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;

Table 1. EPA's proposal will reduce deaths caused by particulate pollution in California, 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
Anaheim/Santa Ana	638	162	475
Los Angeles/Long Beach	3,766	1,602	2,164
Oxnard/Simi Valley/Ventura	95	0	95
Riverside/San Bernadino	1,260	640	620
Salinas/Seaside/Monterey	0	0	0
San Diego	577	55	521
San Francisco/Oakland	396	0	396
San Jose	178	0	178
Santa Barbara/Santa Maria/Lompoc	65	0	65
Santa Cruz	0	0	0
Santa Rosa	0	0	0
Stockton	168	53	115
Vallejo/Fairfield/Napa	36	0	36
Bakersfield	318	190	128
Chico	42	0	42
Fresno	274	129	145
Redding	17	0	17
Sacramento	188	0	188
Visalia/Tulare/Porterville	196	115	82
Yuba City	30	0	30
Total	8,244	2,946	5,298

Source: Environmental Working Group, based on PM10 data from 1990-1994 and mortality data provided by Natural Resources Defense Council, 1996. Methods discussed in "Particulate Air Pollution in California" (EWG, 1996).

Table 2. The top total particulate polluters in California.

Facility Name	City	Total Particulate Emissions (Tons)	County	Industry type
Gold Fieldsco Mesquite	Brawley	1,661	Imperial	Gold ores
Calaveras Cement Co	Monolith	1,223	Kern	Cement, hydraulic
Mitsubishi Cement	Lucerne Valley	910	San Bernardino	Cement, hydraulic
U.S. Borax	Boron	751	Kern	Potash, soda, and borate minerals
Georgia Pacific	Martell	686	Amador	Sawmills and planing mills, general
Chevron USA Inc	El Segundo	601	Los Angeles	Petroleum refining
Arco Products Co	Carson	569	Los Angeles	Petroleum refining
Shell Oil Company	Martinez	557	Contra Costa	Petroleum refining
Granite Rock Co	Aromas	536	Monterey	Crushed and broken granite
Tosco Corp, Avon Refinery	Martinez	420	Contra Costa	Petroleum refining
Riverside Cement Company	Oro Grande	417	San Bernardino	Cement, hydraulic
South Valley Refuse Disposal,	Gilroy	415	Santa Clara	Air, water, and solid waste management
Lone Star Indust Cement Plant	Davenport	404	Santa Cruz	Cement, hydraulic
Owens-Brockway Glass Container	Oakland	402	Alameda	Glass containers
Mobil Oil Corp (eis Use)	Torrance	391	Los Angeles	Petroleum refining
Jackson Valley Energy Partners	Ione	349	Amador	Petroleum and coal products
National Cement Co	Lebec	346	Kern	Cement, hydraulic
March Air Force Base	Riverside	345	Riverside	
Foster Farms- Feed Mill	Livingston	342	Merced	Prepared feeds, nec
Sonora Mining Corporation	Jamestown	331	Tuolumne	Miscellaneous nonmetallic mines
P G & E	Moss Landing	318	Monterey	Electric services
Azevedo Quarry	San Jose	301	Santa Clara	Crushed and broken stone, nec
City Of Tulare, H20 Pol. Contr	Tulare	301	Tulare	Sanitary services, nec

Source: Environmental Working Group, compiled from California EPA, Emission Inventory Development and Reporting System.

- 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."

Before the rule was even announced virtually every major oil company, power utility and steel manufacturer in the nation had banded together as the "Air Quality Standards Coalition," with the avowed goal of killing the new clean air rule.

The administration proposal is 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 and gone on the attack.

Congressional opponents of the rule may seek to block it, using a new law designed to protect small business, or through a legislative rider. Air quality will also be a major issue in this year's reauthorization of the multi-billion dollar transportation law (the Intermodal Surface Transportation Efficiency Act, ISTEA).

The Need for Public Comment

Release of the proposed rule marked the beginning of a public comment period 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).

Table 3. Top ten monitoring hot spots in California where particulate pollution will likely exceed EPA's proposed health standards.

County	Estimated Three Year Annual PM2.5 Average (Based on PM10 Data)	Street Address
Kings	28.00	807 SOUTH IRWIN ST., HANFORD
Riverside	27.74	5888 MISSION BLVD., RUBIDOUX
San Bernardino	24.90	14360 ARROW BLVD., FONTANA
Kings	24.61	VAN DORSTEN AVE., CORCORAN
San Bernardino	23.33	AIRPORT, ONTARIO
San Bernardino	23.12	24302 4TH ST., SAN BERNARDINO, CA.
Tulare	22.97	310 N CHURCH ST, VISALIA
Imperial	22.45	401 MAIN ST., BRAWLEY
Fresno	22.07	4706 E. DRUMMOND ST., FRESNO
San Diego	21.80	1100 PASEO INTERNATIONAL, OTAY MESA, CA

Source: Environmental Working Group, compiled from PM10 data from the U.S. Environmental Protection Agency's AIRS database.

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 California 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 California found that under current rules, over 8,000 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 2,900 people, but would have to be strengthened significantly to prevent the premature death of an additional 5,300 people in California each year (Table 1). In Los Angeles, the Clinton Administration proposal would save only about 1,600 of the estimated 3,700 premature deaths attributable to fine particu-

late matter annually. Problems with EPA's proposed monitoring and enforcement provisions may further compromise the potential health benefits of the new rule.

Top Polluters

In California, the cement, petroleum, and electric industries were the industrial sources responsible for the most direct emissions of particulate pollution. The top particulate polluters in the state are the Gold Fieldsco Mesquite Plant in Brawley (1,661 tons), the Calaveras Cement Company in Monolith (1,223 tons), Mitsubishi Cement Plant in Lucerne Valley (807 tons), and the U.S. Borax plant in Boron (751 tons) (Table 2). Many plants also emit large amounts of sulfur (SO_x) and nitrogen (NO_x) oxides. These "particulate precursors," which form dangerous $PM_{2.5}$ particles after emission are also major contributors to the problem. In California, the petroleum refining and electric services industries were responsible for the most NO_x and SO_x emissions. Cars, trucks, and buses are also a significant source of particulates and particulate precursors but are not included in our analysis. In 1994, the top annual non-transportation related NO_x emitters were Pacific Gas and Electric in Moss Landing (8,417 tons), Chevron U.S.A. in Richmond (5,323 tons) and Shell Oil in Martinez (4,145 tons). The top SOx emitters were Exxon, in Benicia (5,944 tons), the Tosco Corp. Avon Refinery in Martinez (4,224 tons) and Unocal Chemical Division in Arroyo Grande (3,247 tons).

Sacrifice Zones

The Clinton Administration proposal recommends a new monitoring initiative called spatial averaging. This new scheme could create "sacrifice zones" where polluted air in yet undefined spatial averaging zones could be "cleaned up" simply by averaging pollution levels from new monitors placed in adjacent communities with cleaner air. If not modified during the public comment period, spatial averaging will very likely undermine the otherwise significant health protections that the new rule is designed to 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 continue to suffer the serious ill effects of particulate pollution, as polluters push for phony pollution reductions based on more monitors placed in cleaner locations.

There are 186 particulate monitors in California. Estimated three-year average $PM_{2.5}$ levels (1993-1995) at a total of 29 monitors throughout the state would likely exceed the EPA proposed level of 15 $\mu g/m^3$. Five of those hot spots are in Los Angeles County, specifically the city of Los Angeles, Azusa, Burbank, Long Beach, and Hawthorne (Table 3). These hot spots need immediate relief from particulate pollution, but may not receive it under the Clinton Administration proposal.

Recommendations

More Protective Health Standards

The Clinton Administration's proposed $PM_{2.5}$ standard for particulates represents a significant improvement in the status quo. But in order to fully protect the public health, and particularly the health of the most vulnerable individuals in the population, 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 tens of thousands of premature deaths will continue even after the proposed health standards are met (EPA 1996d).

To better protect public health, the Environmental Working Group supports the annual average $PM_{2.5}$ standard of $10\mu g/m^3$ as recommended by the American Lung Association and the Natural Resources Defense Council. This goal will provide dramatic health benefits when achieved, and puts the agency more squarely in compliance with the basic requirements and intent of the law. To guard against the adverse health effects of peak particulate exposures, we recommend a 24-hour $PM_{2.5}$ standard of $20\mu g/m^3$.

Better Monitoring

The current network of state, local, and national PM monitors does not provide a scientifically representative picture of particulate levels in the air in most major U.S. cities. In spite of this major flaw in the current system, there is no requirement in the proposed rule that additional monitoring be statistically reliable, or that additional monitoring increase the ability of the EPA to target pollution reduction efforts toward highly polluted areas.

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.

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.

Chapter One

Particulate Pollution Kills

Particulate matter is the generic name for a broad class of toxic air pollution made up of substances that exist as discrete particles, suspended in the air in either liquid or solid form. This can include various metals such as lead, copper, and cadmium, sulfate and nitrate particles, and particle forming organic compounds such as PCBs and aromatic compounds.

The current EPA particulate standard, referred to as the PM_{10} standard, regulates particles smaller than 10 microns in diameter. A micron is one millionth of a meter. Particles less than 10 microns in diameter are targeted because these small particles can easily penetrate into the deepest regions of the lungs (Bascom et al. 1996). More recent studies, however, strongly indicate that the smallest particles, those less than 2.5 microns in diameter, present the greatest risk to human health and particularly to children's health (EPA 1996c). More than 20 epidemiological studies from around the world confirm the high hazards of breathing fine particles at concentrations typically found in ambient air in U.S. cities (EPA 1996c).

The current PM_{10} standard does little to control fine particles because it is enforced based on the total weight of the particles per cubic meter, expressed as micrograms of PM_{10} per cubic meter of air. This enforcement mechanism creates an inherent bias in favor of measures that control larger particles because reducing larger particles in the air provides a far greater reduction in the overall weight of the PM_{10} per cubic meter of air. Reducing the amount of smaller particles, in contrast, has a more negligible effect on the total mass of PM_{10}, but contributes to a greater reduction in health risks from particulate pollution.

Recognizing this limitation with the current regulations, and the distinct health benefit of regulating fine particles, the EPA has proposed that the new standard be designed to measure "fine" particles, or $PM_{2.5}$, rather than PM_{10}. This simple change in the way particulate levels are monitored could provide the basis for much more effective and targeted regulation of particulate sources in the future. Combustion of fossil fuels in power generation, manufacturing, and transportation are the primary sources of fine particle pollution (Dockery et al., 1993).

The Clear Health Threat From Particulates

The Clean Air Act (CAA) directs the EPA to set air quality standards that protect the public's health, including sensitive individuals within the population. Congress further instructed EPA to ensure that health standards sufficiently protect these populations by 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 100$\mu g/m^3$ 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 $10\mu g/m^3$ 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 (μg/m^3) over a 24 hour period, and 75 μg/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 μg/m^3 over a 24 hour period, and an annual average of 50 μg/m^3. California has established stricter PM_{10} standards: a 24 hour standard of 50 μg/m^3, and an annual average of 30 μg/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 establishes new, tougher health standards for $PM_{2.5}$. These standards represent a significant improvement over the current public health goals. The draft rules recommend a three year average $PM_{2.5}$ limit of 15 μg/m^3, and propose retaining the annual PM_{10} standard of 50 μg/m^3. According to EPA (EPA 1996d), "If finalized as proposed, the new standard would:

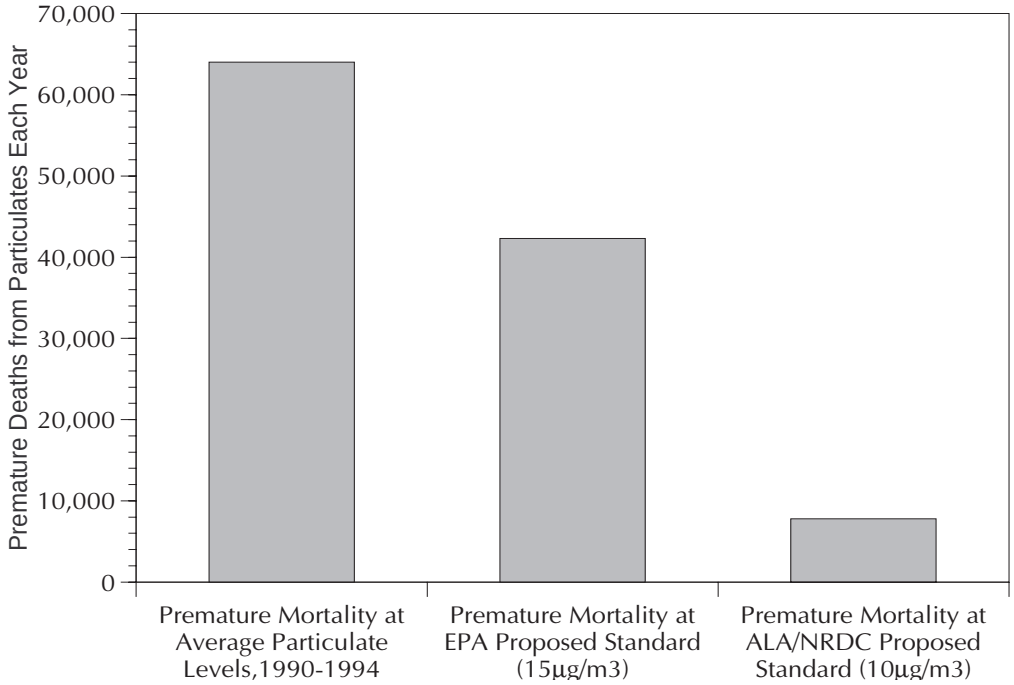
- Cut premature deaths linked with particulate air pollution by 50%, or approximately 20,000 deaths; with acid rain controls currently underway, an additional 20,000 deaths will be avoided;
- Reduce aggravated asthma episodes by more than a quarter million cases each year;
- Reduce incidence of acute 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."

In addition, however, the proposal would weaken the 24-hour PM_{10} standard in favor of a daily $PM_{2.5}$ limit of 50 μg/m^3 (not counting the top 2 percent of concentrations).

Release of the proposed rule marked the beginning of a public comment period, 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 and gone on the attack.

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.

This report supports the Clinton administration's goal of reducing health risks from particulate pollution. Our analysis makes clear that several aspects of the 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 input.

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 each year from airborne 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

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.

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 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 the air in communities near the monitor would not meet federal safety standards. According to the EPA, in spite of this poor air quality, no pollution reduction would be required under the new $PM_{2.5}$ rule, because spatial averaging would bring the entire area into compliance, even as particulate pollution remained at unsafe levels at half of the monitoring sites in the region.

To identify sacrifice zones that could be created under the Clinton Administration monitoring proposal, EWG analyzed data from AIRS including the state and local air monitoring stations (SLAMS) and the national air monitoring stations (NAMS) for the 490 counties across the country with valid PM monitoring data for 1993 through 1995. We then analyzed this information by county, based on EPA's proposal that county boundaries might delineate averaging zones under the new rule. If broader areas were used, even more hot spots could be ignored.

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

Source: Environmental Working Group.

Our analysis found 35 counties that have more than one PM monitor, where the three year average $PM_{2.5}$ levels were below 15 $\mu g/m^3$, but where the three-year average for one monitoring site exceeded the new $PM_{2.5}$ standard. In this scenario, if the county becomes the spatial averaging zone, then under the new $PM_{2.5}$ rule, the people living near the monitors with high pollution levels will receive no relief from what the EPA deems to be unsafe levels of particulate pollution in their air. If the same analysis is modified to look at one-year average $PM_{2.5}$ levels, 77 counties are affected.

EPA has argued that people living in these areas will be protected by the new daily PM2.5 standard of 50$\mu g/m^3$. 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 50$\mu g/m^3$, 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 2.5$\mu g/m^3$ (Table 5). In any

of these 40 counties, compliance could be achieved easily by adding a monitor at a less polluted location, as opposed to reducing pollution levels at the polluted site.

Most worrisomely, the Clinton Administration is proposing to allow independent parties to construct "special purpose monitors", with the promise that data showing poor air quality will not be used for regulatory purposes. Under the EPA proposal, if the data from these special monitors bring an area into a violation of the $PM_{2.5}$ health standard, there is a three-year moratorium on the use of such data. If the data bring an area into compliance, however, there is no similar explicit moratorium on use of the information. While the draft rule does not specifically state that these data will be used, the absence of a prohibition on its use creates the strong supposition that only data that would moderate regulatory burdens from these special monitors will be used in the regulatory process. As drafted, this loophole provides major polluters with a risk-free incentive to set up monitors in clean areas of spatial monitoring zones, as it simultaneously eviscerates independent efforts to monitor air where it is the most polluted. Any potential for such a double standard must be eliminated from the final rule.

Polluters' Attack on Clinton Proposal

The Clinton EPA's proposed new standard for $PM_{2.5}$ levels, while a clear improvement over the current standard, would allow polluters to maintain levels of particulate pollution across the United States that would continue to cause tens of thousands of premature deaths each year. For some of the nation's worst air polluters, however, any reduction in current pollution levels is perceived as too onerous. These polluters have funded an aggressive high profile political and lobbying effort to ensure that new standards are not implemented.

The campaign to foil the new $PM_{2.5}$ standard is being coordinated by the National Association of Manufacturers (NAM) (Skrzycki 1996). This multimillion dollar campaign includes:

- The formation of the NAM "Air Quality Standards Coalition", with a $1.5 million 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 California

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.

Table 6. EPA's proposal will reduce deaths caused by particulate pollution in California, 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 15 µg/m3	Estimated Number of Premature Deaths Under ALA/NRDC Standard Per Year 10 µg/m3
Anaheim/Santa Ana	638	475	81
Los Angeles/Long Beach	3,766	2,164	371
Oxnard/Simi Valley/Ventura	95	95	20
Riverside/San Bernadino	1,260	620	106
Salinas/Seaside/Monterey	0	0	0
San Diego	577	521	89
San Francisco/Oakland	396	396	161
San Jose	178	178	44
Santa Barbara/Santa Maria/Lompoc	65	65	14
Santa Cruz	0	0	0
Santa Rosa	0	0	0
Stockton	168	115	20
Vallejo/Fairfield/Napa	36	36	16
Bakersfield	318	128	22
Chico	42	42	10
Fresno	274	145	25
Redding	17	17	7
Sacramento	188	188	51
Visalia/Tulare/Porterville	196	82	14
Yuba City	30	30	5
Total	8,244	5,298	1,057

Source: Environmental Working Group, based on PM10 data from 1990-1994 and mortality data provided by Natural Resources Defense Council, 1996. Methods discussed in "Particulate Air Pollution in California" (EWG, 1996).

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 threshold for the mortality effects of particulate pollution of 9 $\mu g/m^3$, *not* because no 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 Los Angeles area, EPA's proposal will prevent the premature death of an estimated 1,600 individuals each year. At the same time, over 2,100 people would continue to die prematurely each year 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 Los Angeles each year.

In the San Francisco and Oakland areas, EPA's standard is estimated not to cut premature death at all, while an estimated 396 individuals in those areas would continue to die prematurely each year from particulate pollution (Table 6). The $PM_{2.5}$ level proposed by the ALA and NRDC (10$\mu g/m^3$), on the other hand, would save about 230 lives each year in San Francisco and Oakland.

Statewide, the EPA's proposal will avoid over 2,900 premature deaths from particulate pollution in California each year. The draft rule will need to be significantly strengthened, however, to prevent an estimated 5,300 residents of California from dying prematurely every year due to airborne particulate pollution (Table 6). The standard proposed by the EPA, while setting the stage for important improvements in air quality, is clearly a moderate proposal that leaves substantial room for further reductions in particulate levels.

Moreover, the benefits of the new $PM_{2.5}$ standard will be achieved only if the monitoring proposals in the proposed EPA rule are radically revised. If the proposed spatial averaging and percentile adjustments are not scrapped, then even the moderate public health gains projected here will likely not be attained.

Top Particulate Polluters in California

To quantify and analyze particulate pollution by facility for California and the Los Angeles metropolitan area, the Environmental Working Group obtained facility emissions

Table 7. The top total particulate polluters in California.

Facility Name	City	Total Particulate Emissions (Tons)	County	Industry type
Gold Fieldsco Mesquite	Brawley	1,661	Imperial	Gold ores
Calaveras Cement Co	Monolith	1,223	Kern	Cement, hydraulic
Mitsubishi Cement	Lucerne Valley	910	San Bernardino	Cement, hydraulic
U.S. Borax	Boron	751	Kern	Potash, soda, and borate minerals
Georgia Pacific	Martell	686	Amador	Sawmills and planing mills, general
Chevron USA Inc	El Segundo	601	Los Angeles	Petroleum refining
Arco Products Co	Carson	569	Los Angeles	Petroleum refining
Shell Oil Company	Martinez	557	Contra Costa	Petroleum refining
Granite Rock Co	Aromas	536	Monterey	Crushed and broken granite
Tosco Corp, Avon Refinery	Martinez	420	Contra Costa	Petroleum refining
Riverside Cement Company	Oro Grande	417	San Bernardino	Cement, hydraulic
South Valley Refuse Disposal,	Gilroy	415	Santa Clara	Air, water, and solid waste management
Lone Star Indust Cement Plant	Davenport	404	Santa Cruz	Cement, hydraulic
Owens-Brockway Glass Container	Oakland	402	Alameda	Glass containers
Mobil Oil Corp (eis Use)	Torrance	391	Los Angeles	Petroleum refining
Jackson Valley Energy Partners	Ione	349	Amador	Petroleum and coal products
National Cement Co	Lebec	346	Kern	Cement, hydraulic
March Air Force Base	Riverside	345	Riverside	
Foster Farms- Feed Mill	Livingston	342	Merced	Prepared feeds, nec
Sonora Mining Corporation	Jamestown	331	Tuolumne	Miscellaneous nonmetallic mines
P G & E	Moss Landing	318	Monterey	Electric services
Azevedo Quarry	San Jose	301	Santa Clara	Crushed and broken stone, nec
City Of Tulare, H20 Pol. Contr	Tulare	301	Tulare	Sanitary services, nec

Source: Environmental Working Group, compiled from California EPA, Emission Inventory Development and Reporting System.

data for particulate matter from the California Environmental Protection Agency**.** This analysis included direct particulate emissions as well as additional pollutants (primarily NO_x and SO_x) which serve as precursors to particulate formation. Most large emitters of particulates — particularly electric plants — will also emit large amount of SO_x and NO_x. These data do not include mobile sources of particulate matter or precursors (SO_x and NO_x).

All data in this section of the report are presented as *total* direct particulate emissions, because complete facility-level $PM_{2.5}$ data are not collected by the state of California. Although the exact percentages may vary, $PM_{2.5}$ are generally proportionate to total particulate emissions (CARB 1991). Thus while ranks might change slightly if $PM_{2.5}$ data were available, as a general rule large particulate polluters will also be among the largest direct $PM_{2.5}$ emitters.

Nationwide, about 3.5 *billion* pounds of PM_{10} are spewed into the air each year by stationary pollution sources. Cars and trucks, which emit about 25 percent of PM_{10} each year, are not included in these estimates, nor are the many tons of precursors (NO_x and SO_x). Electric utilities and concrete producers are the top point source emitters of particulate pollution in the United States, followed by steel mills and industrial blast furnaces, iron ore production, and grain milling operations. The major sources of $PM_{2.5}$ "precursors" — SO_x and NO_x — are power plants, oil refineries, and automobiles.

In California, the cement, petroleum, and electric industries were the industrial sources responsible for the most direct emissions of particulate pollution (Table 8). The top par-

Table 8a. Cement, petroleum and electric companies were responsible for the most total particulate emissions in California in 1994.

Industry	1994 Emissions (Tons)
Cement, Hydraulic	4,061
Petroleum Refining	3,992
Electric Services	2,830
Construction Sand and Gravel	2,774

Table 8b. The petroleum refining industry was responsible for almost half of SOx emissions in California in 1994.

Industry	(Tons)
Petroleum Refining	21,350
Petroleum and Coal Products	5,504
Electric Services	3,220
Special Trade Contractors	1,583
All Industries	45,117

Table 8c. The electric services industry was responsible for the most NOx emissions in California in 1994.

Industry	1994 Emissions (Tons)
Electric Services	28,378
Petroleum Refining	23,028
Cement, Hydraulic	15,562
Crude Petroleum and Natural Gas	14,818
All Industries	168,072

Source: Environmental Working Group. Compiled from 1994 California Emissions Inventory Development and Reporting System.

Table 9. The Exxon Benicia facility was the top emitter of SOx in California in 1994.

Facility	Emissions (Tons)	City	County	Industry Type
Exxon Corporation	5,944	Benicia	Solano	Petroleum refining
Tosco Corp, Avon Refinery	4,224	Martinez	Contra Costa	Petroleum refining
Unocal Chem Div-unocal Corp	3,247	Arroyo Grande	San Luis Obispo	Petroleum and coal products
Shell Oil Company	2,463	Martinez	Contra Costa	Petroleum refining
Arco Products Co	1,733	Carson	Los Angeles	Petroleum refining
Union Chemicals	1,602	Rodeo	Contra Costa	Petroleum and coal products
Chevron USA, Inc	1,575	Richmond	Contra Costa	Special trade contractors, nec
P G & E	1,536	Moss Landing	Monterey	Electric services
Chevron USA. Inc	1,157	El Segundo	Los Angeles	Petroleum refining
Mobil Oil Corp (eis Use)	1,053	Torrance	Los Angeles	Petroleum refining
Mitsubishi Cement	946	Lucerne Valley	San Bernardino	Cement, hydraulic
Unocal, Santa Maria Refinery	841	Arroyo Grande	San Luis Obispo	Petroleum refining
Pacific Gas & Electric Co	826	Pittsburg	Contra Costa	Electric and other services combined
Union Oil Co Of Cal.	652	Wilmington	Los Angeles	Petroleum refining
Unocal Corporation	599	Rodeo	Contra Costa	Petroleum refining
Texaco Ref & Marketing Inc	561	Wilmington	Los Angeles	Petroleum refining
Riverside Cement Company	527	Oro Grande	San Bernardino	Cement, hydraulic
Guardian Industries Corp.	459	Kingsburg	Fresno	Flat glass
Celite Corporation	458	Lompoc	Santa Barbara	Minerals, ground or treated
Arco Cqc Kiln	450	Wilmington	Los Angeles	Petroleum and coal products
Fmc Corporation	441	Fresno	Fresno	Agricultural chemicals, nec
San Joaquin Refinery	370	Bakersfield	Kern	Petroleum refining
Kern Oil & Refining Company	369	Bakersfield	Kern	Petroleum refining
Ultramar Inc (nsr Use Only)	349	Wilmington	Los Angeles	Petroleum refining
Owens-Brockway Glass Container	345	Vernon	Los Angeles	Glass containers
Owens Illinois	311	Tracy	San Joaquin	Glass containers
Ace Cogeneration	306	Trona	San Bernardino	Electric services
Pacific Refining Company	290	Hercules	Contra Costa	Petroleum refining
Calaveras Cement Co	286	Monolith	Kern	Cement, hydraulic
Santa Fe Energy Resources, Inc	271	Bakersfield	Kern	Crude petroleum and natural gas
Mich-cal Lbr Co	271	Camino	El Dorado	Sawmills and planing mills, general
Texaco Refining And Marketing	260	Bakersfield	Kern	Petroleum refining
Lone Star Indust Cement Plant	250	Davenport	Santa Cruz	Cement, hydraulic

Source: Environmental Working Group, compiled from California EPA, Emission Inventory Development and Reporting System.

ticulate polluters in the state are the Gold Fieldsco Mesquite Plant in Brawley (1,661 tons), the Calaveras Cement Company in Monolith (1,223 tons), Mitsubishi Cement Plant in Lucerne Valley (807 tons), and the U.S. Borax plant in Boron (751 tons) (Table 7). Many plants also emit large amounts of sulfur (SO_x) and nitrogen (NO_x) oxides. These "particulate precursors," which form dangerous $PM_{2.5}$ particles after emission are also major contributors to the problem. In California, the petroleum refining and electric services industries were responsible for the most NO_x and SO_x emissions. Cars, trucks, and buses are also a significant source of particulates and particulate precursors but are not included in our analysis. The top SOx emitters were Exxon, in Benicia (5,944 tons), the Tosco Corp. Avon Refinery in Martinez (4,224 tons) and Unocal Chemical Division in Arroyo Grande (3,247 tons) (Table 9). In 1994, the top annual non-transportation related NO_x emitters were Pacific Gas and Electric in Moss Landing (8,417 tons), Chevron U.S.A. in Richmond (5,323 tons) and Shell Oil in Martinez (4,145 tons) (Table 10).

Table 10. Fourteen California facilities emitted more than 2,000 tons of NOx in 1994.

Name	City	Tons	County	Industry Type
P G & E	Moss Landing	8,417	Monterey	Electric services
Chevron Usa, Inc	Richmond	5,323	Contra Costa	Special trade contractors, nec
Shell Oil Company	Martinez	4,145	Contra Costa	Petroleum refining
Riverside Cement Company	Oro Grande	3,795	San Bernardino	Cement, hydraulic
Southwestern Portland Cement	Apple Valley	2,978	San Bernardino	Cement, hydraulic
Exxon Corporation	Benicia	2,972	Solano	Petroleum refining
Los Angeles Int Airport	Los Angeles	2,934	Los Angeles	
Pacific Gas And Electric Co.	Antioch	2,829	Contra Costa	Electric and other services combined
Mobil Oil Corp (eis Use)	Torrance	2,731	Los Angeles	Petroleum refining
Tosco Corp, Avon Refinery	Martinez	2,501	Contra Costa	Petroleum refining
North American Chemical	Trona	2,322	San Bernardino	Industrial inorganic chemicals, nec
Kern River Cogen	Oildale	2,300	Kern	Electric services
Cal Portland Cement Co.	Mojave	2,246	Kern	Cement, hydraulic
Sycamore Cogeneration	Oildale	2,182	Kern	Electric services
Chevron U.S.A. Inc	El Segundo	1,948	Los Angeles	Petroleum refining
PG&E Hinkley Compressor Sta	Hinkley	1,809	San Bernardino	Natural gas transmission
Arco Products Co	Carson	1,712	Los Angeles	Petroleum refining
Unocal Corporation	Rodeo	1,651	Contra Costa	Petroleum refining
SDG & E Co/South Bay Plant	Chula Vista	1,606	San Diego	Electric and other services combined
So Cal Gas Co	Blythe	1,588	Riverside	Natural gas distribution
Southern California Gas Comp.	Blythe	1,587	Riverside	Natural gas transmission
Calaveras Cement Co	Monolith	1,562	Kern	Cement, hydraulic
Pacific Gas & Electric Co, Hun	San Francisco	1,504	San Francisco	Electric and other services combined
Mitsubishi Cement	Lucerne Valley	1,466	San Bernardino	Cement, hydraulic
Texaco Ref & Marketing Inc	Wilmington	1,415	Los Angeles	Petroleum refining
SDG & E Co/encina Plant	Carlsbad	1,375	San Diego	Electric and other services combined

Source: Environmental Working Group, compiled from California EPA, Emission Inventory Development and Reporting System.

Hot Spots and Sacrifice Zones

As drafted, EPA's proposal needs significant strengthening to prevent the premature death of thousands of California residents each year from particulate pollution. Efficient solutions to this pressing public health problem will be even harder to come by due to the lack of a scientifically based monitoring plan. Given the nearly random nature of existing monitoring locations, the high spatial variability in air quality, and the use of spatial averaging, some areas with high annual average particulate levels could be ignored by the regulatory process, simply because they may be grouped together with lower PM areas. EPA's proposal to allow "special purpose monitors" will make it even more likely for this to occur. In this scenario, heavily polluted areas where PM levels hover just below the 24-hour standard for long periods of time will essentially become sacrifice zones.

In California, out of 186 monitors, there are 29 where the three-year average $PM_{2.5}$ levels exceeded the EPA proposed standard, based on our analysis of data from 1993 through 1995 (Table 11). These hot spots throughout the state could become sacrifice zones if the EPA proposal is implemented.

Table 11. Monitoring hot spots in California where particulate pollution will likely exceed EPA's proposed health standards.

County	Estimated Three Year Annual PM2.5 Average Based on PM10 Levels	Street Address
Kings	28.00	807 SOUTH IRWIN ST., HANFORD
Riverside	27.74	5888 MISSION BLVD., RUBIDOUX
San Bernardino	24.90	14360 ARROW BLVD., FONTANA
Kings	24.61	VAN DORSTEN AVE., CORCORAN
San Bernardino	23.33	AIRPORT, ONTARIO
San Bernardino	23.12	24302 4TH ST., SAN BERNARDINO, CA.
Tulare	22.97	310 N CHURCH ST, VISALIA
Imperial	22.45	401 MAIN ST., BRAWLEY
Fresno	22.07	4706 E. DRUMMOND ST., FRESNO
San Diego	21.80	1100 PASEO INTERNATIONAL, OTAY MESA, CA
Nevada	21.21	GLENSHIRE FS-10900 MANCHESTER, TRUCKEE
Riverside	20.76	46-990 JACKSON ST., INDIO
Riverside	20.02	237 1/2 N. "D" ST., PERRIS
Los Angeles	19.81	1630 N MAIN ST, LOS ANGELES
Kings	19.61	CALTRANS-HWY 41 & RACINE, KETTLEMAN CITY
Kern	19.11	3311 MANOR ST., OILDALE
Los Angeles	18.52	803 N. LOREN AVE., AZUSA
Los Angeles	18.40	228 W. PALM AVE., BURBANK
Fresno	18.16	3425 N FIRST ST, FRESNO
Madera	18.05	LIBRARY-121 N "G" ST, MADERA
Orange	17.71	1610 S. HARBOR BLVD., ANAHEIM
Fresno	17.70	908 N VILLA AVE, CLOVIS
Merced	17.64	240 E. 15TH STREET, MERCED, CA
Stanislaus	17.46	1100 "I" ST, MODESTO (COURT HOUSE)
Nevada	17.42	FS-10049 DONNER PASS RD, TRUCKEE
Los Angeles	17.22	3648 N. LONG BEACH BLVD., LONG BEACH
Los Angeles	16.34	5234 W. 120TH ST., HAWTHORNE
San Bernardino	16.27	14029 AMARGOSA ROAD, VICTORVILLE, CA
San Diego	15.56	330A 12TH AVE., SAN DIEGO, CA. 92112

Source: Environmental Working Group, compiled from PM10 data from the U.S. Environmental Protection Agency's AIRS database.

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 tens of thousands of premature deaths will continue even after the proposed health standards are met (EPA 1996d).

Moreover, the proposed particulate standard is more accurately viewed as a goal than an enforceable health standard. Historic enforcement of Clean Air Act requirements suggests that attainment of any new particulate standard will be achieved only over a number of decades, during which time millions of people will suffer the health consequences of unsafe air as EPA fights to bring polluters into compliance.

Given these realities, we strongly support the $PM_{2.5}$ standard of $10\mu g/m^3$ as recommended by the American Lung Association and the Natural Resources Defense Council. This goal will provide dramatic health benefits when achieved, and puts the agency more squarely in compliance with the basic requirements and intent of the law. To guard against the adverse health effects of peak particulate exposures, we recommend a 24-hour $PM_{2.5}$ standard of $20\mu g/m^3$.

Better Monitoring

The proposed rule could create sacrifice zones, where unsafe air is not cleaned up, but instead is averaged together with cleaner air from an adjacent community 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.

EWG supports scientifically validated monitoring so that regulators can characterize accurately the spatial distribution of particulate pollution. The purpose of identifying hot spots is to clean them up, not to fake pollution reductions through statistical techniques that leave people at risk, or through dispersing pollution sources throughout cleaner areas, a maneuver that might actually place more people at greater risk than is currently the case.

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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