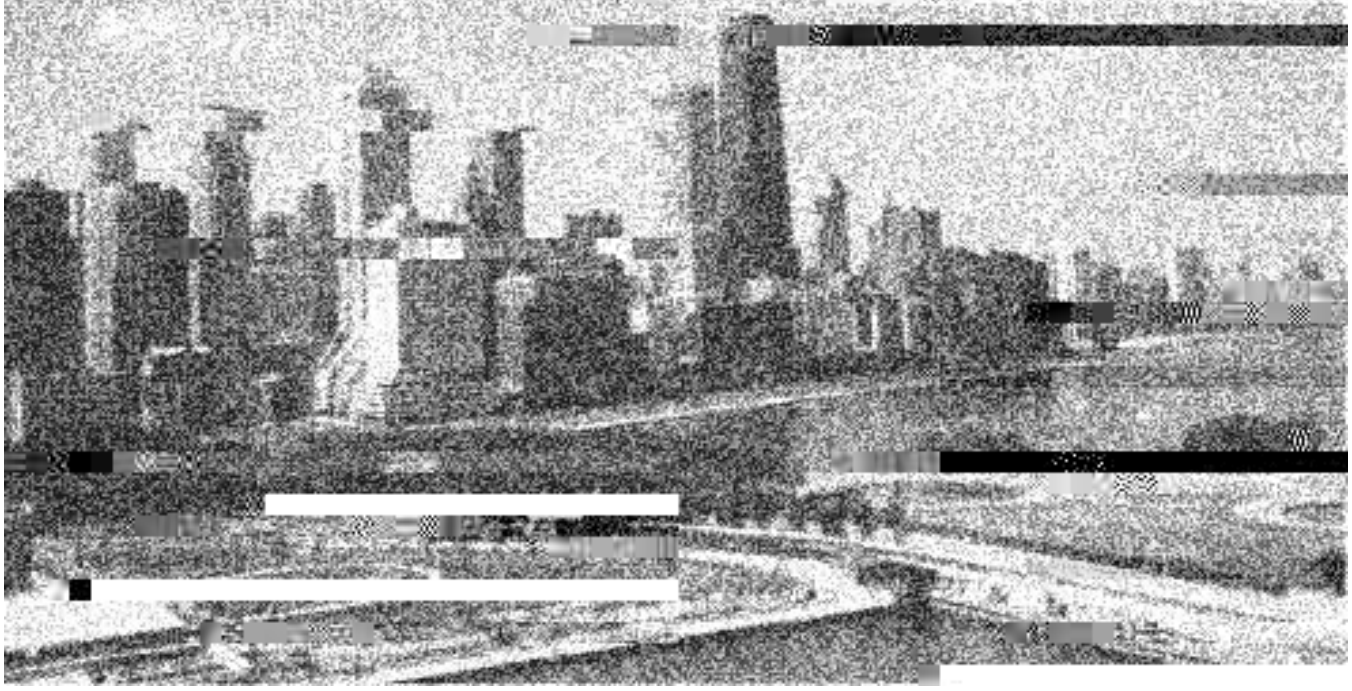
Particulate Air Pollution in Chicago

Human Mortality, Pollution Sources And the Case for Tougher Clean Air Standards



ENVIRONMENTAL WORKING GROUP™

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Executive Summary

On Nov. 27, 1996, the Clinton Administration proposed new regulations to clean up an especially deadly form of air pollution—tiny particles that penetrate deep into human lungs, claiming the lives of more than 64,000 Americans every year (EPA 1993, NRDC 1996). The rule also proposes new standards for ground-level ozone, an issue which is not addressed in this study.

The Clinton Administration proposal represents an important step in protecting public health from particulate air pollution. According to EPA (EPA 1996d), "if finalized as proposed, the new standard would:

- Cut premature deaths linked with particulate air pollution by 50%, or approximately 20,000 deaths; with acid rain controls currently underway, an additional 20,000 deaths will be avoided;
- Reduce aggravated asthma episodes by more than a quarter million cases each year;
- Reduce incidence of acute childhood respiratory problems by more than a quarter million occurrences each year, including aggravated coughing and painful breathing;
- Reduce chronic bronchitis by an estimated 60,000 cases each year;
- Reduce hospital admissions due to respiratory problems by 9,000 each year, as well as reduce emergency room visits and overall childhood illnesses in general;
- Cut haze and visibility problems by as much as 77% in some areas, such as national parks."

Table 1. EPA's proposal will reduce deaths caused by particulate pollution in Illinois, but the regulations need to be strengthened to save even more lives.

Metropolitan Statistical Area	Estimated Number of Deaths Attributed to Particulate Pollution Per Year	Estimated Number of Premature Deaths Avoided by New EPA Standard Per Year	Estimated Number of Premature Deaths Under New EPA Standard Per Year
Chicago	3,767	1,856	1,911
Champaign/Urbana/Rantoul	42	11	31
Davenport/Rock Is./Moline (IA/IL)	163	50	113
Decatur	78	37	41
Peoria	110	14	97
Rockford	52	0	52
Springfield	56	0	56
St. Louis (MO/IL)	1,302	574	727
Total	5,570	2,542	3,028

Source: Environmental Working Group, based on PM10 data from 1990-1994 and mortality data provided by Natural Resources Defense Council, 1996. Methods discussed in Chapter One.

Factory Name	State	City	Annual PM10 Emissions (Tons/Year)	Industry Type	Data Year
U.S. Steel Company, Gary Works	Indiana	Gary	51,752	Blast Furnaces And Steel	1994
Amoco Oil Company, Whiting Refinery	Indiana	Whiting	5,428	Petroleum Refining	1994
Acme Steel Company	Illinois	Riverdale	2,326	Blast Furnaces And Steel	1995
Bethlehem Steel Corp.	Indiana	Burns Harbor	2,168	Blast Furnaces And Steel	1994
Cargill Inc - Commodity Marketing Division	Illinois	Chicago	1,889	Grain	1995
Cargill, Inc.- Oilseeds Division	Illinois	Chicago	1,831	No Classification	1995
Inland Steel Company	Indiana	East Chicago	1,740	Blast Furnaces And Steel	1994
LTV Steel Company, Inc. (Republic)	Illinois	Chicago	1,653	Blast Furnaces And Steel	1995
LTV Steel Company	Indiana	East Chicago	1,234	Blast Furnaces And Steel	1994
Continental Grain Comapny - Elevator C	Illinois	Chicago	1,198	Grain	1995
Reynolds Metals Company	Illinois	Mccook	1,099	Aluminum Sheet Plate & Foil	1995
Republic Engineered Steels, Inc.	Illinois	Chicago	650	Blast Furnaces And Steel	1995
Horsehead Resource Development Co., Inc.	Illinois	Chicago	584	Secondary Nonferrous Metals	1995
Material Service Corp. - Yard 41	Illinois	Thornton	524	Crushed And Broken Limestone	1995
Acme Steel Company-Chicago Coke Plant	Illinois	Chicago	523	Blast Furnaces And Steel	1995
Commonwealth Edison Company Units 7&8	Illinois	Rockdale	498	Electric Services	1995
Rhone-Poulenc Basic Chemicals Co.	Illinois	Chicago Heights	442	Industrial Inorganic Chemicals	1995

County	Estimated Three Year Annual PM2.5 Average (Converted from PM10 Monitoring Data)	Street Address
Madison	28.34	15th & Madison
Cook	26.82	Mayfair Pump Station, 4850 Wilson Avenue
Cook	26.12	50th Street and Glencoe
Madison	25.90	VFW Building, 2044 Washington Avenue
Cook	24.55	Graves Elementary School 60th Street & 74th Avenue
Cook	23.22	Roosevelt H.S., 15th St. & 50th Avenue
Cook	21.88	Marsh School, 9810 S. Exchange
Cook	21.74	3535 E. 114th Street
Cook	21.69	Farr Dormitory 3300 S. Michigan Avenue
Madison	21.69	23rd & Madison
Cook	21.38	13100 S. Doty
St. Clair	20.96	13th & Tudor Raps Site
Cook	20.72	Chicago Ave. Pump Station, 805 N. Michigan
Cook	20.24	Eisenhower High School, 12700 Sacramento Ave.
Randolph	20.19	Site B., Cnty Rds. 00.0 N & 25.0 E
Cook	20.04	4043 Joliet Ave.
LaSalle	19.73	308 Portland Ave.
Madison	19.70	2420 Nameoki Rd., Plaza Furniture
Cook	18.99	170th St. & S. Park Avenue
Madison	18.77	211 Sinclair, City Hall
Madison	18.45	409 Main Street, Clara Barton School
Will	18.40	Midland & Otis, Rockdale
Madison	18.10	54 N. Walcott
Macon	17.81	Grant Elementary School, 2300 Geddes

The premise of this study is that the public has a right to know, and an obligation to comment on, the public health strengths and shortcomings of the particulate pollution proposal. Questions about how much particulate pollution will be reduced, how much illness will be prevented, and how many lives will be saved, ultimately are moral and political questions that demand broad public awareness and input.

This report supports the Clinton administration's goal of reducing health risks from particulate pollution. Our analysis, however, makes clear that several aspects of the proposal, notably its monitoring provisions, should be strengthened, and we support lower limits on particulate pollution in order to save even more lives.

Now it's time for the people of Illinois to make their views known to Washington. Will the polluters win? Or will Americans get cleaner air, live longer lives, and cut the nation's annual medical bill by between $50 billion and $100 billion per year?

Lives on the Line

The link between air pollution and human disease is extraordinarily well demonstrated in the peer reviewed scientific literature. A series of studies from across the country and around the world have shown repeatedly that polluted air increases premature mortality rates (Schwartz 1993, Pope et al. 1995, Schwartz 1994, Dockery et al. 1993, Schwartz and Dockery 1992, Pope 1991, EPA 1993, EPA 1996c) and it is associated with hundreds of thousands of cases of respiratory diseases and tens of thousands of premature deaths each year (EPA 1996c, NRDC 1996).

Analysis of data from air pollution monitoring stations in Illinois and the surrounding area found that under current rules, nearly 5,000 residents of the state die prematurely every year because of particulate matter in the air. The Clinton Administration's proposal, effectively implemented and enforced, would prolong the lives of an estimated 2,500 people, but would have to be strengthened significantly to prevent the

achieve.

Our analysis of state, local and national air monitoring data identified 40 counties with just one particulate (PM) monitor, where the past three years of pollution would exceed the proposed standard for $PM_{2.5}$ of 15 $\mu g/m^3$ by 2.5 $\mu g/m^3$ or less. Under the Clinton Administration proposal, these counties could easily comply with the new $PM_{2.5}$ standard, simply by adding an additional monitor at an cleaner location in the county. None of these counties would have violated the proposed 24-hour $PM_{2.5}$ standard of 50$\mu g/m^3$.

Hot Spots

As drafted, EPA's proposal has no plan to target pollution reduction efforts toward areas with high particulate pollution levels, or "hot spots". Indeed, the administration plan provides strong incentives for statistical manipulation of monitoring results as opposed to actual reductions of particulate levels in the air.

As a result, it is quite possible that people living in heavily polluted areas may con-

To the contrary, the agency's proposed spatial averaging scheme could easily skew monitoring in a manner that creates sacrifice zones, where unsafe air is not cleaned up, but instead is averaged together with cleaner air from somewhere else to create the statistical illusion of clean air within an arbitrary spatial averaging zone. We strongly oppose the used of statistical techniques to hide pollution and avoid cleaning up unsafe air breathed by millions of Americans. Instead, EWG recommends tough health standards that are backed up by a scientifically valid system of airborne particulate monitoring. In most major U.S. cities many more monitoring sites are needed to achieve this goal.

To ensure that representative monitoring occurs, all major particulate polluters, as currently defined by EPA, should be required to contribute to a fund, administered by local air quality officials, that is dedicated to statistically valid particulate monitoring in all metropolitan statistical areas in the United States. Spatial averaging techniques must not be used in any metropolitan region that does not have a representative particulate monitoring network in place.

In addition, we oppose any plan that achieves compliance with the new health standard by:

- moving existing monitors to cleaner locations,
- adding monitors only at cleaner locations, and
- dispersing the pollution source (for example, a bus transfer station) and thus increasing pollution in cleaner areas.

Cleaning Up Hot Spots

The current monitoring system, while not fully representative of local and regional pollution levels, does identify specific locations, or hot spots, where airborne particulates are at unsafe levels. There is no reason to delay pollution reduction measures at these sites yet EPA's proposed changes to monitoring criteria could easily have that effect. Until such time as a representative monitoring system is in place, EWG recommends that the EPA maintain the current rules for monitoring and enforcement where exceeding the standard in one location triggers a violation.

Right to Know

The public has a fundamental right to know about pollution in the air they breathe. EWG's experience in gathering the particulate emissions and monitoring data used in this report shows that the public, and to a significant degree, federal regulators, have no practical way to find out about levels of deadly particulate pollution released in their communities.

We recommend, therefore, that the EPA maintain an up-to-date national database of particulate emissions and ambient concentrations, and that these data be available to the public in a manner consistent with data already widely available in the Toxic Release Inventory.

Chapter One

Particulate Pollution Kills

including an adequate of margin of safety (42 U.S.C.A. §7409 (b)(1)). In other words, the law requires that air pollution be reduced enough so that breathing polluted air does not directly kill people or contribute to the incidence of disease, even for those that are susceptible to these diseases.

There is a broad scientific consensus that the current particulate standard fails this test — that it does not protect the public health, that it does not provide any margin of safety for susceptible populations, and that it should be changed (Wolff 1996, EPA 1996a).

The science supporting the hazards of breathing particulate pollution is exceptionally powerful and consistent. According to the U.S. EPA, more than 60 peer-reviewed community epidemiological studies have found positive, statistically significant associations between short and long term concentrations of various PM indicators (total particulates, PM_{10}, $PM_{2.5}$) and death and morbidity (EPA 1996c). Indeed, although scientists have not yet identified a precise mechanism by which particulate levels increase death rates, scientists also have not identified a level of airborne particulate pollution that does not cause at least some increase in premature death, asthma, and other human health problems.

Several factors within these studies and others (Ostro 1993, Schwartz 1992) strengthen the conclusion that particulates, not other pollutants, are causing the premature death and increased illness found in these studies. First, regardless of the type or level of co-pollutants involved, mortality rates consistently correlate with fluctuations of particulate levels in the air. Second, the actual kind of health effect linked to particulate exposure is consistent between mortality and morbidity data: particulate levels in the air are closely linked with increases in respiratory and cardiovascular related hospital admissions, as well as death rates from lung and heart disease (EPA 1996c).

Both short and long term exposure to particulate levels are strongly associated with increases in mortality and morbidity rates. This concordance strengthens the conclusion that particulates shorten lives by several years for the average affected individuals (EPA 1996a).

Based on the wealth of research linking particulate pollution to premature mortality in cities across the United States and around the world, various institutions and independent experts have calculated the impact of current PM levels on death rates in metropolitan areas in the United States (Schwartz 1993, Pope et al. 1995, Schwartz 1994, Dockery et al. 1993, Schwartz and Dockery 1992, Pope 1991). These calculations typically relate the fluctuations in cardiopulmonary death rates in specific cities to airborne PM levels.

In 1993, the U.S. EPA estimated that 70,000 premature deaths are caused each year by particulate pollution in the air (EPA 1993). This prediction is based on a series of studies, over several decades, using different statistical techniques, in different U.S. cities that have all confirmed a direct link between PM_{10} pollution and elevated incidence of death. These studies all show a direct relationship between rising PM_{10} levels in the air and deaths from cardiopulmonary disease.

In perhaps the most unique study, in the Utah Valley, medical researchers were able to track cardiopulmonary death rates as a direct function of the operations of the lone particulate polluter in the region, Geneva Steel. When the plant stopped operations, death rates in the valley dropped dramatically. When the plant started up again, death rates increased in direct proportion to particulate levels in the air. In the Utah Valley, a 16 percent increase in total deaths occurred for every 100 $\mu g/m^3$ increase in PM_{10} (Pope et al. 1992).

Supporting this finding, in Birmingham, Alabama, between 1985 and 1988, an 11% increase in the death rate was seen for every 100 $\mu g/m^3$ of "inhalable particles," (Schwartz

1993). In Cincinnati, the death rate increased by 6 percent for every 100μg/m^3 increase in total particulates (Schwartz 1994).

A major study in Philadelphia showed that deaths between 1973 and 1980, increased by 7 percent for every increase in total particulate levels of 100 μg per cubic meter (Schwartz and Dockery 1992). In that study, particulate pollution caused a 19% increase in mortality due to chronic obstructive pulmonary disease even though PM_{10} levels were below current standards for all but one day during the study (Dickey 1996).

The Harvard Six City Study, published in 1993 in the New England Journal of Medicine, followed 8,000 adults in six small to medium sized cities over a fourteen year period beginning in 1979. Consistent with the findings from other peer-reviewed studies analyzing particulates and mortality over shorter periods of time, differences in particulate levels in the air from city to city almost directly tracked death rates over the entire period of the study. After controlling for sex, age, smoking status, educational level, and occupational exposure to dust, gases, and fumes, the authors concluded that the average person in the most polluted city studied, Steubenville, Ohio, had a 26% greater chance of premature death than the average person in Portage, Wisconsin, the least polluted city in the study (Dockery, et al. 1993).

A major 1995 study of particulate pollution analyzed the relationship between $PM_{2.5}$ levels in the air, and the health of 295,000 people tracked by the American Cancer Society (ACS) from 1982 through 1989. This study, which because of its size has substantial statistical power, added further weight to the finding that death rates from heart and lung disease rise and fall in direct correlation with particulate levels in the air (Pope et al. 1995). As with the Six City Study, the study authors concluded that particulate air pollution increases the risk of premature death by about 17%.

Building on this unusually consistent and statistically powerful data, in 1996 the Natural Resources Defense Council (NRDC) estimated the number of lives that would be prolonged under various particulate standards likely to be proposed by the EPA (NRDC 1996).

The NRDC analysis, which was extremely cautious in its use of existing data, is based on PM_{10} monitoring data maintained by the U.S. EPA, and data on adult cardiopulmonary deaths from the National Center for Health Statistics (NCHS 1992). These mortality data were corrected to eliminate individuals under 25 years of age. Deaths from lung cancer, though exacerbated by airborne particulates, also are not included in the analysis. PM_{10} levels in a given metropolitan region were averaged over a five year period, *and* over entire metropolitan statistical areas (MSAs). This averaging technique, while valid and illustrative, can mask large areas within MSA's where death rates from especially serious particulate pollution are significantly elevated.

PM_{10} figures were then converted in the NRDC study to a $PM_{2.5}$ level using a nationwide conversion factor of 60 percent (i.e., NRDC assumed that $PM_{2.5}$ concentrations equaled approximately 60 percent of the PM_{10} concentrations). The authors then applied risk factors based on the ACS studies to these particulate levels. The risk factors used are the lowest of the two long-term studies in the peer-reviewed literature (e.g. Pope et al. 1995). The NRDC report showed that a strong standard of 10μg/m^3 for fine particulate matter ($PM_{2.5}$) could prevent over 56,000 premature deaths every year (NRDC 1996).

Chapter Two

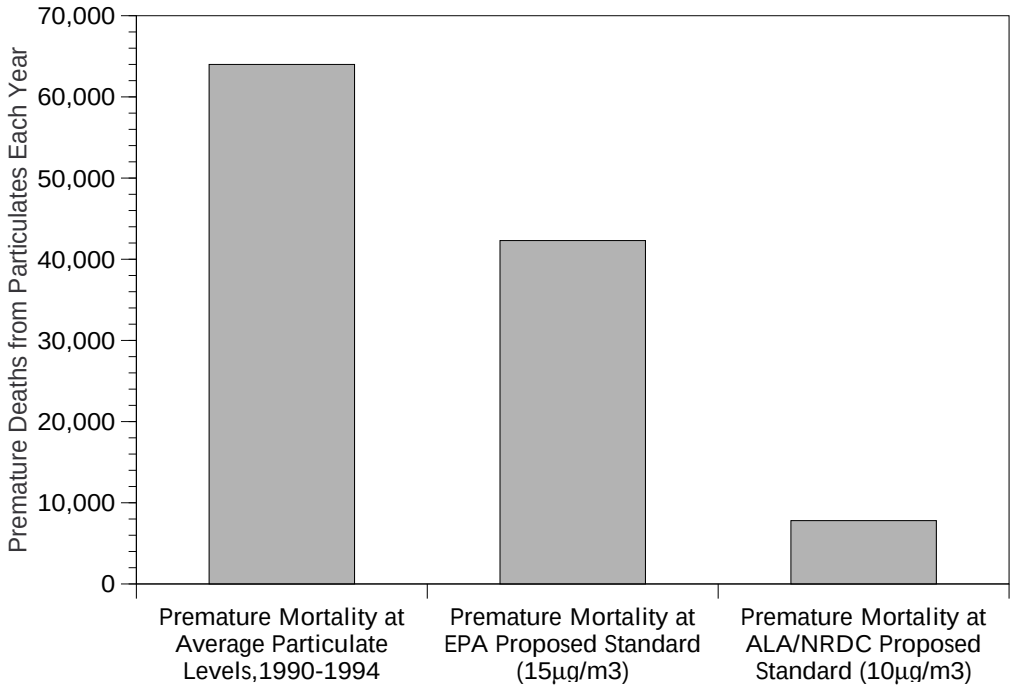
Clinton Administration Proposal

Health Standards

The first standard for particulates in air was established in 1971. This standard, which measured total particulates in the air, was set at 260 micrograms (μg) of particles per cubic meter of air ($\mu g/m^3$) over a 24 hour period, and 75 $\mu g/m^3$ annual average. In 1987, under the Clean Air Act, EPA replaced the original standard with a new standard for PM_{10} at 150 $\mu g/m^3$ over a 24 hour period, and an annual average of 50 $\mu g/m^3$. California has established stricter PM_{10} standards: a 24 hour standard of 50 $\mu g/m^3$, and an annual average of 30 $\mu g/m^3$. Under the 1990 Clean Air Act amendments, EPA was required to review the adequacy of major health standards, including the particulate standard, every five years. The EPA failed to meet the statutory deadline, and was sued by the American Lung Association (ALA). ALA won the suit, and the court established a deadline of November 29, 1996 for EPA to set the new standard.

The Clinton Administration's proposed rule, released on November 27, 1996 estab-

Figure 1. The $PM_{2.5}$ standard proposed by the EPA will substantially reduce premature deaths, but stronger protection is needed.



Source: Environmental Working Group, compiled from Natural Resources Defense Council data.

where "EPA will seek broad public comment on its recommended approach and on the need for any changes to the particulate matter [and ozone] proposal." (EPA 1996d).

The administration proposal was supported by "an overwhelming majority of independent scientists who reviewed the standard for EPA, based on 86 new health studies that indicate the need for a stronger standard," according to the agency. The polluter coalition has dismissed this EPA review as "junk science," and has gone on the attack.

This report supports the Clinton administration's goal of reducing health risks from particulate pollution. Our analysis makes clear that several aspects of this proposal, notably its monitoring provisions, should be strengthened, and we support a lower limit on particulate pollution in order to save even more lives.

The premise of this study is that the public has a right to know, and an obligation to comment on, the public health strengths and shortcomings of the particulate pollution proposal. Questions about how much particulate pollution will be reduced, how much illness will be prevented, and how many lives will be saved, ultimately are moral and political questions that demand broad public awareness and support.

In fairness, it must be noted that even when these new goals are ultimately met, they will still allow tens of thousands of premature deaths every year from airborne

Table 4. EPA's proposed spatial averaging technique could allow unsafe levels of particulate pollution to continue unchecked.

Annual Mean (% data completeness)

Year	Site 1	Site 2	Site 3	Site 4	Spatial Mean
1	12.7 (80%)	No data	No Data	No Data	12.70
2	13.3 (90%)	**17.4** (63%)	9.8 (40%)	No Data	**15.35**
3	12.9 (90%)	**16.7** (80%)	12.3 (85%)	**20.1** (50%)	**15.50**
				3-Year Mean	14.52

Bold = Levels above proposed standard.
Source: Environmental Protection Agency 1996a.

particulates (Figure 1). Of even greater concern, however, are EPA's proposed changes to current monitoring and enforcement procedures which could seriously undermine the advances in public health protection that the standards are designed to achieve.

Monitoring and Enforcement

Several features of the Clinton Administration's proposed $PM_{2.5}$ monitoring and enforcement provisions severely compromise the potential health protections that the new rule is designed to achieve.

Under the EPA's current enforcement scheme, when particulate levels exceed the PM_{10} standard in one monitoring location, action is required to reduce pollution and bring that area into compliance with the standard. The November 1996 EPA proposal dramatically changes this approach by proposing health standard enforcement based on a method of averaging together pollution monitoring results from different locations. This new monitoring and enforcement scheme is strongly supported by major polluters because it would dramatically reduce the need for many of the nation's worst polluters to control their toxic emissions.

This method, called spatial averaging, will allow polluted areas to comply with health standards for particulates, not by actually reducing pollution levels, but by averaging high levels of pollution in one community with lower levels of pollution in an adjacent community. In this fashion, the unhealthy air in a city center, for example, could comply with clean air regulations if pollution levels from cleaner air in the suburbs are averaged with the monitoring from the polluted area. This statistical technique creates *a number* that complies with the new standard. It does nothing, however, to prevent the public from breathing polluted air that would otherwise be deemed unsafe under the new standard.

EPA's proposed PM rule provides two examples of how heavily-polluted communities are permitted to live with air that exceeds health standards under the new regulations.

In order to violate the proposed $PM_{2.5}$ standard the three year *average* of all monitoring sites in a spatial averaging zone must exceed 15 $\mu g/m^3$. In EPA's example (Table 4), the three year mean (or average) over the four sites is 14.52 $\mu g/m^3$. Within

Table 5. High levels of particulate pollution are likely to be maintained in these counties under EPA's new monitoring plan.

Etowah County, Alabama	Richland County, Ohio
Washington County, Georgia	Carter County, Oklahoma
Canyon County, Idaho	Comanche County, Oklahoma
Macon County, Illinois	Kay County, Oklahoma
Johnson County, Kansas	Mayes County, Oklahoma
Sherman County, Kansas	Blair County, Pennsylvania
Floyd County, Kentucky	Bucks County, Pennsylvania
Madison County, Kentucky	Cambria County, Pennsylvania
Marshall County, Kentucky	Delaware County, Pennsylvania
Whitley County, Kentucky	Lackawanna County, Pennsylvania
Garrett County, Maryland	Lycoming County, Pennsylvania
Washington County, Maryland	Montgomery County, Pennsylvania
Calhoun County, Michigan	Grand County, Utah
Lancaster County, Nebraska	Bristol City, Virginia
Otoe County, Nebraska	Covington City, Virginia
Mercer County, New Jersey	Fayette County, West Virginia
Warren County, New Jersey	Ohio County, West Virginia
Mitchell County, North Carolina	Putnam County, West Virginia
Noble County, Ohio	Wayne County, West Virginia
Ottawa County, Ohio	Wood County, West Virginia

the spatial averaging zone, however the three-year average $PM_{2.5}$ levels exceed the new standard at two of the four monitoring locations (Site 2 and Site 4), indicating that

EPA has argued that people living in these areas will be protected by the new daily PM2.5 standard of 50μg/m^3. Our analysis of state, local, and national monitoring data for the three most recent years available, however, shows that none of the affected counties would trigger an enforcement action under the proposed 24 hour $PM_{2.5}$ standard of 50μg/m^3, calculated at the 98th percentile.

In order to facilitate spatial monitoring, the Clinton Administration's proposed implementation plan provides for additional monitors within spatial averaging zones. These monitors must be placed near populated areas, but they are not required to be placed systematically in "hot spots" where the pollution is the worst, nor are they required to be placed in such a way that provides a representative picture of pollution within the spatial averaging zone. Without major revisions, this proposal will create a strong incentive to place new monitors in clean locations to lower "average" pollution levels in the spatial zone — again creating a lower number but doing nothing to clean the air.

To demonstrate how additional monitoring might be used to avoid pollution reduction via averaging, we analyzed the AIRS data for counties with just one monitoring site, where particulate levels at that site exceed the proposed $PM_{2.5}$ standard. Our analysis revealed 40 counties with just one monitoring site, where particulate levels currently exceed the proposed $PM_{2.5}$ standard by less than 2.5μg/m^3 (Table 5). In any

dollar war chest to spend campaigning against tough air quality standards.

- Millions more for industry-oriented "sound science" to challenge the peer-reviewed science relied on by EPA.

- The formation and active use of phony grassroots front groups to pressure governors and local officials.

- Hiring expensive Washington lobbyists, including C. Boyden Gray, former counsel to President Bush, and public relations firms such as Burston-Marsteller, to lobby for weaker standards.

The membership of the National Association of Manufacturers Air Quality Standards Coalition reads like a "Who's Who" of America's worst particulate polluters, including the American Petroleum Institute, the American Automobile Manufacturers Association, the Chemical Manufacturers Association, the Edison Electric Institute, the National Mining Association, the American Forest and Paper Association, and virtually all of their member corporations. The rallying cry of these big polluters is that if the EPA proposal is put into effect, then millions of Americans will lose their right to barbecue and millions more will be forced to carpool (Skrzycki 1996). In reality, restrictions on personal activities will be necessary only if major polluters are unwilling to implement inexpensive pollution control measures.

Chapter Three

Particulate Pollution in Illinois

The EWG analysis of premature deaths due to particulate pollution is modeled after the analysis published by the Natural Resources Defense Council (NRDC) in May 1996. The principal modification is the use of regional conversion factors for PM_{10}. Rather than assuming that $PM_{2.5}$ accounts for 60 percent of PM_{10} nationwide, we utilize regional conversion factors, for different sections of the country, based on actual monitoring of $PM_{2.5}$ and PM_{10} by the EPA. For the east coast the data indicate that on average $PM_{2.5}$ accounts for a greater percentage of total PM_{10} than assumed by NRDC. For the midwest, the west, and particularly the northwest, average $PM_{2.5}$ levels are a lesser percentage of total PM_{10} than assumed by NRDC. There are important exceptions to these regional figures. In certain locations, at certain times of the year, for example, $PM_{2.5}$ can account for up to 85% of total PM_{10} in major cities in the western United States. Nationwide, the average percentage of PM_{10} accounted for by $PM_{2.5}$ is about 0.56. With this one modification, we then apply the NRDC/American Cancer Society methodology and project the impact of the EPA proposed $PM_{2.5}$ standard for the nation and selected metropolitan regions.

This specific quantitative risk factor used in this analysis is based on the relationship between $PM_{2.5}$ and mortality rates in a study of 250,000 individuals in 50 U.S. cities tracked by the American Cancer Society (Pope et al. 1995). This study assumes a

Table 6. EPA's proposal will reduce deaths caused by particulate pollution in Illinois, but the regulations need to be strengthened to save even more lives.

Metropolitan Statistical Area	Estimated Number of Deaths Attributed to Particulate Pollution Per Year	Estimated Number of Premature Deaths Under New EPA Standard Per Year	Estimated Number of Premature Deaths Under ALA/NRDC Standard Per Year
Chicago	3,767	1,911	328
Champaign/Urbana/Rantoul	42	31	6
Davenport/Rock Is./Moline (IA/IL)	163	113	20
Decatur	78	41	7
Peoria	110	97	16
Rockford	52	52	13
Springfield	56	56	10
St. Louis (MO/IL)	1,302	727	125
Total	5,570	3,028	525

Source: Environmental Working Group, based on PM10 data from 1990-1994 and mortality data provided by Natural Resources Defense Council, 1996. Methods discussed in Chapter One.

effects have been demonstrated below 9 $\mu g/m^3$, but because the cleanest city in the study had a $PM_{2.5}$ level of 9 $\mu g/m^3$. In fact, no threshold has been determined below which mortality rates are unaffected by $PM_{2.5}$.

Based on the most recent AIRS data on PM_{10}, 9 $\mu g/m^3$ $PM_{2.5}$ is a reasonable estimate of fine particulate levels in the least polluted areas in the United States. Further EWG analysis shows that about 50 of 600 counties currently monitoring PM would have levels below 9 $\mu g/m^3$ $PM_{2.5}$. Given the demonstrated mortality effects at low levels of $PM_{2.5}$, our recommended annual $PM_{2.5}$ standard of 10 $\mu g/m^3$ represents a level of particulate pollution that is at least 10 percent above background levels in cleaner areas of the country. As a part of the final rule, EWG recommends that EPA determine background $PM_{2.5}$ levels in representative regions of the country. This study should not delay implementation of the health standards recommended in this report.

Lives on the Line

Nationwide, the EPA proposed annual $PM_{2.5}$ Standard of 15$\mu g/m^3$, if achieved, would prevent approximately 20,000 premature deaths each year (EPA 1996d). It would, however, need to be significantly strengthened to prevent the 45,000 premature deaths from particulate pollution that would continue to occur each year.

In the Chicago area, EPA's proposal will prevent the premature death of an estimated 1,800 individuals each year. At the same time, 1,900 people would continue to die prematurely from airborne particles (Table 6). In comparison, the $PM_{2.5}$ standard proposed by the American Lung Association (ALA) and the Natural Resources Defense Council (NRDC) (10$\mu g/m^3$), would avoid about 3,400 premature deaths in the Chicago area each year.

In the St. Louis metropolitan area, EPA's standard is estimated to cut premature death by about 570 people annually (Table 6). An estimated 720 individuals in that area, however, would continue to die prematurely each year from particulate pollution. The $PM_{2.5}$ level proposed by the ALA and NRDC (10$\mu g/m^3$), on the other hand, would save over 1,100 lives each year in the St. Louis area.

Table 7. The U.S. Steel Gary Works was the top emitter of PM_{10} particles in the Chicago metropolitan area.

Factory Name	State	City	Annual PM10 Emissions (Tons/Year)	Industry Type	Data Year
U.S. Steel Company, Gary Works	Indiana	Gary	51,752	Blast Furnaces And Steel	1994
Amoco Oil Company, Whiting Refinery	Indiana	Whiting	5,428	Petroleum Refining	1994
Acme Steel Company	Illinois	Riverdale	2,326	Blast Furnaces And Steel	1995
Bethlehem Steel Corp.	Indiana	Burns Harbor	2,168	Blast Furnaces And Steel	1994
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Continental Grain Comapny - Elevator C	Illinois	Chicago	1,198	Grain	1995
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Material Service Corp. - Yard 41	Illinois	Thornton	524	Crushed And Broken Limestone	1995
Acme Steel Company-Chicago Coke Plant	Illinois	Chicago	523	Blast Furnaces And Steel	1995
Commonwealth Edison Company Units 7&8	Illinois	Rockdale	498	Electric Services	1995
Rhone-Poulenc Basic Chemicals Co.	Illinois	Chicago Heights	442	Industrial Inorganic Chemicals	1995
Com Ed - Will County Generating Station	Illinois	Romeoville	395	Electric Services	1995
Nalco Chemical Co.- Clearing Plant	Illinois	Bedford Park	370	Chemical Preparations, Nec	1995
CPC International Inc	Illinois	Bedford Park	342	Wet Corn Milling	1995
Uno-ven Company	Illinois	Romeoville	313	Petroleum Refining	1995
Com Ed - Collins Station	Illinois	Morris	311	Electric Services	1995
Mobil Joliet Refining Corp	Illinois	Joliet	311	Petroleum Refining	1995
115th Street Corporation	Illinois	Chicago	273	Industrial Organic Chemicals	1995
Owens-Corning Fiberglas Corp.	Illinois	Summit	261	Paving Mixtures And Block	1995
Com Ed - Joliet Generating Station	Illinois	Joliet	243	Electric Services	1995
Acme Steel Company	Illinois	Chicago	227	Blast Furnaces And Steel	1995
Com Ed - Fisk Station	Illinois	Chicago	219	Electric Services	1995
Com Ed - Crawford Station	Illinois	Chicago	205	Electric Services	1995
Katalco-Division Of ICI	Illinois	Chicago	198	Industrial Inorganic Chemicals	1995
Quaker Oats Company-Pet Food Division	Illinois	Kankakee	193	Dog, Cat And Other Pet Foods	1995
Meyer Material Co	Illinois	Aurora	171	Paving Mixtures And Block	1995
Unocal Diversified Businesses	Illinois	Lemont	166	Petroleum And Coal Production	1995
Northwest Waste To Energy	Illinois	Chicago	162	Refuse Systems	1995
J R Short Milling Co. Kankakee Division	Illinois	Kankakee	162	Flour & Other Grain Mill	1995
J-pitt Steel Melt Shop, Inc.	Illinois	Chicago	154	Cold Finishing Of Steel Shapes	1995
Nipsco-Dean H Mitchell Station - Gary	Indiana	Gary	146	Electric Services	1994
Nipsco - Bailly	Indiana	Chesterton	146	Electric Services	1994
General Mills,Inc.-Package Food Division	Illinois	West Chicago	144	Cereal Breakfast Foods	1995
Lehigh Portland Cement Co	Indiana	Gary	139	Cement, Hydraulic	1994
Vulcan Materials Corp-Lehigh Plant	Illinois	Kankakee	134	Crushed And Broken Limestone	1995
General Mills Inc	Illinois	Chicago	116	Flour & Other Grain Mill	1995
3M Industrial Tape	Illinois	Bedford Park	112	Paper Coated And Laminate	1995
Manteno Limestone Co	Illinois	Manteno	111	Crushed And Broken Limestone	1995
Anchor Glass Container-Plant #16	Illinois	Gurnee	111	Glass Containers	1995
Abbott Labs - N. Chicago Plant	Illinois	North Chicago	110	Pharmaceutical Preparation	1995

County	Estimated Three Year Annual PM2.5 Average (Converted from PM10 Monitoring Data)	Street Address
Madison	28.34	15th & Madison
Cook	26.82	Mayfair Pump Station, 4850 Wilson Avenue
Cook	26.12	50th Street and Glencoe
Madison	25.90	VFW Building, 2044 Washington Avenue
Cook	24.55	Graves Elementary School 60th Street & 74th Avenue
Cook	23.22	Roosevelt H.S., 15th St. & 50th Avenue
Cook	21.88	Marsh School, 9810 S. Exchange
Cook	21.74	3535 E. 114th Street
Cook	21.69	Farr Dormitory 3300 S. Michigan Avenue
Madison	21.69	23rd & Madison
Cook	21.38	13100 S. Doty
St. Clair	20.96	13th & Tudor Raps Site
Cook	20.72	Chicago Ave. Pump Station, 805 N. Michigan
Cook	20.24	Eisenhower High School, 12700 Sacramento Ave.
Randolph	20.19	Site B., Cnty Rds. 00.0 N & 25.0 E
Cook	20.04	4043 Joliet Ave.
LaSalle	19.73	308 Portland Ave.
Madison	19.70	2420 Nameoki Rd., Plaza Furniture
Cook	18.99	170th St. & S. Park Avenue
Madison	18.77	211 Sinclair, City Hall
Madison	18.45	409 Main Street, Clara Barton School
Will	18.40	Midland & Otis, Rockdale
Madison	18.10	54 N. Walcott
Macon	17.81	Grant Elementary School, 2300 Geddes

Will counties could become sacrifice zones if the EPA proposal is implemented (Table 9).

The Clinton Administration proposal is nearly silent on the placement of monitors. While they suggest that they be placed near populations, there is no requirement for scientifically validated monitoring that clearly delineates hot spots and cleaner areas within the state. In essence, the proposal suggests that the air in some areas may remain heavily polluted, as long as the air in other areas meets the new standard.

Chapter Five

Recommendations

More Protective Health Standards

The Clinton Administration's proposed $PM_{2.5}$ standard for particulates represents a significant improvement in the status quo. In order to fully protect the public health, and particularly the health of the most vulnerable individuals in the population, however, it must be strengthened substantially. By the EPA's own calculations, the proposed rule would reduce premature mortality from airborne particulates by 50 percent, while teETpoÉ gG 32.5

To ensure that representative monitoring occurs, all major particulate polluters, as currently defined by EPA, should be required to contribute to a fund, administered by local air quality officials, that is dedicated to statistically valid particulate monitoring in all metropolitan statistical areas in the United States. Spatial averaging techniques must not be used in any metropolitan region that does not have a representative particulate monitoring network in place.

With better monitoring and delineation of hot spots the EPA can achieve two goals. It can aim its regulatory efforts at the biggest polluters in the most polluted locations, and it can minimize the number of times that clean areas are dragged into noncompliance due to arbitrary political distinctions such as a county or township boundaries.

Finally, we oppose any plan that achieves compliance with the new health standard by:

- moving existing monitors to cleaner locations
- adding monitors only at cleaner locations, and
- dispersing the pollution source (e.g. a bus transfer station) and thus increasing pollution in cleaner areas.

Hot Spots

The current monitoring system, while not fully representative of local and regional pollution levels, does identify specific locations, or hot spots, where airborne particulates are at unsafe levels. There is no reason to delay pollution reduction measures at these sites. Therefore, until such time as a representative monitoring system is in place, EWG recommends that the EPA maintain the current rules for monitoring, where exceeding the standard in one location triggers a violation.

Right to Know

The public has a fundamental right to know about pollution in the air they breathe. EWG's experience in gathering the particulate monitoring data used in this report shows that the public, and to a significant degree, federal regulators, have no practical way to find out about levels of deadly particulate pollution in their communities.

We recommend, therefore, that the EPA maintain an up-to-date database of particulate pollution levels nationwide, and that these data be available to the public in a manner consistent with data already widely available in the Toxic Release Inventory.

We further recommend that citizens in polluted communities be given the right to petition for and receive in their communities the monitoring equipment needed to detect particulate and other air pollution, and a timely public notification of monitoring results.

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