Policy Analysis

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Executive Summary

When the Environmental Protection Agency released its 17th annual report, National Air Quality and Emissions Trends Report, 1989, on March 5, 1991, EPA administrator William K. Reilly announced both good and bad news. The good news was that, from 1982 through 1989, atmospheric smog levels fell by 14 percent. The bad news, however, was "the magnitude of the air pollution problem still remaining," given that "sixty- seven million people are living in counties exceeding the smog standard."[1]

In fact, the March 1991 annual report was but one episode in the EPA's continuing saga of factual misrepresentation and statistical manipulation of the data on urban smog. By refusing to fully acknowledge and appropriately correct for the role of weather in urban ozone trends; by not calling attention to positive preliminary data for 1989, 1990, and 1991 in a timely manner, even though it had to negative preliminary data in 1988; by misrepresenting the meaning of ozone "nonattainment"; and by failing to differentiate between distinctly California ozone problems and those of the other 49 states, the EPA has purposefully and cynically misled the nation about the true extent of urban smog. The price of the EPA's misrepresentation will be paid by the American people, who will unnecessarily spend billions of dollars and possibly sacrifice tens of thousands of jobs to solve a problem that exists only in the minds of EPA bureaucrats and environmental advocacy groups.

Urban Smog and the Clean Air Act

Urban smog, which is known as ozone pollution, is produced by a complex series of chemical reactions involving automotive and industrial emissions of volatile organic compounds (VOCs, mainly hydrocarbons), nitrogen oxides (NOx) from the same sources, and sunlight. As temperatures increase during the day, solar energy enhances those chemical reactions and increases the amount of ozone produced. Correspondingly, as temperatures decrease, the chemical reactions are slowed and smog is seldom formed. Ozone formation is thus a daytime phenomenon, which occurs during the late spring and summer months in most of the United States.

The health effects of ozone pollution have been studied extensively over the past 20 years. Epidemiological studies have failed to demonstrate any chronic health effects. In 1986 the EPA concluded that

> reported effects on the incidence of acute respiratory illness and on physician, emergency room, and hospital visits are not clearly related with acute exposure to ambient ozone or oxidants and, therefore, are not useful for deriving health effects criteria for standard-setting purposes. Likewise, no convincing association has been demonstrated between daily mortality and daily oxidant concentrations; rather, the

effect correlates most closely with elevated temperatures.[2]

The Clean Air Act of 1970 required the EPA to establish a National Ambient Air Quality Standard (NAAQS) for ozone concentration. The standard was originally set at 0.08 parts per million (ppm) but was subsequently revised to 0.12 ppm in 1979. The clinical studies on which the standard is based demonstrated reversible effects above 0.15 ppm. Hence the 0.12-ppm standard incorporates the statutory requirement of an ample margin of safety.[3]

State and local agencies, with heavy EPA financial and technical support, maintain an extensive ambient ozone monitoring network. There are more than 800 ozone monitors located in 467 counties where ozone has been thought to exceed the 0.12-ppm standard. If even one monitoring device registers an ozone concentration over 0.124 ppm for one hour or more, the entire region is officially found to exceed the NAAQS that day. If any monitor shows four exceedances during any consecutive three-year period, the region is declared an ozone nonattainment region.

Nonattainment regions are classified by the EPA as marginal, moderate, serious, severe, and extreme, depending on the concentration of ozone found in the fourth highest reading at any monitoring station over the most recent three-year time frame. The boundaries of nonattainment regions vary depending on the air quality monitoring data.

Thus, the fact that a person lives in an ozone non-attainment region is not an indication of his actual exposure to unhealthy levels of ozone. Almost all exposures of persons living in nonattainment areas outside California are only two to five days more than the permissible one-day-peryear exposure. The maximum exposure concentration on the worst day, with rare exceptions, is within the current legally mandated margin of safety, below 0.15 ppm ozone. In terms of total annual exposure, there is no significant difference between one day and a few days of exposure above the standard. Finally, one monitor does not generally reflect actual ozone exposures over an entire metropolitan area, yet one monitor may detect a one-hour exceedance that causes the whole region to be declared in nonattainment.

Finally, it is worth noting how misleading Reilly was being when he said that 67 million people were living in areas that exceeded the ozone standard. Although he was undoubtedly attempting to underscore what he perceives to be the widespread, serious nature of the problem, he failed to mention that 85 percent of all ozone exposures above 0.12 ppm in the nation occur in California and that 82 percent of all exposures nationwide occur in the Los Angeles Basin.

The Great 1988 EPA Smog Scare

Although the EPA has long been relatively silent about the true implications of ozone nonattainment--preferring to dramatize each year's nonattainment readings without providing a proper context--the agency entered an entirely new realm of misinformation in August 1988. For the first time since it began collecting nationwide air quality data from state and local agencies, the EPA publicly released preliminary urban ozone data before the official end of the ozone-monitoring period and some 10 months before the end of the normal data collection cycle.[4] In a memo to Administrator Lee Thomas dated August 18, 1988, EPA's acting assistant administrator for Air and Radiation, Don Clay, noted that the national air monitoring station coordinators had updated most of the summer's ozone data through August 12 and cautioned, "In order to expedite the reporting of the ozone data, it must be clearly understood that the data has not gone through the normal validation process." Neither Clay's memo, nor "A Preliminary Comparison of 1988 Ozone Concentrations to 1983 and 1987 Concentrations, August Update," dated August 15, 1988, and submitted by William G. Laxton of the Technical Support Division to the administrator in preparation for his appearance on the MacNeil/Lehrer Newshour, nor Laxton's cover memo makes any mention of the unusually hot weather that was producing the ozone exceedances.

It would seem that the unprecedented early release of data was politically motivated. The 1988 elections were looming, and then-candidate George Bush was promising that an amended Clean Air Act would be one of the centerpieces of his domestic agenda. Given the unusually hot summer of 1988, ozone readings were reaching record highs in U.S. cities, and alarming smog reports from the EPA would pressure candidate Bush into making campaign promises he would be bound by in the first year of his administration. And just to make sure that the unusually elevated levels of urban smog were a central part of the presidential debate, the Natural Resources Defense Council (NRDC) issued parallel scare reports to back up the EPA's position.[5] Clearly, special interests were at work to manipulate the release of the 1988 data to create a crisis atmosphere that would demand political action.

However, the significance of the EPA's politicization of its preliminary 1988 findings pales in comparison with the agency's failure to explain the true causes of the 1988 ozone readings. Although the EPA pointed out repeatedly that a record number of people were living in nonattainment regions in 1988, a marked deterioration in air quality compared with trends earlier in the decade, the agency failed initially to mention atypical weather as a possible cause of the extremely high levels of smog in the midwestern and eastern United States. Instead, the EPA argued that America was simply polluting too much, that current VOC strategies were not adequate, and that stringent new federal regulations were needed to prevent air quality from getting progressively worse.

The fact is, however, that weather--not VOC or NOx emissions--is the most important determinant of the number of days a year that are conducive to ozone formation. Judging by the number of days on which the temperature rose above 90 degrees Fahrenheit, the summer of 1988 was among the hottest two or three summers in the past 25 years.[6]

Before the 1988 preliminary ozone data release, the consensus thinking in Washington had been that there would be some relaxation of the most stringent regulations in the upcoming amendments to the Clean Air Act relative to ozone nonattainment strategies (e.g., making state automobile inspection and maintenance programs discretionary rather than mandatory). Few people expected Congress to try to "fix" an ozone nonattainment problem that was well on the way to being solved. Thanks to the EPA's and the NRDC's intentional misinterpretation of the 1988 data, however, we now have a more draconian and expensive urban ozone regulatory program than was imaginable just four years ago.

The Role of Weather

In response to scattered criticism of the EPA's alarmist 1988 ozone findings, the agency argued that, although the summer of 1988 was indeed unusually hot, hotter summers were a pronounced trend in the 1980s and the "greenhouse effect" might increase the likelihood of even hotter summers in the future. Thus, according to the EPA, using the 1988 data to establish nonattainment regions was perfectly legitimate and in fact prudent if America was to ensure clean air in the future.

To test the EPA's greenhouse assertion, I compiled an annual 90F temperature profile for more than 90 ozone non-attainment areas for 1967 through 1989. That temperature yardstick is a good indicator of how many days per year weather conditions (i.e., high temperatures, low wind speeds, and temperature inversions) are conducive to smog formation.[7]

Seven of those profiles (with 1990 and 1991 data added) are shown in Figure 1. The median number of days above 90F during the first half versus the second half of the 25-year period shown in Figure 1 demonstrates that there is no trend of increasing temperatures for the cities that suffered from record temperatures during the summer of 1988. Three of the six areas influenced by the drought (all but Dallas/Fort Worth) show an increase, and three show a decrease in the median for the first versus the second time period. Other cities in those regions show the same pattern. Accepted statistical tests, however, indicate that the observed differences are not statistically significant, except for Washington, D.C. The temperature data for Dallas/Fort Worth and other Sun Belt cities exhibit a different pattern over the past decade than do the data for midwestern and northeastern cities.

Figure 1
Twenty-Three Year Temperature trends for Seven Representative Regions
Source: National Climatic Data Center, National Oceanic and At- mospheric Administration.
(Graphs Omitted)

The data also give rise to another important observation. The six drought-affected cities experienced much wider temperature fluctuations during the last 12 years than during previous years. Those fluctuations masked the true downward ozone trend during the 1980s. The EPA has taken advantage of those extremes to falsely show a nationwide upward trend between 1983 and 1988 and between 1987 and 1988 in a recent report.[8]

To further examine the greenhouse argument, I analyzed 44 years of Chicago temperature data. My results are shown in Figure 2. I divided the 44 years of data into four separate 11-year periods. The median number of days per year on which temperatures were above 90F for each 11-year period was 21, 21, 23, and 17. That trend analysis does not indicate an increase in temperature. The most probable values for the first 22 years and the second 22 years were 21

and 20 days above 90F, respectively--again, no increase.

Figure 2
Forty-Four Year Tempature Trends, Chicago Nonattainment Region
Source: National Climatic Data Center, National Oceanic and Atmospheric Administration.
(Graph Omitted)

Figure 3
Trends in Ozone and Temperature
Source: Appendix; National Climatic Data Center, National Oceanic and Atmospheric Administration.
(Graphs Omitted)

The influence of annual temperature variations on the trends in urban ozone concentration is clearly indicated in Figure 3, where temperature and ozone trends are plotted together for three cities representative of the Midwest and the East Coast. The true ozone trend is not readily discernible.

Using the same data, I created a simple trends index (i.e., the number of exceedances in a year divided by the number of days conducive to ozone formation in that year) that indicates whether or not improvement is taking place. Figure 4 shows the results. The true trend is dramatically downward.

Those results are typical of all ozone data nationwide. The 1987-88 annual report of the Council on Environmental Quality contained a similar trends index for 23 major cities. Nineteen of those cities showed downward trends over the 1979-88 time frame.[9]

Figure 4
Trends in Ozone Air Quality Corrected for Temperature Influence -- Three Cities
Source: Appendix; National Climatic Data Center, National Oceanic and Atmospheric Administration.
(Graph Omitted)

The EPA Drags Its Heels

In August 1988 the EPA proved that it could act rapidly to report ominous air pollution data. However, in subsequent years, it made no effort to call the public's attention to encouraging preliminary data.

The preliminary data for 1989 indicated a dramatic reduction in urban smog levels from 1988 and a return to expected ozone levels, but the EPA did not call public attention to those data. It waited until March 1991 to issue the annual report. When I asked the EPA, in the fall of 1989, why the good news about the preliminary data was not being publicized, the answer was, "No one has asked us for the data."[10]

The 1991 ozone readings were as favorable as the 1990 readings. Their incorporation into a new three-year ozone nonattainment data base, from which the aberrant 1988 readings would be removed, would radically alter the ozone non- attainment status of dozens of cities. Although EPA staff members concede that they have indeed gathered the preliminary 1991 data and confirm that there was a distinct downward trend in national nonattainment status, the agency argues that it cannot release a preliminary report because "the 1991 data have yet to be quality assured." Of course, the agency did not let quality assurance concerns get in the way of its rushed 1988 preliminary report. Given the tens of billions of dollars that would be saved by immediately adopting the 1989-91 date base, it is outrageous that the EPA refuses to spend the few thousand dollars necessary to provide quality assurance for the already compiled 1991 numbers.

During the debate on the 1990 amendments to the Clean Air Act, the EPA steadfastly supported the use of the 1988 data in classifying nonattainment areas. The establishment in the amendments of a closure date of November 1990 for data review for baseline nonattainment designation and severity classification ensured the worst possible portrayal of the nation's ozone problem. The EPA could and should have proposed to Congress a one- or two-year wait-and-see strategy to ensure scientific honesty.

Now the act requires states to go through several arduous steps to get redesignated or reclassified, or both, on the basis of the new data. It does not appear that the EPA is encouraging the states to do so.

1991 Ozone Findings

Even if the nonattainment data are not adjusted to account for temperature fluctuations, recalculation of regional nonattainment status using the latest three-year cycle (1989-91) reveals a dramatic improvement in urban air quality.[11]

The annual ozone exceedance rates at the worst ozone monitors of the 114 cities that the EPA cited in its 1988 report as well as the rates for the 98 cities the EPA reported in nonattainment in its November 1991 report are given in the Appendix. The attainment/nonattainment status of those cities is evaluated using both the 1988-90 three- year window (the EPA's current period for designation of regional status) and the more recent (and thus more accurate) 1989-91 three-year figures.[12]

Examination of the data in the Appendix reveals that there has been more than a 60 percent nationwide reduction in median ozone exceedances since 1988. That dramatic improvement in ozone air quality was obviously not due to increased regulatory activity alone, although the EPA may now wish to make such a claim. More important, there are only 28 nonattainment areas outside California, not 89 as reported by the EPA in November.[13] That dramatic reduction in urban ozone is even more remarkable when one considers that the 1989-91 data have not been adjusted for temperature, and it can be readily demonstrated that the most recent data have a slight hotter-than-normal bias.[14]

Table 1 is a subset of the data contained in the Appendix. It shows the annual number of nonattainment areas and the total number of exceedances nationwide. The data for California are separated from those for the rest of the nation.

Several major conclusions can be drawn from the data in the Appendix and Table 1:

* Non-California data for 1988 were clearly aberrant.

* There is a clear downward trend in ozone pollution (in terms of both total exceedances and number of nonattainment areas) when the 1988 data are excluded from the non-California trend data base.

* California stands alone as an ozone regulatory problem, principally because of the Los Angeles Basin.

Table 1 Annual Nonattainment Rates and Total Nationwide Exceedance Levels, 1985-91

	Year						
Case	85	86	87	88	89	90	91
Number of Areas with 2 or More Exceedances							
California	9	8	8	9	9	5	6
Other U.S.	33	36	43	85	20	20	29
Total U.S.	42	44	51	94	29	25	35
Total Number of Exceedances							
California	257	272	270	308	233	167	90(a)
Other U.S.	188	166	275	607	101	124	155
Total U.S.	445	438	545	915	334	291	245
Percent Calif.	58	62	30	34	70	57	37

(a)Data on Los Angeles are incomplete.

The last conclusion makes a mockery of the EPA's implication that Los Angeles's regulatory strategies should be

applied to other regions of the nation. It must also be remembered that California has an ozone standard of 0.10 ppm, which inevitably makes comparisons between California and the rest of the nation problematic.

The 28 non-California nonattainment areas are listed in Table 2 in ascending order of their deviation from attainment status. The most recent EPA nonattainment severity classification is also given.

There are obvious gross inconsistencies between the EPA's classification of nonattainment regions and the truth of the matter. The huge discrepancies between the EPA's current representation of the nonattainment problem and the data from the last three years are further illustrated by Figure 5.

Finally, an evaluation of 1985-91 temperature-adjusted ozone data for regions outside California is found in Figure 6. The dramatic improvement in urban air quality is evident; there has been a full 74 percent reduction in ozone nonattainment days over the past six years.

Those findings are particularly interesting when compared with the findings of a report recently released by the National Academy of Sciences. Although the NAS report concluded that "despite the major regulatory and pollution control programs of the past 20 years, efforts to attain the NAAQS for ozone largely have failed,"[15] that finding was constrained by lack of data more recent than 1989 as well as the fact that no weather-related corrections were applied to the trends and nonattainment data that were reviewed. As we have seen, incorporation of 1990-91 data changes the national trend dramatically.

Figure 5
Comparison of EPA Nonattainment Designations with Actual Current Status -- Non California Urban Areas
Source: Table 3

(Graph Omitted)

Figure 6
Temperature-Adjusted Trends in Non-California Urban Ozone Air Quality
Source: Table 1; National Climatic Data Center, National Oceanic and Atmospheric Administration.

(Graph Omitted)

Most urban areas lack good pre-1979 data on ozone concentrations. Less monitoring was done before 1979, and there were calibration problems with some monitoring equipment. Yet there are some data available that do incorporate continuous ozone measurements back as far as 1975. The monitoring site downwind of New York City used in my study (Stratford, Connecticut) is such a site. Figure 7 shows the raw and temperature-adjusted exceedance rates for that site for 1975 through 1991. The raw exceedance rate for each year was normalized to the 25-year average 90F temperature data. The ozone air quality improvement over that period is 81 percent. The same trends analysis can be applied to every urban area to determine the empirical relationship between historical ozone air quality and emission inventory trends.

Figure 7
Termperature-Adjusted Trends in Ozone Air Quality in the New York City/Connecticut Region (Stratford, Conn., Monitor)
Source: EPA and Connecticut state agency.

(Graph Omitted)

The second main conclusion of the NAS report is that "the currently used principal statistical measure of ozone trends--the second highest daily one-hour concentration--is not robust because it is highly sensitive to fluctuations in weather patterns, and therefore is not a reliable measure of long-term trends."[16] The above analysis of ozone trends and the aberrant ozone readings of 1988 certainly confirm that conclusion. In fact, the methods I used in this study were cited as a potential alternative to EPA practices in the NAS report. Corrective methods are needed not only for trends analysis but for legal determination of nonattainment as well. The results of my study respond directly and affirmatively to the academy's findings.

Economic Costs of EPA Regulations

Areas designated as nonattainment regions by the EPA face draconian regulations and severe economic burdens. The true cost of the EPA's misrepresentations is clear when one considers what the spurious designations mean for economic growth in America.

Areas that are determined to be in marginal nonattainment with federal ozone standards must

* apply Reasonably Available Control Technologies (RACT), as uniformly designated by the EPA, to all industrial facilities that emit over 100 tons of VOCs or NOx a year;

* implement the most stringent automobile inspection and maintenance program possible;[17] and

* require that all new and modified VOC sources undergo stringent new source review and adopt Lowest Achievable Emission Reduction (LAER) practices.[18]

Areas designated as moderate ozone nonattainment regions must

* comply with all requirements for marginal non- attainment areas;

* achieve an additional net 15 percent VOC emissions reduction from the 1990 baseline inventory beyond that provided by auto fleet turnover and fuel volatility reduction credits; and

* install gasoline station vapor recovery systems (known as Stage II technology).[19]

Areas designated as serious ozone nonattainment regions must

* comply with all requirements for moderate non- attainment areas;

* further reduce VOC emissions by 3 percent per year beginning in 1996 until attainment is demonstrated;

* promulgate RACT controls on industrial sources of VOCs or NOx that emit more than 50 tons per year;

* adopt an enhanced auto inspection and maintenance program including increased waiver thresholds (i.e., $75 for pre-1981 cars and $200 for post-1981 cars);

* implement the federal clean fuels program;[20] and

* mandate more stringent transportation control measures as deemed necessary by the EPA.[21]

Areas designated as severe ozone nonattainment regions are further required to

* implement all strategies required of serious ozone nonattainment regions;

* adopt NOx emission control technologies guidelines stipulated by the EPA;

* mandate VOC emission controls on public activities and consumer products;

* promulgate RACT controls on industrial sources of VOCs or NOx that emit as little as 10 tons per year;

* adopt VOC emission controls on marine vessel loading activities; and

* establish monetary sanctions of $5,000 per ton for noncomplying sources.

In addition to the direct costs of the various regulatory programs, there are administrative costs of preparing state implementation plans, taking emission inventories, conducting required special studies, and monitoring compli ance. Those costs are extremely onerous and burdensome to both local governments and private businesses.

Although it is beyond the scope of this paper to estimate the actual costs imposed by the EPA's failure to publicize the 1991 data, one can safely conclude that dramatic economic savings would result from acknowledging the true national nonattainment situation. The data in Table 3 indicate the potential cost differential between the EPA's representation of ozone nonattainment outside California and the true ozone nonattainment picture that emerges from the data. The difference between the number of nonattainment areas in each classification represents the minimum relative cost savings.

Relative Cost Reduction due to Proper Classification of Non- attainment Areas outside California			
	Number of Urban Areas So Classified		
Classification	EPA	Jones	Percentage Reduction in Relative Cost
Marginal	42	18	57
Moderate	29	7	76
Serious	12	2	83
Severe	6	1	83

Further, the costs of implementing ozone control regulations escalate geometrically with increasing severity of nonattainment. Therefore, the actual cost of bringing the true number of nonattainment areas outside California into attainment is probably much less than 25 percent of the cost associated with the EPA's regulatory strategy. Thus, at a minimum, the misleading ozone picture presented by the EPA is costing the American people $13 billion annually.[22] That estimate, however, does not take into account secondary economic costs of regulation, which would bring the total economic cost of the EPA's smog reduction strategy to at least $26 billion annually.[23]

Those economic costs will buy us neither improved air quality nor better health. Indeed, the new ozone regulatory program will have no significant effect on future urban ozone.

The Environmental Benefits of Current Policy

The EPA's new regulatory program, particularly the NOx control provisions, will not only bleed precious money from the economy; it will exacerbate ozone air pollution in America and slow progress in improving urban ozone air quality as well.

Those effects have two causes. First, the ozone non- attainment regulations stipulated in the 1990 amendments to the Clean Air Act attack minor VOC sources that may contribute to urban ozone. The combination of RACT standards, LAER, and new source review mandates, if imposed on all industrial sources of VOCs or NOx emitting 25 tons per year (which could shut many small businesses down), would reduce stationary source emissions by only a few percentage points.[24]

Similarly, rigid inspection and maintenance (I/M) programs for automobiles are a total waste of time and money. Only 3 percent of all 1981-89 vehicles in Seattle failed the I/M test.[25] My review of other such data suggests that the same is true of other state programs as well. Non-California-certified cars already emit about half of the legal standard of 0.41 grams per mile (gpm); hence the new 0.25- gpm standard is meaningless.[26] The federal clean fuels program will address sources that generate only 4 percent of total VOC emissions in the average city.[27] Stage II vapor recovery nozzles on gasoline pumps will reduce emissions by only about 2 percent.[28] Because 70 to 80 percent of emissions in the commute cycle occur in driveways during initial ignition,[29] controlling vehicle miles traveled is also of dubious value since any transportation control measure that involves starting a car (e.g., park and ride) leaves most transportation emissions unaffected.

All of the above strategies taken together--even if they proved to be 100 percent effective--would result in less than a 0.01-ppm reduction in ozone concentration at the air quality monitor.[30]

The EPA's regulations are counterproductive because auto fleet turnover is the only proven means of significantly reducing ozone pollution. Ten percent of America's cars are responsible for 50 percent of all emissions, and most of those cars are pre-1981 vehicles without catalytic convert ers and other emissions control devices.[31] Regulations that increase the costs of new cars will simply delay the turnover of the auto fleet and unnecessarily postpone further improvements in air quality.

Summary: The EPA Must Come Clean

Reilly's rhetoric aside, America has made great strides in smog abatement over the past decade. Temperature-adjusted data indicate that ozone pollution outside California has been reduced by 74 percent since 1985. Today only three urban areas outside California have serious or severe ozone nonattainment problems. Another 25 areas, which suffer only marginal to moderate smog problems, show every sign of achieving attainment within two to five years without the additional onerous regulatory controls spelled out in the 1990 amendments to the Clean Air Act. Any major ozone-smog problem in America is confined to the state of California, particularly the Los Angeles Basin. It is ridiculous to treat all of America as if it faced the problems California does and to impose on the entire nation massive economic costs that are ultimately unnecessary and counterproductive.

In pursuit of greater budgets, increased regulatory authority, and the political benefits of front-page coverage, the EPA has perpetrated a fraud on the American people. The agency's refusal to acknowledge that the 1988 data on ozone were an aberration and its failure to publicize preliminary 1991 data in a timely manner could cost the economy $26 billion a year. The result can only be continued economic stagnation, higher unemployment, and reduced international competitiveness. Three-quarters of the cost of the EPA's ozone nonattainment program is a total waste of money. Even under optimistic assumptions, the costs of the program outweigh any possible benefits by a factor of from 9 to 48.[32]

EPA administrator Reilly and the Air Office under William Rosenberg should be held accountable for present policies. When the EPA finally does release its official report for 1991, the game will be over. By publicizing the positive preliminary 1991 data now, the EPA would take the first step toward relieving the economy of unjustified economic burdens.

Notes

[1] Quoted in "EPA Report Reveals Ten-Year Emissions Cut in Hand with Economic Growth," Clean Air Report, March 14, 1991, p. 11.

[2] Environmental Protection Agency, Air Quality Criteria for Ozone and Other Photochemical Oxidants (Washington: EPA, August 1986), p. 1-154.

[3] The study upon which the current standard is based showed reversible physiological stress in adults engaging in heavy exercise at ozone concentrations above 0.15 ppm. See 44 Federal Register 8220, February 8, 1979. For an excellent summary of the most recent clinical studies of ozone exposure, see Kenneth Chilton and Anne Sholtz, Battling Smog: A Plan for Action, Formal Publication no. 93 (St. Louis: Center for the Study of American Business, Washington University, September 1989), pp. 7-14.

Although the American Lung Association, the Natural Resources Defense Council, the Environmental Defense Fund, and several states have petitioned the EPA to review the current ozone standard in light of the findings of two new studies, the overwhelming weight of scientific opinion supports the 0.12-ppm standard. See American Lung Association et al. v. U.S. EPA, petition to review NAAQS for ozone, filed in U.S. District Court for eastern New York, October 22, 1991. Such a review will take three to four years, at minimum, to complete. Given the ineffective nature of current VOC control policy, the marginal effectiveness of new strategies, and the rapidly diminishing number of ozone non attainment regions, a tighter NAAQS for ozone will not significantly improve public health. See Council on Environ mental Quality, Environmental Quality 1987-88, 18th and 19th annual reports (Washington: CEQ, June 1989), chap. 2: "Urban Air Quality."

[4] See EPA, August Update on Ozone Air Quality (Washington: EPA, September 1988). Normally, the EPA requires

that state and local agencies submit data on a quarterly basis to its 10 regional offices for quality assurance review. Those reports are then sent to the EPA's central data storage and retrieval system (AIRS). During the time I managed a parallel, industry-sponsored data base extracted from AIRS, the central AIRS data base was never complete until the July following the last year of data collection.

The EPA issues one formal annual report on emissions and air quality trends each year. The report is normally released about 15 months after the last year for which data are contained in the report. The EPA also issues official nonattainment reports from time to time. The preliminary data release of August 1988 was unique, although the author is fully aware that the EPA has gathered similar preliminary data in other years. The issue is that the agency failed to call attention to those data in the same time frame it did the alarming 1988 preliminary data.

[5] David Hawkins, senior NRDC scientist, NRDC Press Re lease, May 1989.

[6] K. Jones, L. Militana, and J. Martini, "Ozone Trend Analysis for Select Urban Areas in the Continental U.S.," Paper 89-3.6, presented at the Air and Waste Management Association annual meeting, Anaheim, California, 1989.

[7] See Committee on Tropospheric Ozone, Rethinking the Ozone Problem in Urban and Regional Air Pollution (Washing ton: National Academy of Sciences, December 1991); Council on Environmental Quality; and Jones, Militana, and Martini. Needless to say, there have been more sophisticated indicators developed by local agencies (but not the EPA) that may be more accurate, but the 90F statistic is readily available and can be applied nationwide.

[8] "Ozone Non-Attainment Areas Design Value Update," EPA Press Release, November 7, 1991.

[9] Council on Environmental Quality.

[10] William D. Fay, executive director of the National Clean Air Working Group, reports that he was politely but firmly put off when he asked for preliminary 1989 data.

[11] There is a strong case to be made that ozone nonattain ment data must be temperature adjusted in order to objectively assess progress in air quality. At the very least, most analysts suggest using a four-year window to determine nonattainment status, thus stabilizing the policy impact of aberrant years. See David Fairley and Charles Blanchard, "Rethinking the Ozone Standard," Journal of the Air and Waste Management Association 41, no. 7 (July 1991): 928-36.

[12] The 1991 ozone data presented herein have not been quality assured, as the EPA will undoubtedly point out. My 16 years of experience with air quality data analysis, however, lead me to believe that any deficiencies found in the 1991 data will have little if any impact on the conclusions that can be derived from preliminary analysis. Comparison of the official EPA report on 1990 ozone exceedances with my pre liminary data gathered for 1990 before the EPA's quality assurance review reveals only 13 unresolved discrepancies in the total data set for 114 urban areas. All of those dis crepancies are explained by the fact that the EPA used data from different monitors for its 1988 and 1990 reports. Thus, the EPA's claim that it cannot use the 1991 data immediately because of the lack of quality assurance is further undermined.

[13] The number of nonattainment areas should not be consid ered exact. The 1991 data are not fully quality assured, and there may have been exceedances in September in some cities. However, temperature adjustments would reduce the three-year averages for most midwestern and northeastern cities.

[14] Analysis of the 1989-91 data on days above 90F for several representative midwestern and northeastern cities shows averages above the long-term norm. Hence, if the exceedance rates were adjusted downward, several of the marginal nonattainment cities would be dropped from Table 2.

[15] Committee on Tropospheric Ozone, p. 4.

[16] Ibid.

[17] Estimates of the cost of advanced inspection and maintenance equipment range from $100,000 to $300,000 per inspection garage, as opposed to the typical $35,000 machine in widespread use today. Those costs will probably cut small- and medium-sized garages out of the inspection business simply because capital costs will be far too high to amortize in any realistic period of time. Since inspection services contribute between 20 and 80 percent of total busi ness to small garages, the removal of that market is likely to have a devastating impact on those businesses. See Matthew Wald, "Nearing Standards for Car Exhausts, EPA Faces Assault from All Sides," New York Times, October 20, 1991, p. A14; and "Repair Shops Fear the Costs of Proposed Smog Test, New York Times, October 20, 1991, p. A14.

[18] Any construction activity that results in other than deminimis increases in ozone precursors must not only satisfy technology standards reflecting LAER but must also provide offsets representing emission reductions from other sources. Those offsets are 1.1:1 in marginal areas, 1.15:1 in moderate areas, 1.2:1 in serious areas, 1.3:1 in severe areas, and 1.5:1 in extreme areas. Many industry sources fear that emissions available for offsets will quickly dry up under a regime of strict regulation, stifling economic growth. The administrative procedures necessary to obtain a new source review license will also prove time consuming, necessitating serious delays in operational changes that could seriously harm economic competitiveness. See John Quarles and William Lewis, The New Clean Air Act: A Guide to the Clean Air Pro gram as Amended in 1990 (Washington: Morgan, Lewis & Bockius, 1990), pp. 22-23.

[19] The Petroleum Marketers Association of America estimates that emissions recovery devices cost about $2,200 per pump, imposing a $40,000 capital cost on an 18-nozzle service station. Annual maintenance costs are also expected to average $6,000 to $9,000. Given the razor-thin margin of profit at many service stations--particularly independent stations--many firms will probably be pushed out of business by the mandates. When Stage II controls were mandated in four counties in the St. Louis area, for example, 100 of the 900 retail gasoline outlets closed rather than install the expensive Stage II equipment. See "Automakers Feud with Oil Industry over Costs of At-the-Pump Controls," Clean Air Report, October 10, 1991, p. 16; and "Comments of the Na tional Association of Convenience Stores and the Society of Independent Gasoline Marketers of America," EPA Docket A-87- 11, October 25, 1991, p. 9.

[20] The federal clean fuels program addresses both vehicle fleets and gasoline composition. Cars and trucks in private fleets of more than 10 vehicles must be powered by fuels resulting in a 60 to 70 percent reduction in emissions. Those clean fuels are defined to include methanol, ethanol, mixtures of those fuels with gasoline, reformulated gaso line, natural gas, liquified petroleum gas, and electricity. The percentage of vehicles in each fleet that must meet the stricter standards increases on a sliding scale. Ultimate ly, 70 percent of new fleet cars and 50 percent of heavy trucks must be clean fueled. Even excluding the heavy up- front capital costs necessary to implement the program, the combined fuel and vehicle cost of alternative fuels is oner ous. See W. David Montgomery and James Sweeney, Mandates for Alternative Fuels: A Policy Analysis, Report no. 868.00, prepared for the American Petroleum Institute (Cambridge, Mass.: Charles River Associates), August 1991.

Gasoline sold at the pump must be reformulated by 1995 to increase oxygen content while reducing aromatic hydrocar bons, benzene, VOCs, and other miscellaneous hazardous air pollutants. Fuel costs will consequently increase by 3.5 to 15 cents per gallon. See Alan Kovski, "Reformulation Cost Estimates Reflect Wide Fluctuation," Oil Daily, September 11, 1991, p. 1. Regions that are still out of attain- ment after they comply with the mandates will face even more onerous fuel reformulation standards, which will increase gasoline prices by 16 to 25 cents per gallon. See "Price of Gasoline Reformulation Seen Affecting Energy and Public Policy," New Fuels Report, August 26, 1991, p. 5.

To produce the new fuels, refineries will be forced to spend $23 billion to $70 billion on capital improvements over the next five to eight years. See Suzie Parker, "Kellogg Study Puts Reformulation Price Tag at $30 Billion," Oil Daily, November 26, 1991, p. 3. Nearly half of Ameri ca's refineries are expected to go out of business as a result of those and other costs mandated by the 1990 amend ments to the Clean Air Act. Jobs, capital, and economic growth will be exported out of the country. See Matthew Wald, "Refiners Are Pushed to Clean Fuel," New York Times, May 22, 1990, p. D1; Peter Fusaro, "Clean Fuel Rules Put West Coast Refiners on Endangered List," Oil Daily, October 21, 1991, p. B3; "Oil Industry, Agriculture Potentially Hit Hard by California Fuel Plan," Oil Daily, September 13, 1991, p. 3; Suzie Parker, "Gasoline Supply to Shrink 5-10 Percent by Late '90s," Oil Daily, October 23, 1991, p. 4; and "Independent Refiners: EPA Clean Gas Deal Will Close Some Small Companies," Inside EPA, August 23, 1991, p. 12.

[21] Recent U.S. district court rulings are pressing the EPA and the states to account for the emissions effect of growth in vehicle miles traveled attributable to building, upgrad ing, or expanding urban roads. If they hold needed road capacity hostage to ozone nonattainment, affected cities will find economic growth nearly impossible. Moreover, mandated changes in social behavior and reductions in allowed vehicle travel could well result from aggressive en forcement of that provision. See "Court Rulings Force EPA, States to Account for Effect of Growth on Emissions," Clean Air Report, July 18, 1991, p. 9; "States, Environmentalists Square Off on Stringency of Exhaust Offsets," Clean Air Report, August 29, 1991; and "Restrictions on Vehicle Miles Key to Meeting Deadlines in Congested Areas," Clean Air Report, October 10, 1991, p. 7.

[22] Alan Krupnick and Paul Portney, "Controlling Urban Air Pollution: A Benefit-Cost Assessment," Science 252 (April 1991): 522.

[23] For a discussion of why most economic cost estimates of regulation underrepresent true costs by at least 50 percent, see Michael Hazilla and Raymond Kopp, "Social Cost of Envi ronmental Quality Regulation: A General Equilibrium Analy sis," Journal of Political Economy 98, no. 4 (1990): 853-73.

[24] Chilton and Sholtz; Committee on Tropospheric Ozone.

[25] Seattle test results for July 1 through December 31, 1988. Washington State Department of Ecology, July 1989.

[26] EPA, Federal Certification Test Results for 1991 Model Year (Washington: EPA, April 1991).

[27] James Kinnear, "Democracy and the Clean Air Act: Why State Legislators Must Take a Role," American Legislative Exchange Council's ALEC Forum 1, no. 1 (November 1991): 1.

[28] Chilton and Sholtz.

[29] Personal communication with mobile sources emission control staff of General Motors, 1991.

[30] Krupnick and Portney.

[31] Suzie Parker, "Some Top U.S. Scientists Question Bene fits of Widespread MTBE Use," Oil Daily, October 16, 1991, p. B3.

[32] Krupnick and Portney.