

104

CLEAN AIR ACT AMENDMENTS

Y 4. C 73/8: 104-55

Clean Air Act Amendments, Serial No. **104-55**

OF THE
SUBCOMMITTEE ON
OVERSIGHT AND INVESTIGATIONS
AND THE
SUBCOMMITTEE ON
HEALTH AND ENVIRONMENT
OF THE
COMMITTEE ON COMMERCE
HOUSE OF REPRESENTATIVES
ONE HUNDRED FOURTH CONGRESS

FIRST SESSION

ON

TITLE I—NATIONAL AMBIENT AIR QUALITY STANDARDS

NOVEMBER 9, 1995

Serial No. 104-55

Printed for the use of the Committee on Commerce



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CLEAN AIR ACT AMENDMENTS

Title I—National Ambient Air Quality Standards

THURSDAY, NOVEMBER 9, 1995

HOUSE OF REPRESENTATIVES,
COMMITTEE ON COMMERCE,
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS,
AND THE SUBCOMMITTEE ON HEALTH AND ENVIRONMENT,
Washington, DC.

The subcommittees met, pursuant to notice, at 10:04 a.m., Hon. Joe Barton (chairman, Subcommittee on Oversight and Investigations) and Hon. Michael Bilirakis (chairman, Subcommittee on Health and Environment), presiding.

Members present: Representatives Barton, Bilirakis, Burr, Bilbray, Deutsch, Eshoo, Franks, Hall, Hastert, Klink, Stearns, and Waxman.

Staff present: Bob Meyers, majority counsel, and Steven Sayle, majority counsel.

Mr. BILIRAKIS. The hearing will come to order. I want to welcome our witnesses and the assembled audience to this first joint hearing of the Health and Environment Subcommittee and the Oversight and Investigations Subcommittee on implementation of the 1990 Clean Air Act Amendments.

Our hearing today is focused on Title I of the 1990 Amendments. This title contains provisions related to the attainment of ambient air quality standards. Perhaps most importantly, the title established a new legislative regime for attainment of the Federal ozone standard.

I look forward to receiving the testimony of our State government witnesses, our panel of scientific experts, and, of course, the remarks of EPA Assistant Administrator for Air and Radiation, Mary Nichols. I also want to commend my colleague, Mr. Barton, on moving forward with this hearing and the previous nine hearings on the Clean Air Act which have been held by the Oversight and Investigations Subcommittee. I believe the hearings have served an important role in preparing the Commerce Committee to make a comprehensive assessment of the impact of the 1990 Amendments.

While we are presently considering only one title of the 1990 Amendments, today's hearing will also help to prepare us for the transition from oversight to legislative consideration of the Clean Air Act. In this regard, the combined hearing record of Oversight and Investigations Subcommittee points to a number of areas which do require further review and possible redress through the legislative process. While we have not established a firm deadline for any activity within the Health and Environment Subcommittee,

let me assure you that the Clean Air Act remains a prime concern and there is ample time in this Congress to accommodate almost any legislative endeavor.

On this matter, let me first say that I am aware of EPA's contention that the Clean Air Act should not be reopened under any circumstance, despite any flaws that may exist in implementation. Simply put, I don't consider that view persuasive. It's like saying that if you find a leaky roof in the spring, you have to wait until the fall to fix it. For example, despite written indications that the agency would produce a notice of availability regarding section 112(g) of the Clean Air Act by September 15, to date no notice has been forthcoming.

Deficiencies in revisions, and we all know this, to inspection and maintenance rules have also been noted by several States and some States have withdrawn centralized programs in a modern revival, I think, of the Whiskey Rebellion.

Title V remains a moving target well over a year after major revisions were proposed, withdrawn, a white paper issued and another supplemental proposal offered in August of this year. And there are other less visible signs of problems in both statutory interpretation and administrative implementation.

Federal rules and regulations must make sense or they will be ineffective in achieving their goals, no matter how salutary. The centralized inspection and maintenance program designed by EPA to help achieve the ambient air quality standards outlined in Title I may be the most pertinent example of overreaching. With regard to my previous historical analogy and the Whiskey Rebellion, I might remind EPA of Thomas Jefferson's words to George Washington on the eve of the rebellion in 1794, when Jefferson wrote that the underlying revenue measure was unwise for it committed "the authority of the government in parts where resistance is most probable and coercion least practicable." Although less noted, I also think it's highly pertinent to our committee's review of the Clean Air Act that EPA has recently lost a number of court cases based on its interpretations of the law. In a National Mining Association case this past August, for example, the U.S. Court of Appeals for the District of Columbia stated that, and I quote them, "EPA would have us accept a rather strained interpretation of the statute based on what appears to be only its unwillingness to evaluate any State or local controls that are not Federalized." In an April 1994 case regarding EPA's ability to create a 30 percent set-aside for ethanol-based reformulated gas, the same court chastised EPA for its overly broad reading of its authority under the Act. Citing another opinion, the court stated that EPA's interpretation of the Clean Air Act is, and, again, I quote, "both flatly unfaithful to the principles of administrative law and refuted by precedent." In other cases involving the Clean Air Act, EPA has been criticized for acting in a "high-handed and conclusory manner"—those are the court's words—for improper interpretations of the law in the face of the "unambiguous" statutory language and even for, again, the quotes words, a "bizarre departure from existing practice, in complete defiance of the plain terms of the statutory criteria." So, thus, despite whatever good intentions we may impart to the agency from this committee dias, it appears that many sections of the Clean Air Act

have been subject to a meandering stream of regulation which at times has overflowed its banks, and, quite frankly, I think that EPA, even though they may not say so, would like to see us make a few changes because it would probably be helpful to them.

Regulations have twisted around deadline suits, judicial remands from the U.S. Court of Appeals, and re-proposals of over-complicated and flawed regulations. Fully 5 years after the Clean Air Act was signed into law, regulatory uncertainty pervades the implementation effort.

If EPA's position is that the Act should not be reopened and that it can indeed be fixed administratively, it must realistically have the ability to resolve ongoing concerns. Flawed regulations and reversals by the judicial system do not speak well of such ability. Thus, we must ask whether the statutory provisions of the Act are sufficient to channel the regulatory current or whether new banks and levees must be built.

I look forward to this hearing, quite frankly, although it may not sound like it, with a very open mind, into the committee's further review of the 1990 Amendments. At this point, we would recognize the ranking member of Health and Environment Subcommittee and member of the Oversight and Investigations Subcommittee, also, Mr. Waxman.

Mr. WAXMAN. Thank you very much, Mr. Chairman. I'm pleased you didn't execute the accused before the trial.

Mr. BILIRAKIS. You know me better than that.

Mr. WAXMAN. I'm becoming increasingly dismayed by the approach taken in these oversight hearings on clean air. They seem completely out of touch with what the American people want, which is more environmental protection, not less.

There is an editorial in today's USA Today that is very instructive. It's entitled, "Attack on Clean Air Law Crashes into the Facts." According to this editorial, the Clean Air Act is working. Let me read some excerpts. "Pollution is way down and the public knows it. The number of cities that fail Federal ozone levels has fallen by 50 percent since 1990, 63 percent of carbon monoxide is measured instead. The result, 50 million people breathe better air." Next quote, "Supporters sometimes try to hide their assault on air and water laws behind more popular issues of regulatory reform—costs, excessive burden, States' rights. But complying with clean air rules, for instance, has cost less than half what industry predicted in 1990 and which State will set the standards for resources it shares with five others." Next quote, "The fundamental principles of clean air and water don't deserve to be shanghaied, nor do the laws that honor and advance them. As a matter of need, popularity and effectiveness, these laws work." Unfortunately, these clean air hearings are part of the assault on our Nation's environmental laws that are the subject of the USA Today editorial and that the American public has overwhelmingly rejected. For instance, this committee held hearings in June on the problem of air toxics. Instead of focusing on the death and disease that toxic emissions can cause, the purpose of the hearings was to give the oil industry and the cement industry a chance to complain about how they were over-regulated.

As a direct consequence of those hearings, special interest riders were inserted into the EPA appropriations bill that prevent the EPA from controlling toxic emissions from oil refineries and cement kilns burning hazardous waste, and the chairman of these hearings supported these provisions.

Today's hearing is more of the same. The witnesses today aren't going to talk about how to strengthen the Clean Air Act. They're going to talk about how it can be torn apart for the benefit of special interests. One witness, for instance, will argue that we should eliminate controls on nitrogen oxide emissions which are produced by power plants and industrial facilities. Another witness will say that we should base air quality standards on costs to industry, not the health of those who have to breathe the polluted air.

These witnesses are entitled to their views, but the members of the committee and the public are also entitled to more than one side of the story. We should be hearing, as well, from individual citizens whose lives are affected by polluted air and from doctors and other health experts who can describe the serious health risks they face.

It's for that reason that I strongly believe we need more than this one hearing today for the subcommittee to have a complete record of views and other information upon which we reach our conclusions, and I hope to be working with the two chairmen of the subcommittees to have an additional hearing so we can receive a more complete picture.

Mr. Chairman, we should be here today to praise the Clean Air Act, not to bury it. By any objective measure, we have made enormous strides under the Act in reducing air pollution and the economic costs have been much lower than predicted by industry. Given this record of success, our focus should be on maintaining health protections provided by the Clean Air Act, not weakening them because some special interest thinks they cost too much.

I appreciate the fact that we're hearing from these witnesses today. I want to get their opinions and I plan, as I have in every other hearing that we've held, to participate fully and to listen to what they have to say and to take into consideration the views that will be expressed. I would hope that we'll have an opportunity for the members who may have a different point of view to hear views with which they may not initially agree, but may be influenced after hearing and discussion of those relevant matters that ought to be before us in any hearing that's fair and complete.

I thank you for this opportunity for an opening statement.

Mr. BILIRAKIS. I thank the gentleman. Mr. Barton.

Mr. BARTON. Thank the chairman of the Health and Environment Subcommittee. I'm glad to co-chair the 10th hearing, and I want to emphasize the 10th hearing that we've held on the Clean Air Act this year. After listening to my good friend from California's opening statement, I'm reminded of a football game where there is a close play and 60,000 people see it one way and the referee sees it another way. People saw the same activity, they interpreted it differently.

The intent of the Oversight and Investigations Subcommittee and the intent of the Health and Environment Subcommittee in this Congress is to do a complete and comprehensive review of the

Clean Air Act and, once we've gone through the hearing process, decide what changes, if any, need to be made in the Act. We are doing that, quite frankly, after consultation both with the chairman of the committee this year, Tom Bliley, and the chairman of the committee and the subcommittee chairman of this subcommittee last year, the Honorable John Dingell of Michigan.

We have given the minority every opportunity to present their witnesses on the hearings and, in most of those cases, accepted every witness that they have offered. So we are not in business to arrive at a preconceived conclusion. We are in business to determine what the facts are. And as my good friend from California pointed out, when you look at the objective data that's being compiled, there is no question that we are making progress on the environment.

The EPA just this week released data that show in many of the areas that were in non-attainment for ozone in 1990, significant numbers of those areas now in attainment and that by any credible measurement of valid data, our air quality is improving all across the country. That is a tribute to the work of Congressman Waxman and Congressman Dingell and all the others that had helped prepare the Clean Air Act Amendments in 1990 or 1991 and before that, 1977.

It doesn't mean, though, that the Act is perfect. And, quite frankly, many of the more stringent provisions of those Amendments have not yet kicked in and that is one of the purposes of these hearings, is to see, before we continue too much further along the trail, if there might be some areas that we can come up with new ways, new flexibility, without changing the basic parameters of the Act. That's what a hearing is supposed to be about.

I can assure everybody in this room and everybody that's interested in air quality that if it were the intent of the new Republican majority to repeal the Act or to gut the Act or to significantly change the Act without even knowing what the facts were, we could have done that 6 months ago. But that's not what we're about.

Now, today we're going to look at Title I of the Clean Air Act that deals with the national ambient air quality standards. We've got excellent qualified witnesses, ending up with Ms. Mary Nichols, who has testified, I think, in almost every one of our other hearings so far this year on the Clean Air Act, and we're going to try to define what the issues are, what the problems are, what the possible improvements are, and we'll find out what the Clinton Administration's issue is on this title of the Act when Ms. Nichols testifies as our last witness.

So we're about finding information and finding facts. We're not about trying to railroad anything. I guarantee you that as long as I'm chairman of the Oversight and Investigations, we'll be a fact-finding committee. And I assure you that in my conversation with Chairman Bilirakis, that he is not at all interested in doing anything but coming forward with consensus legislation that improves the chances for continuing to maintain air quality and hopefully to improve it in the future.

Mr. Chairman, with that, I will submit my formal statement for the record.

[The prepared statement of Hon. Joe Barton follows:]

PREPARED STATEMENT OF HON. JOE BARTON, CHAIRMAN, SUBCOMMITTEE ON
OVERSIGHT AND INVESTIGATIONS

Today we are holding the tenth in a series of hearings on the Clean Air Act Amendments. As the audience may know, the nine previous hearings have been conducted solely by the Subcommittee on Oversight and Investigations. Today we are having a joint hearing between the Health and Environment Subcommittee and the Oversight and Investigations Subcommittee. Let me say to my good friend, the Chairman of the Health and Environment Subcommittee, Mike Bilirakis, that I welcome this joint hearing, and look forward to working with him, both as a Subcommittee Chairman, and as a member of the Health and Environment Subcommittee.

Today we want to focus broadly on provisions within Title I of the Clean Air Act that are aimed at reducing ozone levels, and, more specifically, on how ozone standards are developed, and how compliance with those standards is determined.

First the good news. Overall concentrations of ozone have been declining for approximately 15 or more years. EPA's own analysis indicates that levels in the past ten years have declined approximately 12 percent. Dr. Kay Jones, who will testify on our second panel, states that if California is excluded, there has been a 50 percent reduction in the total violations of the ozone standard in the last 10 years. And many expect these trends to continue.

Despite this good news for clean air, some areas are still fighting an uphill battle towards attainment. Oftentimes areas may not be able to demonstrate attainment within their allotted time period, even when showing significant improvement. Ironically, the Clean Air Act, as currently structured, would reward this improvement that is short of attainment by bumping the area up to a higher, more stringent classification. Common sense would allow areas to be reclassified downward when great gains toward attainment have been achieved.

Another area this hearing will focus on is the level and form of the ozone standard. The Clean Air Act requires that the ozone standard be set at a level that protects public health and provides an ample margin of safety. The Act does not permit EPA to consider cost when setting this standard. Today we will hear testimony that the cost of achieving attainment should be a consideration when promulgating the standard.

There is also concern that the method by which an area is determined to be in compliance is flawed. Currently a small subset of ozone values determine whether an area is in compliance, while the other 99 percent of the monitored ozone values are ignored. This is not only bad science, but it is costly to areas that must then adopt emission controls as a result.

Let me close by saying we are all for clean air. What we are talking about now is how to improve air quality in the most efficient way possible.

Mr. BILIRAKIS. Without objection. Mr. Deutsch.

Mr. DEUTSCH. Thank you, Mr. Chairman. This is my first hearing as a ranking member of the Subcommittee on Oversight and Investigations. I look forward to working with Chairman Barton and the other members of his subcommittee in the months ahead.

I understand that the subcommittee has spent much time examining the implementation of the Clean Air Act and that the EPA is doing much to bring flexibility and common sense to its work. I also understand there has been much discussion by some of the Republican leadership about doing away with large portions of the Act. Frankly, the Act has been a clear and dramatic success. It would be foolhardy to jeopardize the progress to date.

I and a great majority of my constituents believe strongly that our environment must be protected for our economy, for our health and for future generations. Without question, the Clean Air Act has been one of our greatest achievements toward protecting and preserving our fragile environment. The Act has dramatically reduced lead emissions, urban smog, carbon monoxide pollution and toxic emission, saving tens of millions of lives from brain damage and

cancer birth defects, reproductive disorders, and other serious human health effects.

Effective implementation of our environmental statutes is critical to protecting the health of our citizens. After all, the health of all of our citizens, whether rich or poor, young or old, well or sick, is the primary concern, not making it easier or cheaper for companies to pollute air we all share. We don't want to put unnecessary costs on industry and we should keep bureaucratic red tape to a minimum, but we must protect public health.

As we examine implementation of Title I of the Clean Air Act, we should keep this in mind.

Mr. BILIRAKIS. I thank the gentleman.

Mr. Stearns.

Mr. STEARNS. Good morning, Mr. Chairman, and thank you and Chairman Barton for your decision to hold these hearings on the implementation and enforcement of the Clean Air Act Amendments of 1990. I look forward to open and frank debate.

Very few of those involved in the debate would argue with the principles on which the Clean Air Act are based. Certainly, the Title I non-attainment provisions of the Act are meant only to provide our country with a cleaner and safer environment. This, I think everyone will agree, is a laudable goal. However, the implementation of the Act remains problematic.

It is timely that we hold hearings, that we explore fully and completely this issue and work together to discover any mistakes that may have been made and that we learn from those mistakes and try possibly to correct them. But we must also work to discover what about the Act is good and helpful and beneficial.

I am confident that through this hearing process and through meaningful deliberations, we can begin the process of clarifying and altering the Clean Air Act so that we can implement the most reasoned environment act policy possible. These hearings are an important first step in ensuring that the right steps are taken in regard to the amendment and amending to the Act. It is essential that we look for the appropriate balance, guaranteeing that sound science, economic benefits and costs, and the environmental coexistence within the Clear Air Act occur.

Certainly, there is a balance that can be discovered to infuse this act with common sense, providing and sound and sage environmental policy for our Nation. So, again, I commend both chairmen for their diligence in this matter and I welcome the distinguished members of the panel and I look forward to hearing their testimony.

Thank you, Mr. Chairman.

Mr. BILIRAKIS. And I thank the gentleman. The gentleman from western Pennsylvania, Mr. Klink.

Mr. KLINK. Thank you very much, Mr. Chairman. I don't have a formal statement, just a few brief comments that I'd like to make. I know that, first of all, we've worked in the Oversight and Investigations Subcommittee on this topic and I appreciate Chairman Barton's concern. And I know that Chairman Bilirakis knows and has a great deal of thoughts on this issue because he, like I, have seen the yellow skies over Clairton, Pennsylvania, the result of the coke works. And we know when there were people around

the Pittsburgh area and towns along the Ohio and the Mohn and the Allegheny River, who used to have to go outside and sweep their lawns, who couldn't hang laundry out because it got dirtier rather than cleaner. This was back in the days when people didn't have—I mean, the only kind of clothes dryer you had was solar, with a piece of rope tied onto two poles.

On the other hand, we have worked extremely hard to clean up the air. We have had a tremendous loss of jobs in our region as a result of companies making those kind of investments and not being able to make investments in capital improvements and staying competitive.

We understand that there is a happy medium to all of this. In western Pennsylvania particularly, really across the entire State, but in western Pennsylvania, one of the hottest issues has been this new centralized emission testing and the push by EPA to get us into this program. The people are not accepting that. We're not accepting that. Our former colleague, Tom Ridge, who is now Governor of the State of Pennsylvania, has come up with what I think is a much more reasonable plan, which will, I think, clean the air. And I know that discussions have been going on with EPA and I want those who are present to understand that Governor Ridge, a Republican, has support not only from the Republican side, but from the Democratic Members of the Congressional delegation from the State, as well as many Democratic State senators and State representatives.

That said, we are also concerned not only about the mobile source pollution, but the stationary source pollution. It doesn't make any sense to us that the Pittsburgh region would be deemed to be in non-attainment, when, if you move further to the west, where, last I knew in my career as a TV weather forecaster many years ago, the weather always moved from the west to the east and so much of the air that we were breathing in western Pennsylvania came from Ohio and Indiana and Illinois and yet they don't have the same rules that we have Pennsylvania and that causes some problems.

So I look forward to being able to continue to wrestle with these issues in this joint committee hearing, as we have in the Oversight and Investigation. I hope we get some answers because people's health depends on it, as well as their livelihood and the ability of companies and individuals to be able to make money and to contribute to the economy, and we'll look to striking that happy medium. I thank the chairman, both chairmen, for holding this hearing.

Mr. BILIRAKIS. And I thank the gentleman. He used the word "balance" and that really, I think, says it all. And I mean that. My old home town that he refers to, the air is clean there now, but you don't see too many people in the streets, either. The place is virtually a ghost town and I'm sure that Mr. Waxman and those others who have done such a very good job on this certainly didn't intend that. So balance is so very, very important, too.

The gentlelady from California for an opening statement.

Ms. ESHOO. Thank you, Mr. Chairman, for this hearing. I don't have a formal opening statement. I want to thank you for holding

the hearing. Before I came to the Congress, I did a lot of work on cleaning up the air in the Bay Area.

I served for many years on the Bay Area Air District Board and was elected President of that Board, just as I was elected to Congress. So I'm familiar with both the Federal law and implementation in the State. What I always look for is a good, sound, fair law that can be implemented and achieve really what the people in the community want—they want to be able to breathe clean air. So anything that we can do, where we can improve on what I just said, I look forward to hearing experts giving us their take on it. And, again, Mr. Chairman, thank you for having the hearing.

Mr. BILIRAKIS. If there are no other—

Mr. WAXMAN. Mr. Chairman, may we have unanimous consent that other members may have an opportunity to insert a statement in the record?

Mr. BARTON. Without objection, so ordered.

[The prepared statement of Hon. John D. Dingell follows:]

PREPARED STATEMENT OF HON. JOHN D. DINGELL, A REPRESENTATIVE IN CONGRESS
FROM THE STATE OF MICHIGAN

Thank you, Mr. Chairman. Back in February, when the Oversight Subcommittee started this series of hearings on the implementation of the Clean Air Act, I said I wanted to take a sober and serious look at both the progress and the problems of the Clean Air Act before taking any precipitous actions. The Subcommittee has taken such a look at many of the implementation problems, and today's hearing will do so as well. For that I commend Mr. Barton, and I commend Mr. Bilirakis for joining this effort. I do hope, however, that at some early point we can examine the other part that I spoke of in February—the progress under the Clean Air Act. The health benefits are worth our careful look.

There is little doubt our air is cleaner today. On that most agree. But there is disagreement as to why, as to what the implications are, and as to how best to sustain that progress. We need to know more, particularly where there is much scientific uncertainty and much economic cost. It is most unfortunate that the Republican leadership decided to kill the Office of Technology Assessment this year, just at the time we most needed its expert and nonpartisan scientific advice.

We do know, however, that the EPA under Ms. Browner has taken many steps to undo the regulatory excesses that occurred under the previous Administration. Reality seems to be intruding into much of EPA decisionmaking, although I continue to have reservations about the Northeast Ozone Transport Region rule and other matters.

We also know that the blunderbuss approach exhibited in the ill-fated Republican riders to the appropriations bill is not the answer to implementation concerns. The kind of careful and comprehensive review undertaken by the Oversight Subcommittee this year and in years past is needed to avoid precipitous action based on unreliable anecdotes. Today's hearing is part of that review, and I look forward to hearing from the witnesses.

Mr. BARTON. It's the tradition of the Oversight and Investigations Subcommittee to request that all witnesses who testify do so under oath. Congressman Bilirakis, chairman of Health and Environment, indicates that he wishes to continue that tradition in these joint hearings.

So our first panel of witnesses is at the table. Do either of you gentlemen have a problem with testifying under oath?

[Chorus of nays.]

Mr. BARTON. You also need to know that you also have the right to be advised by counsel during your testimony. Do either of you wish to so be advised?

[Chorus of nays.]

Mr. BARTON. Then would both of you please rise and raise your right hand?

[Witnesses sworn.]

Mr. BILIRAKIS. Be seated. Now that we've gone through that process. Our first panel consists of the Honorable R.B. Ralph Marquez, Commissioner of Texas Natural Resource Conservation Commission, and Mr. Dennis Drake, Chief of Air Quality Division of the Michigan Department of Environmental Quality.

Mr. Marquez, why don't we start off with you. You have 5 minutes, sir. Your written statement is a part of the record. I'd appreciate if you would both try to stay as close to the 5 minutes as you possibly can.

Mr. BARTON. Mr. Chairman, could I, before he starts, since Mr. Marquez is from my State, could I give him a little more of an introduction?

Mr. BILIRAKIS. By all means.

Mr. BARTON. He is from Texas City. He was appointed by Governor George Bush on May 1, 1995 and was confirmed by the Texas Senate on May 5, 1995. He'll serve until August 1999. He's been on several advisory committees and task forces on environmental issues in Texas and he's a registered professional engineer, as I am. So I'm proud to have an engineer before this committee.

He's been Vice Chair of the Texas Chemical Council Environmental Committee. He's been a board member on the Gulf Coast Water Authority and he served on the State of Texas Waste Reduction Advisory Committee. He is an outstanding engineer, has a degree from the University of Texas, and it pains me to say that since I went to Texas A&M, and he has a master's degree from the University of Houston.

We're glad that you're here to testify.

Mr. BILIRAKIS. And I thank the gentleman. Welcome to both of you, gentlemen, and we'll start off with you, Mr. Marquez.

**TESTIMONY OF HON. R.B. RALPH MARQUEZ, COMMISSIONER,
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION;
AND, DENNIS DRAKE, CHIEF OF AIR QUALITY DIVISION,
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

Mr. MARQUEZ. Chairmen Barton and Bilirakis, members of the subcommittees, my name is Ralph Marquez, currently serving as Commissioner of the Texas Natural Resources Conservation Commission, TNRCC for short. I appreciate the opportunity to present this testimony to your subcommittees.

Let me make it clear at the beginning that we realize that much progress has been made on the reduction of ozone levels and we believe that we must preserve that progress and that we must continue on the path of continuous improvement. We in Texas have been regulating emissions of the compounds that contribute to ozone formation for more than 20 years.

While these regulatory programs have resulted in downward trends in measured levels of ozone, we have not been able to bring all of our areas into compliance with the current standard, in spite of expenditures of a tremendous amount of public and private resources.

We believe it's time to reevaluate our current approach to reducing the levels of ozone and to make appropriate adjustments. I would like to address four points. First, the use of ozone as a surrogate for hazardous pollutants. Having worked in the pollution control area for over 20 years, I can recall that the original reasons for the U.S. Environmental Protection Agency to focus attention on ozone control in the early 1970's was to address the Los Angeles smog, but it soon became a mechanism to reduce specific chemicals which, at that time, EPA did not have the authority to control.

The argument at that time was that even though reductions in volatile organic compounds, or VOCs, may not result in the anticipated reduction in ozone levels, it is still a step in the right direction because it will reduce dangerous air pollutants. With the authority of Title III of the Federal Clean Air Act, as amended in 1990, EPA no longer needs to rely on ozone control as a surrogate for the control of hazardous pollutants. While the VOC reduction strategy has lowered the ozone levels, the hidden agenda to use ozone as a surrogate should be discontinued.

The second point is the uncertainty of ozone causes. The current ozone control strategy is based on many theories that are themselves derived using assumptions and each have certain margins of error. These assumptions, with their recognized margins of error, are built one upon the other, thereby multiplying the margin of error several times, which results in strategies that are inherently uncertain.

We in the technical community seem to address ozone control as a discipline with a high degree of certainty, as if the mathematical model results are an absolute truth. We know that this is not so.

An indication that we're not as sure as we sound is EPA's shifting strategies. First, EPA focused on VOC controls and then switched to nitrogen oxide control programs. EPA now seems to be shifting again to control very small particulate matter, known as PM2.5. We are making progress and we must continue to make progress toward lowering ozone levels. But with the history of shifting strategies, I do not believe that EPA can really guarantee whether any or even all of their required control strategies will bring the Nation's non-attainment areas into attainment.

The cumulative costs of implementing these shifting strategies continues to climb. We must be more cautious than in the past. We cannot continue to pursue new strategies without regard to the cost to the Nation or the health benefits.

No. 3 is the issue of the revision of the standard. There has been interest raised as to whether the level of the ozone standard and how compliance with that standard is evaluated should be revised. The current standard is set to be protective of even the most sensitive members of the population and vast areas of States are subjected to the rigorous control requirements of the Clean Air Act, sometimes on the basis of one single monitoring site exceeding that standard.

This approach has resulted in tremendous economic burdens being placed on large areas of the country, when only a limited number of monitors indicate high ozone levels. Additional monitoring in other areas is needed to help understand the creation and movement of ozone, but the current standard and EPA monitoring

policy discourages the placement of additional monitors due to the serious consequences that an area can suffer on the basis of as little as four 1 hour measurements above the standard over a 3-year period.

Mr. BILIRAKIS. Please summarize, if you would, sir. During the questioning, I'm sure you'll have an opportunity to get an awful lot of your points across.

Mr. MARQUEZ. Thank you, sir. The fourth item I'd like to—before I go on. As far as the revised standard, I have submitted a proposal from Texas, a recommendation from Texas, that I will be glad to discuss, at your pleasure.

The fourth item I'd like to make is that we must get outside of the current ozone philosophical box and reassess our air pollution priorities. We have spent tremendous resources for progress in ozone level reductions and it's a question of how much benefit we will receive in the future by continuing on the path we are on.

After all, ozone is not a poison or a carcinogen. It is a relatively benign pollutant compared with other environmental risks.

I thank you for the opportunity to present these comments and we'll try to answer any questions you may have.

[The prepared testimony of Hon. R.B. Ralph Marquez follows:]

PREPARED STATEMENT OF R.B. (RALPH) MARQUEZ, COMMISSIONER, TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Chairmen Barton and Bilirakis, Members of the subcommittees, my name is Ralph Marquez and I am currently serving as a Commissioner on the Texas Natural Resource Conservation Commission (TNRCC). I sincerely appreciate the opportunity to present the following testimony to your subcommittees on the subject of the Implementation and Enforcement of the Clean Air Act Amendments of 1990. We in Texas have been regulating emissions of the compounds that contribute to ozone formation for more than 20 years. While these regulatory programs have resulted in some downward trends in measured levels of ozone, we have not been able to bring all of our areas into compliance with the current standard in spite of the expenditure of tremendous amounts of resources and capital used to address this problem by the state, regulated community, and public. We believe it is time to re-evaluate our current approach to reducing the levels of ozone and make appropriate adjustments. Therefore, I would like to address the four following points:

1. Ozone As Surrogate For Hazardous Pollutants

Having worked in the pollution control area for over 20 years in my previous career and current position, I can recall that one of the original reasons the U.S. Environmental Protection Agency (EPA) focused attention on ozone control in the early 1970's was to address the Los Angeles smog but it soon became a mechanism to reduce specific chemicals which at that time EPA did not have the authority to control. The argument at that time was that even though reductions in volatile organic compounds (VOC) may not result in the anticipated reduction in ozone levels, it is still a step in the right direction because it will reduce dangerous air pollutants. With the authority of Title III of the Federal Clean Air Act Amendments of 1990, EPA no longer needs to rely on ozone control as a surrogate for control of hazardous pollutants. While the VOC reduction strategy has lowered the ozone levels, the hidden agenda to use ozone as a surrogate should be discontinued.

2. The Uncertainty Of Ozone Causes

The current ozone control strategy is based on many theories that are themselves derived using assumptions and each have certain margins of error. These assumptions with their recognized margins of error are built one upon the other thereby multiplying the margin of error several times which results in control strategies that are inherently uncertain. We in the technical community seem to address ozone control as a discipline with a high degree of certainty as if the mathematical model results are an absolute truth. We know that this is not so.

An indication that we are not as sure as we sound is EPA's shifting strategies. First, they focused on VOC controls and then nitrogen oxides (NO_x) control pro-

grams. EPA now seems to be shifting again to control of very small particulate matter (PM2.5). We are making progress and we must continue to work toward lowering ozone levels. But with the history of shifting strategies, I do not believe EPA can really guarantee whether any, or even all, of their required control strategies will bring the nation's nonattainment areas into attainment. The cumulative costs of implementing these shifting strategies continue to climb. We must be more cautious than in the past. We cannot continue to pursue new strategies without regard to their cost to the nation.

3. *Should The Standard Be Revised?*

There has also been recent interest raised as to whether the level of the ozone standard and how compliance with that standard is evaluated should be revised. The current standard is set to be protective of even the most sensitive of the population and vast areas of states are subjected to the rigorous control requirements of the Clean Air Act sometimes on the basis of a single monitor exceeding that standard. This approach has resulted in tremendous economic burdens being placed on large areas of the country, when a limited number of monitors indicate high ozone levels that may be localized in nature. Additional monitoring in other areas is needed to help understand the creation and movement of ozone, but the current standard and EPA monitoring policy discourage the placement of additional monitors due to the serious economic consequences that an area can suffer on the basis of as little as 4 one-hour measurements above the standard in a three year period. We believe that the standard needs to be revised to focus more on the causes of high levels at localized monitors than on control programs for larger geographical areas such as the Houston nonattainment area which covers some 7,800 square miles and is larger than the state of New Jersey. This revision should also incorporate features to encourage additional monitoring in new areas. I have provided you with a proposal developed by our staff which would address these concerns.

4. *Reassessing Priorities (Stepping Out Of The Box)*

I believe that it is time that we, as a nation, step out of the current ozone control philosophy box and reassess our air pollution priorities. Over 20 years of control programs focused on VOC reductions to bring ozone levels down have shown some degree of success, but only at tremendous cost for the public, regulated community and states. To me, it does not seem that the benefits derived have warranted that tremendous cost. Despite these great efforts and exorbitant economic impacts, ozone levels have decreased but remain above the standard in many areas, while demonstrated detrimental effects have been virtually nonexistent. Considering these extremely high costs for very little demonstrated benefit, I suggest that review of our national environmental priorities is needed and that greater focus on other issues for which the cost of control could result in greater benefits. After all, ozone is not a poison or a carcinogen. It is a relatively benign pollutant compared to other environmental risks.

I thank you for the opportunity to present these comments and will try to answer any questions you may have.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION,
INTEROFFICE MEMORANDUM,
October 31, 1995.

To: Barry R. McBee, Chairman; John M. Baker, Commissioner; R.B. (Ralph) Marquez, Commissioner; and Andrew N. Barrett, Governor's Office

From: Dan Pearson, Executive Director

Subject: Texas' Position on Revising the Ozone National Ambient Air Quality Standard

Attached is a memorandum and a Summary of Current Ozone Standard Activities outlining a proposed position for the State of Texas to take regarding revisions to the National Ambient Air Quality Standard for ozone. Detailed information on any of the groups or issues discussed in the summary can be provided upon request.

The U.S. Environmental Protection Agency (EPA) is under a federal court order to review the ozone standard and promulgate any appropriate revisions by mid-1997. As part of EPA's review process, their Clean Air Science Advisory Committee (CASAC) has been reviewing possible options to the ozone standard and plan to make recommendations to EPA by mid-1996.

I asked Dan Wittliff to review the CASAC materials plus the documentation upon which the current ozone standard is based. I tasked him to develop an appropriate position for the state to take with regard to this issue. With the assistance of several staff, Dan completed that review and recommends the position proposed in the

attached memorandum. The proposed position is to support revising the ozone standard to include: a level of 0.080 parts per million, a rolling eight-hour average, composite averaging data from all monitors in the area, no more than five exceedances per year averaged over a three-year period, deleting the high and low years from the most recent five years to derive the three-year average, and a mitigation strategy for monitors indicating a high ozone level.

This position takes the most favorable of the options currently under consideration by the CASAC/EPA with the exception of the level of the standard which is the middle of the range. This position also includes consideration of composite averaging of all monitors in the area, deletion of the high and low in a five-year period, and a mitigation strategy for monitors with high levels.

The staff and I believe that this is an appropriate position for the state to take regarding this issue. We request your approval to move forward in advocating this position to the appropriate national policy forums. If you have any questions or would like a personal briefing on this proposal or issue, please let me know.

Attachments

cc: Bill Campbell, Deputy Executive Director; Dan Wittliff, Chief Engineer; Beverly Hartsock, Deputy Director, Office of Policy and Regulatory Development; and Jeff Saitas, Deputy Director, Office of Air Quality

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION,
INTEROFFICE MEMORANDUM,
October 31, 1995.

To: Dan Pearson, Executive Director

Thru: Bill Campbell, Jeff Saitas, Beverly Hartsock

From: Dan Wittliff, P.E., Chief Engineer

Subject: Proposed Commission Position on Ozone Nonattainment Calculations

The current system of monitoring and calculating ozone (O₃) nonattainment needs to be revised so that meaningful area strategies to control ozone can be implemented. These revisions include: (1) using weighted composite readings from area monitors to determine general attainment status and (2) using eight-hour rolling averages to diminish the impact of uncontrollable transient conditions. Implementing these revisions will: (1) reduce the likelihood of a single monitor forcing an entire area into nonattainment, (2) employ specific strategies to mitigate the impact of localized high levels, and (3) encourage the placement of more air quality monitors across the state. As a result of this strategy, the ozone attainment status of three of the four nonattainment areas in Texas remains the same. Only El Paso, which was marginally above the existing standard for ozone, changes ozone attainment status. Using the criteria described below, the impact of this proposal on several areas of Texas is described in the attached bar graph.

NOTE: The following provisions are linked together as joint components of a carefully formulated strategy and are not individually severable.

Composite Readings. Some of the nonattainment areas can be as large as 7,800 square miles with more than 14 monitors. Hourly composite readings (i.e., weighted averages of the hourly averages from all the monitors in the control area) provide a much clearer picture of area air quality than a single monitor. By comparing these composite readings to established standards, we can more clearly determine when area controls are working or even warranted. To accommodate missing data and provide an incentive to maintain high monitor reliability and representative composite averages, values for monitors not achieving good data return during ozone forming hours (daylight) could be substituted using any one of a number of scientifically credible methodologies developed over the past few years. This composite reading approach is recommended without regard to the level of the standard whether it is at the current 0.12 ppm or some other figure because it is more reflective of areawide ozone levels.

Rolling Averages. The current practice of using one-hour averages from single monitors to determine ozone levels is far too sensitive to meteorological conditions such as approaching weather systems. Because these weather systems are generally short-lived, it makes sense to use a rolling average to smooth out the effect of such spikes. Current discussions concerning this issue focus on three components: (1) length of the rolling average period, (2) the level of the ozone standard for an exceedance, and (3) the number of allowable exceedance days. Using an eight-hour rolling average reduces the impact of spikes and more accurately represents ozone formation. Health data indicate that adverse health effects are more likely to occur over longer periods of exposure. As is currently under consideration in a national forum and under this strategy, the ozone standard could be set as low as .070 ppm

or as high as .090 ppm. However, the lower standard would require more allowable exceedance days than the higher one. Assuming the implementation of composite area readings, the standard should be no lower than .080 ppm ozone for an eight-hour rolling average with an allowable of at least five exceedances per year averaged over a three-year period. The most recent five years would be considered in each case, throwing out the highest and the lowest year. This standard is designed to be adequately protective of human health for the general population of the area. On the other hand, a higher ozone level at individual monitors may have the potential to affect members of the population living near the monitors. Specific programs to notify affected populations and address any such higher level will need to be developed and implemented.

Area Control Strategy. Given the size of attainment monitoring areas in Texas, subjecting vast areas to air quality controls based on the readings of one monitor exceeding the existing standard only an exceptionally small percentage of the time is costly and provides marginal ozone protection benefits. Before spending millions of dollars, it makes sense to determine if the observed problem is an isolated occurrence or symptomatic of a larger area problem.

Individual Monitor Mitigation Strategy. To ensure that any affected populations are adequately protected, the following mitigation strategy is proposed to address those individual monitors that indicate a high level of ozone. When an individual monitor indicates or is predicted to indicate a level of ozone above 0.12 ppm for more than one hour, appropriate notification procedures will be implemented. These procedures will be used to advise the public living near that monitor of the high ozone level and the appropriate precautionary measures to avoid unnecessary exposure. Should this level of ozone (0.12 ppm for more than one hour) be experienced at the same monitor more than five times in any year, specific programs to determine the cause of these levels of ozone and implement plans to reduce the localized high levels will be required.

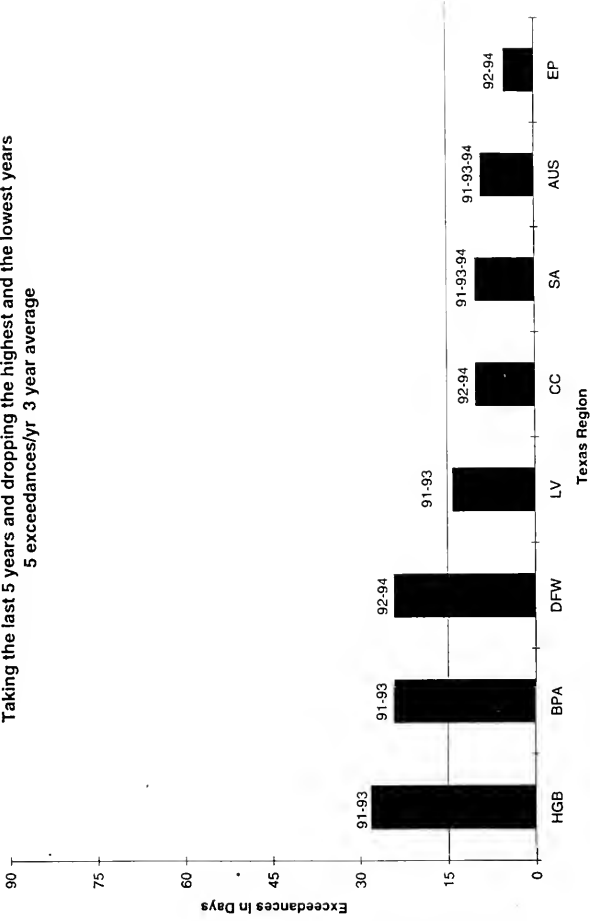
Encouraging More Monitors. Presently, the approach of relying solely on individual monitor readings to determine attainment status discourages the proliferation of monitors to uncovered areas. The potential costs generated by required follow-up to a few hours of exceedances on even a single monitor compel people to avoid additional monitors. Unfortunately, this avoidance frustrates attempts to monitor and model: (1) background or naturally occurring O₃ precursor sources and (2) ozone transport from and to urban areas. By using composite monitor readings and eight-hour rolling averages and by negotiating with the U.S. Environmental Protection Agency to allow specific monitors to be designated for scientific research rather than attainment determination, we reduce the resistance to installing additional monitors. The data from additional monitors would provide us with a more complete understanding of the cause-effect relationship involved and allow us to develop more effective area control strategies. It would also provide more information to allow evaluation of the causes of any higher levels of ozone at individual monitors and development of programs to reduce those levels consistent with providing protection to populations living near those monitors.

These changes to the current federally authorized system of monitoring and calculating O₃ nonattainment need to be made so we can focus limited resources on fixing clearly defined air quality problems. By using composite area readings and eight-hour rolling averages, we can improve area control strategies and encourage putting in more monitors. Where monitors show hot spots, we can mitigate the impact of exposure through better notification and put our energies on identifying and fixing the cause of the localized high ozone level. All of these results will help us better understand the nature of and the remedy for ozone pollution.

Attachment

cc: Doyle R. Pendleton, Director, Monitoring Operations Division

Ozone Standard Composite Analysis
Exceedances above 0.080 ppm, 8-hour Rolling Average
Taking the last 5 years and dropping the highest and the lowest years
5 exceedances/yr 3 year average



Data Source: TNRCC and local area networks

SUMMARY OF CURRENT OZONE STANDARD ACTIVITIES

Several recent developments in the air pollution regulatory framework will significantly affect how national, state and local air pollution control officials execute their responsibilities. These developments are discussed below. The primary element, however, underpinning all of initiatives is the National Ambient Air Quality Standard for ozone. Size of nonattainment areas, significance of long range transport of ozone, strategies for precursor reductions and the impact of weather anomalies are all triggered by the ozone standard. The following is a summary of recent and ongoing developments regarding the ozone standard. It contains detailed information on groups formed to consider the standard and the issues related to ozone nonattainment.

Ozone Standard

Based on recommendations from EPA's Clean Air Act Science Advisory Committee, the EPA is currently examining options for a new ozone standard. The most likely result will be a standard that is averaged over an eight hour period and has a concentration between 0.070 and 0.090 parts per million with up to five exceedences per year. The proposed state position takes the most favorable of the options and adds in consideration of composite averaging of all monitors in the area.

Ozone Transport Assessment Group (OTAG) and Transport Issues

In attempts to achieve the ozone standard within individual state borders, it became clear that there is considerable transport of ozone and ozone precursors between states and even larger areas of the country. This transport phenomenon prevents many areas from attaining the standard. In response to this, EPA and the Environmental Council of the States formed the Ozone Transport Assessment Group. This state led group was charged to research the transport problem and develop recommendations for regional volatile organic compound (VOC) and nitrogen oxides (NO_x) controls to reduce the impact of transport in the eastern United States. These control strategies are intended to help nonattainment areas meet the current 0.12 parts per million ozone standard. The TNRCC has been involved in OTAG primarily to monitor developments for potential impacts upon Texas.

Another effort to study transport is being conducted by the Southern Oxidant Study (SOS). This group is also working in conjunction with OTAG but its primary focus is the unique ozone problem and transport experience specific to the southern part of eastern United States. The TNRCC is also involved in this study.

Federal Advisory Committee Act (FACA) Subcommittee for Ozone, Particulate Matter and Regional Haze

Recognizing that ozone, fine particulate matter and regional haze have some common precursor gases, EPA formed a subcommittee under the Federal Advisory Committee Act to review and propose recommendations regarding the potential for an integrated standard. It is the charge of the subcommittee to provide advice and recommendations to the EPA for developing integrated control strategies to implement new NAAQS for all three pollutants. The subcommittee will also examine the concept of applying the strategies over broad regional areas.

1995 Ozone Season

In the summer of 1995 there was a marked increase in the number and severity of ozone exceedences over the previous two years. Many parts of the United States had a similar experience in the summer months of 1988. States and local areas, therefore, became very interested in the unique weather conditions that are believed to be at the root of the higher numbers of exceedences. Specifically, the TNRCC and local officials are gathering data to show that ozone levels in Texas were exacerbated by these weather conditions.

The years such as 1989 and 1995 are a particular concern for near-nonattainment areas such as Tyler-Longview, Corpus Christi, San Antonio and Austin. The potential designation of nonattainment resulted in the Texas Legislature appropriating \$1 million for efforts to understand the sources of ozone precursors in these areas and implement appropriate strategies to address this concern.

Potential Impacts and State Position

It is apparent from the number and various approaches of groups reviewing the ozone issue that policies and recommendations may be miscommunicated. For example, in discussions on the revised ozone standard, EPA indicated to the FACA Subcommittee for Ozone, Particulate Matter and Regional Haze that the change in the ozone standard would result in no appreciable difference in the number or size of current nonattainment areas. The same EPA representative at a recent OTAG meet-

ing presented a position that "preliminary modeling and monitoring information indicate that [a change in the standard] will result in more and broader nonattainment areas." Since even by EPA's own statements, it is not clear whether the proposed revisions to the ozone standard will essentially maintain the status quo or result in additional areas of Texas being subjected to the nonattainment area requirements, Texas should consider taking an advocacy position for a revision to the ozone standard that is favorable to our state.

Mr. BILIRAKIS. Mr. Drake. Thank you, Mr. Marquez.

TESTIMONY OF DENNIS DRAKE

Mr. DRAKE. Thank you, Mr. Chairman and members of both subcommittees. I very much appreciate this opportunity to talk about the problems and the successes that Michigan has had in meeting the Title I requirements of the Clean Air Act, particularly ozone. Michigan, like many States, has struggled to meet these requirements. In fact, meeting the ozone standard has been the major clean air initiative in our State for the last two decades.

We've made great progress. We've reduced our industrial or stationary source emissions statewide by over 60 percent. We've also seen reductions in mobile source emissions, due largely to the lower tailpipe emissions from new cars. This past summer, we also had a very successful voluntary reduction program where individuals and businesses were asked to reduce their emissions voluntarily during what we called Ozone Action Days. We've seen improvements in our air and, in fact, enough improvement that the seven-county Detroit-Ann Arbor metropolitan area earlier this year was designated as attainment. I believe, at the time, we were the largest metropolitan area in the country to have achieved that goal.

As part of the redesignation, though, for the Detroit area, we've had to develop a maintenance plan that would show our emissions will continue to decline, but, unfortunately, maintenance plans don't control the weather and this past summer, Michigan, like many parts of the country, saw record-setting heat and we've now had a violation of the standard in Detroit. Specifically, we've had four exceedances, two this year on top of two in prior years, for one more than the allowed three.

We would have seen many more exceedances in prior years were it not for the reductions in our emissions. But we're now faced with the necessity of having to implement additional control programs based upon this recent violation. We've selected measures based upon the consensus of a group of industry, of business, of environmental groups, local government and State government. They've recommended a better gasoline for this area, a less volatile gasoline that will reduce emissions substantially, by over 26 tons a day. The cost to the consumer will be 1 to 2 cents a gallon or, on average, less than \$10 a year.

Contrast that with the reduction of a little over one ton from our current auto test program that costs considerably more for testing and repair. We think this is the kind of flexibility that States should have in meeting the requirements of the Act.

At the same time, we're concerned about the 1 hour exceedance that has triggered these requirements, when we've demonstrated that our emissions are being reduced through other controls that are coming on-line.

Let me turn now to the other side of our State, in west Michigan. Here we have three counties that are also moderate non-attainment, but we think that they're non-attainment because of the overwhelming transport from emissions that are upwind. We've demonstrated this through a multi-million-dollar study, called the Lake Michigan Ozone Study, conducted jointly with EPA and the States of Wisconsin, Illinois and Indiana.

Even though we have this impact of transport, we achieved the standard in west Michigan at the end of 1994, that 3-year period. But once again, with this summer, we've seen violations due to the higher temperatures and the overwhelming transport. We believe it's unacceptable to require an area to implement control programs that will have no significant impact on the air quality in that area.

We're aware that EPA is reviewing the ozone standard and that they're looking at a longer averaging time. The proposal to revise the standard from 1 hour to 8 hours, we think, would help smooth out the short-term variability that comes with met conditions. We support that concept.

We're also aware that EPA is looking at a range of what the standard should be, from .07 to .09 parts per million. There is a significant difference in impact on the State with that range. At the low end, at .07, all of our monitors would show non-attainment. At the other end of the range, at the .09, with five exceedances, the entire State would be in attainment. Obviously, this will impact the economy of the State and EPA must exercise great caution in revising the target.

As significant as the standard itself is the strategy that will be used to implement it. We think any strategy must recognize the regional nature of ozone. The current strategy of requiring non-attainment areas to implement control areas assumes that the area that's monitoring the violation is causing the violation. We know, particularly in areas like west Michigan, that that is simply not the case.

Finally, we're emphatic that as we move forward on this, we preserve the progress that we've made, especially through our long-standing efforts and control programs. Our request is that future standards and future strategies be scientifically sound, be practical, and, you've heard this before, be based on common sense.

I'd be happy to answer any questions.

[The prepared testimony of Dennis Drake follows:]

STATEMENT OF DENNIS DRAKE, CHIEF, AIR QUALITY DIVISION, MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

Good Morning. My name is Dennis Drake, and I am chief of the Air Quality Division of the Michigan Department of Environmental Quality. I would like to thank both subcommittees for the opportunity to tell Michigan's story and experiences in implementing the Amendments to the Clean Air Act and to urge members of Congress to continue to press for flexibility and common sense solutions in the quest for clean air.

Today I would like to talk about our problems and successes in achieving and maintaining the National Ambient Air Quality Standard for ozone.

Michigan, like many other states, has struggled to implement the Clean Air Act, particularly the ozone requirements. We have wrestled with the thorny and difficult issues of implementing mandatory measures and policies dealing with attainment demonstrations, redesignation and the transport of ozone precursors. Michigan shares the common objective of implementing air quality programs designed to achieve and maintain a health-based standard for ozone.

Michigan believes that this objective must be achieved in an equitable, cost effective manner, that is less prescriptive and provides greater flexibility to the states. Michigan is not alone in its belief, as evidenced by the efforts of the National Governor's Association to work with EPA to influence how the Clean Air Act will be implemented.

The EPA has responded by providing relief on some of our concerns and promising to continue working with the states to address overwhelming transport, redesignation criteria, automobile inspection programs, transportation conformity and a number of other issues, all of which are related to meeting and maintaining the standard for ozone.

Attaining and maintaining the ozone standard has been the major clean air initiative in Michigan for the last two decades. Millions of dollars have been spent to reduce emissions and improve air quality and achieve statewide attainment for ozone. As Governor Engler previously testified before the Oversight and Investigations Subcommittee in February of this year, the stigma of being classified as a non-attainment area has the effect of curtailing economic growth and development. Ironically this stigma leaves urban nonattainment areas less equipped to make the reductions mandated by the Clean Air Act.

Even without any federal funding of control measures, Michigan has reduced statewide industrial emissions of volatile organic compounds from 220,000 tons per year to 80,000 tons per year since 1980. This is a 64 percent reduction of the VOC ozone precursors which locally contribute to the formation of ozone. As you know, Detroit is the "Motor City" and our automotive manufacturers have led the industry by making tremendous reductions in the emissions of ozone precursors through technological innovations and more efficient manufacturing techniques. To the credit of the Big Three automakers, new cars emit 96 percent less VOCs than the cars of 20 years ago. During the past two summers, we have also had in place a very successful program, called "Ozone action Days." This program includes actions that individuals can take to voluntarily reduce ozone and was put together by a coalition of individuals from local government, state government, private organizations, and businesses. In fact, such great strides have been made that the seven-county Detroit/Ann Arbor metropolitan area has been redesignated to attainment for ozone.

At great economic and political cost, Michigan has enacted legislation necessary to implement the Clean Air Act. Attainment demonstrations and maintenance plans have been developed and are being implemented to provide the future reductions and contingency measures required.

But maintenance plans don't control the weather. This summer Michigan, like many other parts of the country, experienced a record setting heat wave, which resulted in a violation of the ozone standard in southeast Michigan. With the monitor readings from this past summer, four one-hour exceedances, have been recorded in the last three years, one more than the three that are allowed. These violations occurred at two monitors at the perimeter of the metropolitan area. Ten years ago, this record setting weather would have resulted in many more exceedances. Thus despite dramatically cutting the emissions of ozone precursors and successfully demonstrating that our emissions will continue to decline, we are faced with the necessity of implementing additional ozone control measures.

In Michigan, we believe we are pioneers in developing the kind of control measures that are cost effective and protective of public health. In response to the recorded violation this past summer, we formed a partnership with local units of government through the Southeast Michigan Council of Governments, representatives from business and industry, representatives of local environmental groups, and four departments of state government to look at the nature of the problem in southeast Michigan. This group has come up with a proposal to reduce emissions while protecting our recovering economy and spreading the cost of clean air equitably between business and the consumer. Specifically, this group has proposed to the Governor a reduction in the vapor pressure of fuel from the federally required 9.0 pounds per square inch to 7.8 pounds per square inch. With this measure the volatile organic compound emissions in the Detroit area can be reduced by 26.8 tons per day by the year 2008, at a cost of between one and two cents per gallon of gas during the four month ozone season. The cost to the average consumer will be less than \$10.00 per year.

Contrast that with a reduction of only 1.4 tons per day under a vehicle inspection and maintenance program at a cost of a minimum of \$13 per year to consumers for tests and up to \$200 for repairs.

In Michigan we believe that this is the kind of flexibility states should have in meeting the requirements of the Clean Air Act. At the same time, we are concerned that a one-hour exceedance of the ozone standard during an unusual heat wave has forced our state into requiring controls costing hundreds of thousands of dollars

when it has been demonstrated that ozone emissions are decreasing and future controls, such as on board vapor recovery systems in automobiles and onboard diagnostics, are coming on line.

The complicated issue of dealing with the transport of ozone stalks the west borders of Michigan. There are three lakeside counties in west Michigan that are currently designated as moderate nonattainment for ozone. These counties are impacted by the overwhelming transport of ozone and its precursors across Lake Michigan from upwind areas.

A consortium of air directors from the Lake Michigan border states along with the EPA developed the Lake Michigan Ozone Study. This study clearly showed that ozone standard violations in these counties is not a local problem that can be addressed with local controls.

In fact, even though heavily impacted by transported ozone, the standard was met in these three counties for the three-year time period ending in 1994, and the state has petitioned EPA for redesignation.

However, once again, record-breaking heat this past summer saw violations of the standard in west Michigan. And here, unlike in southeast Michigan, no amount of contingency measures can counter the overwhelming transport. Unfortunately the Clean Air Act does not provide relief for areas like west Michigan. While relatively unpopulated, the area does not qualify as rural.

This situation clearly must be addressed. We believe it is unacceptable to force an area into requiring controls costing hundreds of thousands of dollars when it is demonstrated that implementing these measures will have no significant impact on the air quality.

I have already mentioned our concern that the current standard is based upon the number of short-term (one-hour) exceedances. We are aware that EPA is currently reviewing the ozone standard and that a longer averaging time is being considered. The proposal to revise the standard from a one-hour to a longer eight-hour averaging period would help to smooth out the short-term variability of meteorological conditions. We support the concept of a longer averaging time and understand that the Clean Air Science Advisory Committee Ozone NAAQS Review Panel has also endorsed establishing an eight-hour standard.

In addition to the averaging time, it is our understanding that EPA is also considering revising the standard to between 0.07 part per million (ppm) and 0.09 ppm, with multiple exceedances. The differences between 0.07 and 0.09 are extremely significant for Michigan. Adopting the 0.07 standard with two expected exceedances would place all monitored locations in Michigan in nonattainment. At the other end of the range, the 0.09 standard with five exceedances would place the entire state in attainment. Where EPA sets the standard will affect the economic competitiveness of Michigan and the entire nation and could trigger the expenditure of incredible amounts of money for no real difference in the quality of life for our citizens. EPA must exercise great caution and wisdom in revising the target of our nation's ozone control programs. Absent a significant difference in health impacts between the proposed 0.07 ppm and 0.09 ppm standards, Michigan believes that common sense dictates the least stringent and least costly option.

As significant as the standard itself, is the strategy that will be used to implement the standard. Any strategy for controlling ozone must recognize the regional and even multi-regional nature of the problem. The current strategy of requiring controls in nonattainment areas assumes that the area monitoring the violation is responsible for the violation. This is simply not the case, particularly in areas like west Michigan that are impacted by the overwhelming transport of ozone. It needs to be made clear that the implementation of a new standard has to be equitable and place the burden of reducing emissions on those sources which are causing the problems.

Finally, as we move forward, Michigan is emphatic that we must preserve the progress and reductions that have been realized through long standing and progressive air pollution control efforts that have resulted in the air quality improvements in Michigan. Our request is that future ozone standards and control strategies be scientifically sound, practical, and based upon the simple principle of common sense.

Thank you again for providing this opportunity to testify. I would be pleased to answer any questions that members of either subcommittee may have.

Mr. BILIRAKIS. Thank you, Mr. Drake. We're going to try to do this uninterrupted. I'm not sure how far we'll get. Let me ask you, Mr. Drake. Do you believe that the Clean Air Act should provide for reclassification where an area can demonstrate with data that

it belongs to a lower, less stringent classification and be treated differently, obviously?

Mr. DRAKE. Yes, I do, if it's an area that can show that it's being impacted by this overwhelming transport, as in the case of west Michigan. There's already a provision in the Act for relief for areas that are called rural transport. Unfortunately, we don't qualify for that classification because of the population test. Even though west Michigan is not as highly populated as, say, the Detroit area, it exceeds the population test of a rural transport area.

We think it makes sense for a provision for areas like west Michigan that we can show are being impacted overwhelmingly by transport and controls in those areas are not going to significantly affect the air quality in that area. But, yes, they should get reclassified.

Mr. BILIRAKIS. All right. Now, how would you suppose that that might be done? How would you propose, I guess, that that might be done, reclassified in what sense and, also, how might it be treated in that new classification as against the way it's treated now?

Mr. DRAKE. We have pending with EPA—it's been pending for nearly a year now—a petition to have the area declared attainment. As I said, we had the air quality data up till this past summer to show that it qualified for that classification. We'd like to see EPA go forward with that reclassification despite this summer's readings because we think they show even more that the problem is due to transport.

Mr. BILIRAKIS. All right. And apparently you've been unsuccessful so far in getting it reclassified.

Mr. DRAKE. We have not.

Mr. BILIRAKIS. Should there be an in between, if you will, a range? I mean, if you haven't reached attainment, that at least you have improved to the point where you may have not reached attainment, but you're somewhere in between where you are classified now and attainment. Is that a decent idea?

Mr. DRAKE. Well, in effect, that's what happens with reclassification to attainment. You then are classified as a maintenance area and the maintenance plan includes a commitment to keep emissions to a certain level and to even implement other measures if you have problems in the future. So it already is a slightly different classification than "an attainment area" or an area that never was non-attainment, and I think that's a fair way to approach it.

Mr. BILIRAKIS. I know, Mr. Marquez, you have included in your written testimony a proposal regarding how the standard could be structured. Now, maybe you have a comment here, because I guess what little I know about what you have suggested, I think, sort of squares with my having asked that question about maybe a reclassification, but possibly something in between the classification you now are in and attainment, something in between there.

You were talking about conceivably we could be talking about a little cleaner air. Maybe it's not completely to the attainment level, but something better, and maybe a different type of a treatment insofar as the so-called penalties that apply. Do you have any comment on that?

Mr. MARQUEZ. Yes, sir. First of all, let me point out that we believe that the ozone standard and the criteria for this area of non-

attainment will be modified in 1997. We believe that EPA should refrain from creating any new or designating new non-attainment areas or, in some cases, bumping up areas based on the current standard when we know the standard will be changed.

Mr. BILIRAKIS. How do you know that? How do you know that it's going to be reclassified?

Mr. MARQUEZ. The Clean Air Act Science Advisory Committee has made recommendations on that basis. It makes so much sense, so much common sense. We do believe there is strong support from everywhere, primarily on the issue of using an 8 hour average instead of a 1 hour exceedance. That makes so much sense that it will probably happen, I hope. We are supportive of using a rolling 8 hour average.

We're also recommending in our program that we use composite averages of all the monitors in the area that are being considered. Right now, the exceedance is counted by just one monitor in that area exceeding the standard. We believe it should be a composite, an average of all those monitors to make it more representative.

We believe that there should be no more than five exceedances per year, average over 3 years, to maintain the attainment designation. We also believe that because of the long-term trends that we're looking for and the experience—

Mr. BILIRAKIS. Mr. Marquez, forgive me. You better get accustomed to this. I understand I only have about 5 minutes to make my vote. So I'm going to call just a very brief recess. Please remain at your stations. As soon as Mr. Barton comes in, he'll reconvene the hearing. But I better run. Otherwise, I'm going to miss the vote.

[Brief recess.]

Mr. BARTON. This is like a tag team wrestling match. Since we have three panels of witnesses, we're going to try to continue the hearing. I will ask questions until Mr. Waxman or Mr. Deutsch or another member gets back, and then we'll give them the opportunity. So I'm not going to start the time clock because we've got three or four pages of questions and I'm sure you can answer some of the questions.

I have a general question to both of you and it's about the way we set the standard for ozone non-attainment and we monitor it based on these so many variances in a given time period based on a spike.

What relationship does that kind of a measurement have to the actual average daily ozone level? Do you understand the question? I guess another way to frame it. Is the current measurement methodology appropriate to really determine whether areas in non-attainment actually have higher than acceptable levels of ozone?

Mr. MARQUEZ. Let me go ahead and try to answer that, Congressman. Part of the proposal that Texas is making is that the determination of exceedances should be based on 8 hour rolling averages, but, also, that we should not let one single monitor exceedance of the standard dictate the classification of areas as big as the Houston area, for example, there are 7,800 square miles, actually bigger than the State of New Jersey. It can record an exceedance for that large area just for one monitor for 1 hour. That's the way it happens now. So we believe rolling 8 hour aver-

ages for ozone measurements. We believe in averaging, composite averaging whatever number of monitors are located in that area.

We also believe that because we're looking at long-term trends in ozone, that we should look at 5 years at a time, and when we develop this 3-year average out of those 5 years, we should drop the high and the low exceedance years. That will eliminate the problems that we're seeing this summer with very unusually high ozone numbers that cannot be explained. It also happened in 1988. So this will smooth out the trend and give us a better perspective.

We also are proposing that we need to look at individual monitors to alert the population near the monitoring areas of high levels of ozone specific to that particular area and that if we get repetitive high readings of ozone at a given monitor, then we should initiate some investigation and some corrective action to determine what pollutants are in the ozone locally and how we can reduce it.

Mr. BARTON. Mr. Drake.

Mr. DRAKE. I might answer it a little bit differently. Is a 1 hour standard really measuring the ozone in an area or is 8 hours really measuring it? I think they both are. But what I would go back to is what are you concerned about from the standpoint of protecting public health, and I'm not really prepared to answer that question.

I know there's a wealth of information about what are the health impacts of ozone and I think you need to look at are those impacts a result of an exposure for 1 hour or are they the result of an exposure for a longer term. I would rely on what's already a recommendation from EPA staff and the Scientific Advisory Panel that EPA has looking at this, and they've recommended that it be an 8 hour standard. I take that to mean that that then is as protective of public health as the shorter term is and it certainly is an easier standard to implement and does even out the short-term fluctuations.

If you look at a monitor reading, it runs continuously, you will see it spike up and down. You can have an 8 hour average that has no 1 hour peaks or has many 1 hour peaks. So, again, I think you have to look at what you're trying to accomplish. Is it protecting public health at a longer averaging time?

Mr. BARTON. You indicate that there is an advisory group at EPA that's actually recommended a change from the current spike standard to this 8 hour average standard. Do either of you happen to know what the status of that is? Can EPA implement that without Congressional action? Do they have the flexibility under the Act now to change the standard or is that something that we would have to give them authority to do?

Mr. DRAKE. It's my understanding that that's a decision by the Administrator, but that it requires full public review, Federal Register Notice. It's my understand they're under court deadline to do that early next year, but that's obviously a question you should direct at EPA.

Mr. BARTON. Do either of you have an opinion on—I don't want to say extraterrestrial activity because that's not quite right, but unusual events should be discarded. Now, Mr. Marquez, you indicated that if you went to a 5-year, where you throw out the low and throw out the high, so certainly that would eliminate some of

these unusual weather days that we've had in Texas and things like this.

I guess you're both supportive of unusual activity being discarded when we're setting the standard or evaluating the data.

Mr. MARQUEZ. I wouldn't classify it unusual, per se, but things that perhaps we cannot control and, no matter what we do, we will never control, like very hot weather in Texas.

Mr. DRAKE. I think that if there are ways to make the standard a more robust standard, like the averaging time, like looking at the statistical unusual occurrence or not, those, I think, are good ways of improving on the standard, again, assuming the health experts would say that is as protective of public health as the short-term standard.

Mr. BARTON. What about when Mr. Marquez talks about that in the Houston area, he's got monitor that—one exceedance at one monitor impacts a huge area geographically. Would you all support there being more monitors? Is that a cost problem if we tried to get more monitors? And I guess another way to phrase it, how big an area can one monitor monitor? Is this room or is it a 100 square miles? What's the scientific validity of the monitoring station at the control area?

Mr. MARQUEZ. I'll give it a try. I believe every area may have a different criteria for how many monitors are needed. The problem, Congressman, is that placing a new monitor is taking a great risk that if that monitor shows an exceedance of 1 hour, it may cause for a new area now to become non-attainment.

So the practical reality is that people do not want to put additional monitors.

Mr. BARTON. You say people don't. What people are we talking about? EPA doesn't or TNRCC or neighborhood groups?

Mr. MARQUEZ. I think people who know what the consequences of having a non-attainment designation are for an area. The criteria should allow for more monitors to be placed in areas where there are high readings of ozone so that we can better investigate the sources of that ozone, whether it's coming from far away or from a very nearby source.

Mr. BARTON. But what's the scope that a monitor can monitor? If we put a monitor right out here in front of the Rayburn horse-shoe, could it monitor the White House or can it only monitor right here in the block around the Capitol?

Mr. DRAKE. In the Detroit area that I mentioned, which is seven counties, including the metropolitan areas, we have about ten ozone monitors.

Mr. BARTON. Ten.

Mr. DRAKE. Ten. And they're expensive to operate. If we could, I think we'd like to greatly increase the number of those monitors, but cost is certainly a consideration.

Mr. BARTON. Does the State pay it, the city pay it or the Federal Government pay the monitor costs?

Mr. DRAKE. It's a combination of State and Federal money. We receive some grant dollars under section 105 of the Act and supplement that with general funds from the State legislature. But ozone is, I think, a pollutant that is more conducive to having fewer monitors. It is a pollutant that isn't emitted directly. It's not a localized

problem. It's not like a plant emits ozone. A plant emits compounds that react in the atmosphere and then form ozone.

Mr. BARTON. So the ozone level here in front of the Rayburn horseshoe is going to approximate very closely the ozone level down at the White House.

Mr. DRAKE. I think so.

Mr. BARTON. And also the ozone level out at National Airport.

Mr. DRAKE. Well, when you get to that distance, you're probably not as accurate. But it is an area-wide problem. We find that when we see high levels of ozone in the Detroit area at one monitor, we tend to see them at other monitors, as well.

Mr. BARTON. So there is a correlation across there. Okay. I've used more than 5 minutes. I'm going to recognize Mr. Klink and he will be allowed to ask questions until another Republican member shows up or until I decide he's had as much time as I had, in which case I will reclaim my time and ask questions until another Democrat shows up.

Mr. KLINK. Thank you, Mr. Chairman. I was going to say you may be too kind. We don't know how long it's going to take. But I appreciate the opportunity to ask some questions.

I wanted to start off by getting my mind back on the testimony after going over for the vote. Mr. Marquez, I was interested in your testimony when you talked about—and I want to give you an opportunity to get into this a little bit more. You talk about the fact that ozone is a surrogate, that there's too much emphasis being put on that and you say, also, that at different times, I think you said, is an indication that we are not as sure as we sound as EPA is shifting strategies. You talked about first they focused on VOC and then nitrogen oxides and now particulate matter.

What would be your suggestion? What should we focus on to make sure that we're really getting to the heart of the problem of air pollution that is adversely affecting the health of our citizenry? Is there one small thing to focus on which really gives us an in-depth reading as to what's happening?

Mr. MARQUEZ. The point I tried to make with that statement is that at times, the requirement for VOC reductions were tainted by the ozone non-attainment, because there was no specific authority for EPA to regulate other pollutants, and that produced a lot of progress. We made progress with that policy.

But now there are other parts of the Clean Air Act that provide authority to EPA to address specific pollutants. It's a rifle-shot approach rather than a shotgun approach and the ozone standard should not be used for regulating other things. If we have a problem with hazardous pollutants, they should be addressed individually. If it's particulate matter, there is authority to address that directly and not use ozone as the driving force to make it happen.

Mr. KLINK. Can you also expand upon your closing line, which I found intriguing, and which is true, of course. But you say, "After all, ozone is not a poison or carcinogen. It is a relatively benign pollutant compared to other environmental risks." Can you expand on that?

Mr. MARQUEZ. Well, I tried to just put in perspective how much effort, how many resources have gone to the control of ozone relative to some other environmental problems we have in the coun-

try. I'm just saying that we need to step outside and above. As long as we're just talking ozone, we can talk about different degrees of health impacts. When you step outside and compare those health impacts to the impacts of other pollutants or other environmental issues, perhaps they are not as big as they sound.

Mr. KLINK. Getting more to the root of the problem, in case one of my colleagues does show up and my time runs a little bit shorter. What is your opinion of the Clean Air Act? We're obviously taking an in-depth look at it here, which I think should be done. The ramifications of this Act have been far-reaching in many respects. What is your basic opinion of the Act? In particular, Title I, which we're dealing with today.

Mr. MARQUEZ. I think we must continue to make progress in cleaning up the air. There is no question about that. But I believe that we must be more cautious and we're probably approaching that point of diminishing return, where we do not get as much return for our investment.

Mr. KLINK. So you think that the Act—I mean, are you one of those people that believes that the Act should be opened up, there should be legislation to modify the Act? We sit you here and make you king for the day. What would it be that you would decide that we should do?

Mr. MARQUEZ. One thing that would be very much addressed—for example, the Act now—or EPA now requires that we make this attainment demonstration through the year 2007. We're looking out 17 years from 1990 to 2007. And there are already prescribed reductions that have to be made in VOCs throughout this period of time, just based on the prediction of the mathematical model.

We are proposing, Texas, a phase-in approach where we look—every 6 years, we actually look at the actual levels of ozone that were experienced and modify our attainment program based on actual data, rather than act so intelligent that we think that we can predict 17 years and what the results of our actions will be over a 17-year period of time.

Mr. KLINK. So you think we should repair that? Is that what you would—is this something there that you think we should be repairing? Is that what you're saying?

Mr. MARQUEZ. I think that we should be allowed to have mid-course corrections based on actual data and the actual improvements that we see rather than just prescribing what the actions will be for 17 years.

Mr. KLINK. Thank you. Mr. Drake, nothing personal. We had to go for a vote and we missed some of your testimony, but let me just ask you the same question. I saw in your testimony, as I looked at it before, that you make mention of the fact that the political and economic capital that the State of Michigan has spent to comply to the Clean Air Act. Yet, where do you find yourself in areas of disagreement and what do you see, again, if you were king for the day, that we would take action on to try to modify it and how would you suggest that the Act be modified?

Mr. DRAKE. My colleagues told me to watch out for the "what if you're king for a day" question.

Mr. KLINK. You're colleagues were wise, because it's coming.

Mr. DRAKE. And what I would do to change the Act. Clearly, our preference would be for administrative fixes to some of the problems that we've seen. A year ago, I would have said that it's obvious that the Act needs to be amended to address the problems that we saw at that time. But in the past year, we've seen some renewed flexibility and creativity on the part of EPA and their interpretations of the Act.

Nonetheless, the problems that I still see would probably take a change in the statute and that's why Michigan has, really for the past year, advocated a change in the Act, a fairly narrow change, to forestall the sanctions that are mandated for a 2-year period. We've asked for that simple question for a 2-year moratorium. Our logic has been that during that time, EPA could really sort out what can be done administratively and what can't.

The main problem that we see for Michigan is the one I mentioned with respect to west Michigan. There is a view held by folks in Michigan, including yours truly, that that is unfair to require those controls in that area and to impose sanctions in that area when they can't solve the problem.

Mr. BARTON. Mr. Klink, I think another member of your side has arrived. So we'll let you ask one more question and then—

Mr. KLINK. If I could, Mr. Chairman, I just want to make one statement. I agree with Mr. Drake. We in Pennsylvania, if we knew a year ago that there was going to be this spirit of cooperativeness in the EPA—in fact, if it had existed a little over a year ago, I guarantee that our State would be a lot more wealthy because we could have gotten out of an agreement that we had for centralized testing a lot cheaper than I think we're going to end up getting out of it.

We welcome that flexibility, that spirit of cooperation. However, I'm a little nervous that if some of those people change or if the minds at EPA change, that there may not be the same cooperation next month that there is this month. I am from Pennsylvania, but in this respect, I am from Missouri. They have to continue to show me.

So thank you, Mr. Chairman. I yield back.

Mr. BARTON. Thank you, Mr. Klink. Mr. Waxman, we're going to recognize you. Mr. Klink and myself each asked questions for approximately 10 minutes. So we're going to give you till 11:25 on the clock on the wall back there.

Mr. WAXMAN. Thank you very much, Mr. Chairman. I'll see if I can move as quickly as possible. Mr. Marquez, I'm astounded by your testimony. Texas has some of the worst air pollution in the country and it's getting worse. This summer, Houston had 50 days when the Federal health standard for ozone was violated, more than any other time since 1990. Yet, your testimony today doesn't advocate doing more to clean up the air in Houston and other polluted cities in Texas. Instead, your suggestion is to weaken the health standard so that Texas would no longer be out of compliance. In other words, you want to redefine Texas into attainment.

Unfortunately, there's one big problem with your idea. It's contrary to medical and scientific evidence. The medical and scientific evidence shows that if anything, the standard should be tightened.

Mr. Marquez, are you aware of the new report issued today by the American Lung Association, entitled "Out of Breath: Populations at Risk to Alternative Ozone Levels?" Mr. MARQUEZ. No, sir. I have not seen it.

Mr. WAXMAN. Well, I want to share this with you and I do want to put this report in the record, if I might have unanimous consent to do that, Mr. Chairman.

Mr. BARTON. As far as I know, it's appropriate. Do we allow complete reports?

Mr. WAXMAN. We'll be pleased to submit it to the chairman.

Mr. BARTON. I'm not opposed to it. I would assume that unless there's some reason within the rule, but I'm going to say I'm willing to accept it.

Mr. WAXMAN. Unless it's inconsistent with any rules, I'd like unanimous consent.

Mr. BARTON. Without objection.

[The information to be furnished follows:]

+ AMERICAN
LUNG
ASSOCIATION.

Out Of Breath:



**Populations-at-Risk to
Alternative Ozone Levels**

American Lung Association • 1726 M St., NW, Suite 902 • Washington, D.C. 20036-4502
November 1995

SUMMARY OF FINDINGS

This report presents estimates of the total number of people in the United States, as well as those who are at greatest risk from exposure to ozone air pollution (children, the elderly, people with asthma and chronic obstructive pulmonary disease) and live in areas that violate either the current federal ozone standard (0.12 parts per million) or two alternative standard levels. The two alternative ozone levels selected for this report are based on the top and bottom of the range of alternative eight-hour average ozone standard levels currently under consideration by EPA as a revised national ozone standard.

One alternative under EPA consideration is a 0.07 ppm, one-exceedance level, which the American Lung Association supports as providing the most public health protection with the margin of safety required by the Clean Air Act. This report also estimates the number of people that would be covered by a 0.09 ppm, five-exceedance standard, the least protective alternative under EPA consideration. Data on the numbers of at-risk people covered by the current ozone standard are included for sake of comparison.

Table 1 of the report summarizes the national statistics for at-risk populations for the current 0.12 ppm ozone standard and the two alternative standard scenarios. Table 2 provides total population statistics by state for the three ozone standard levels. Tables 3, 4, and 5 provide state totals of the at-risk population categories. Tables 6, 7, and 8 provide county level estimates of at-risk and total populations.

Major findings of the report are:

- An estimated 161 million people, representing 63 percent of the U.S. population, live in areas that exceed the 0.07 ppm, one-exceedance ozone standard alternative under consideration by EPA. These people are potentially exposed to **unhealthful ozone levels**.
- An estimated 33 million children, 20 million elderly, 8 million people with asthma and 9 million people with chronic obstructive lung disease live in areas that exceed the 0.07 ppm ozone level. These people are potentially exposed to **unhealthful ozone levels**.
- The number of at-risk people protected by the most lax ozone standard (0.09 ppm, five exceedances) under consideration by EPA is almost 75 percent less than the more protective standard (0.07 ppm, one exceedance) recommended by American Lung Association.
- Even though the level of the 0.09 ppm standard alternative is lower than the current 0.12 ppm ozone standard, allowing multiple exceedances of this level results in a 30 percent reduction in the number of people protected even when compared to the inadequate current ozone standard.

BACKGROUND

History of the Ozone Standard

Ozone was first identified as a key component of urban air pollution in Southern California in the 1950s. This type of air pollution was quite different from the particulate matter/sulfur dioxide smog that plagued the industrial areas of the eastern and midwestern United States at that time in that it was found to be photochemical in nature — that is, formed by the action of sunlight on the organic compounds and oxides of nitrogen emitted by cars, trucks and large industrial sources. Today, ozone is still our nation's most prevalent air pollution problem. Tens of millions of people living in dozens of metropolitan areas across the nation are potentially exposed to levels above the current federal health standard each year.

The Clean Air Act of 1970 is the foundation of our nation's air pollution control efforts. Its cornerstone is formed by the national ambient air quality standards (NAAQS) that set goals for achieving healthful air quality. The U.S. Environmental Protection Agency (EPA) is charged under the Clean Air Act with establishing these standards at a level that "allowing an adequate margin of safety, [is] requisite to protect the public health." The legislative history of the 1970 Clean Air Act clearly indicates that Congress intended that these national air quality standards protect the health of people who are especially sensitive to air pollution.

including millions of individuals with asthma. The Clean Air Act Amendments of 1977 require that EPA review the adequacy of the standards in light of current scientific information at no more than five-year intervals, beginning in 1980.

The first national air quality standard to address ozone air pollution was established by EPA in 1971. A standard of 0.08 parts per million (ppm) averaged over a one-hour period was developed for photochemical oxidants, the class of air pollutants of which ozone is a major component. EPA revised this standard in 1979 to an ozone-only standard at a level of 0.12 ppm, a weakening of the standard by 50 percent.

In 1991, despite the five-year review cycle required by the 1977 Act Amendments, EPA had not completed a review of the ozone standard since 1979. The American Lung Association successfully filed a lawsuit against EPA in 1991 to require that the review be completed. In response to the court-ordered review schedule, EPA announced in March 1993 it would not revise the ozone standard. Unfortunately, the EPA's decision was based on scientific information that was at least five years out of date. EPA simultaneously announced its intention to undertake an "expeditious" review of the ozone standard, with a final decision scheduled for mid-1997. Responding to a second, 1993 Lung Association lawsuit, EPA agreed in 1994 to review its earlier decision not to revise the standard, but maintained its previously announced review schedule. A 1994 lawsuit by the Lung Association to require the EPA to accelerate the review schedule to conform with Clean Air Act requirements was unsuccessful.

Ozone's Health Effects

Beginning in the early 1980s, studies published on the acute respiratory effects of ozone on healthy exercising children and adults at or just above the current federal ozone standard of 0.12 parts per million (ppm), found an increase in the acute respiratory symptoms, such as shortness of breath, chest pain when inhaling deeply, wheezing and coughing, as well as a loss of lung function. More recent studies have found similar effects at ozone concentrations below 0.12 ppm. A number of clinical studies have found increases in acute respiratory symptoms, loss of lung function, sensitivity to bronchoconstricting agents and biochemical indicators of inflammation occurring in healthy, exercising subjects at ozone levels as low as 0.08 ppm when the exposure duration was increased to approximately 7 hours. This ozone cumulative effect is of particular concern because the heavily populated areas of the eastern United States frequently experience ozone peaks between 0.08 ppm and 0.12 ppm for 6 to 8 hours at a time.

Epidemiological data linking ozone air pollution to increased hospitalization and hospital visits for respiratory disease (especially asthma) have emerged as another important public health concern. The acute respiratory symptoms that accompany ozone exposure, while unpleasant for the general healthy population, can be particularly devastating to the person with asthma or chronic obstructive lung disease, which includes emphysema and chronic bronchitis. A 1991 clinical study of people with atopic (allergy-induced) asthma found increased responsiveness to common allergens with a 1-hour exposure to 0.12-ppm ozone while at rest. These allergens, such as pollen and mold, can "trigger" asthma attacks. This finding might explain the increase in hospital visits and admissions for asthma-related problems during the summer months when ozone levels are high. EPA's August 1995 draft Ozone Staff Paper notes that a number of epidemiological studies have found a relationship between ozone levels and hospital admissions and emergency department visits for respiratory problems and have been unable to identify a threshold level at which no adverse health effects occur.

A 1993 study published by the American Lung Association estimated that more than 6 million adults and children with asthma and more than 8 million people with chronic obstructive pulmonary disease (COPD) lived in areas that exceeded the federal primary (health) 0.12 ppm standard. A 1991 Lung Association study estimated that more than 7.5 million adults and children with asthma — approximately two-thirds of the total number of people with asthma in the United States — and more than 7 million people with COPD lived in areas that experienced ozone levels above 0.08 ppm averaged over 8 hours in 1987-1989.

To many in the scientific and public health communities, the preponderance of clinical, epidemiological and field study data was sufficient to question the adequacy of the 1-hour, 0.12-ppm standard in protecting the public the acute health effects of ozone. In late 1988, approximately one-half of the members of the Ozone Review Committee of EPA's Clean Air Scientific Advisory Committee recommended that the primary 1-hour ozone standard be revised to a level below 0.12 ppm. In addition, a vast majority of the Ozone Review Committee members, including several experts who had not recommended tightening the primary standard, noted that "at 0.12 ppm there was little or no margin of safety." Since then, the convergence of data from a wide range of scientific disciplines has become overwhelming regarding the acute adverse effects of ozone at levels well below the existing health standard.

The health effects that provided the basis for the establishment of the ozone standard in 1971 and for the 1979 revision were primarily acute effects, such as respiratory symptoms and reduced respiratory function. However, a number of animal toxicology studies have been published since the mid-1980s that find changes in lung cell type, formation of lesions, and loss of lung elasticity and inflammation for chronic exposure to ozone levels that typically occur in the ambient air. Coincident with these findings was the publication of a number of studies that allow for increased confidence in extrapolating the animal studies to human populations.

The findings of epidemiological studies that residents of high ozone areas in southern California have an accelerated loss of lung function in comparison to residents of areas with lower ozone levels in southern California and Michigan adds to the mounting evidence of important adverse health effects occurring from long-term exposure to high levels. A 1991 study of children in Austria found that long-term exposure to high ozone levels may lead to persistent bronchial hyperresponsiveness. These studies, plus results from a pilot autopsy study of Los Angeles teenagers and young adults that found a high occurrence of lung lesions of the type and location in the lung normally associated with chronic ozone exposure in animals, add to the "convergence of data" strongly suggesting that chronic exposure to high ozone levels may be associated with a premature aging of the lungs and the development of chronic lung disease.

Adding to the concern regarding ozone's chronic effects are findings that high levels enhance the formation of tumors in mice and enhance the ability of normal cell transformation to cancerous cells, both alone and concurrent with exposure to a carcinogen *in vitro*. More studies at lower ozone levels more closely relating to human ambient air exposures are needed before these very serious effects can be considered as part of the decision-making process regarding how best to protect the public from chronic ozone exposure.

The public health implications of this growing body of scientific evidence are immense. Lung disease, including lung cancer, is the third leading cause of death in the United States and is the fastest growing among the top ten causes of death. More than 10 percent of the U.S. population currently suffers from chronic lung disease and the prevalence of these frequently devastating diseases is increasing rapidly. The cost to society in terms of direct expenditures for health care, lost productivity, restriction of daily activity, and a reduced quality of life, and suffering of acute symptoms and premature death likely reaches billions of dollars each year for ozone alone.

Current Ozone Standard Review

As a result of its current review of the federal ozone standard, EPA is considering the adoption of an eight-hour average ozone standard in the range of 0.07 ppm to 0.09 ppm. A key component of EPA's forthcoming decision will be what form the standard will take. The existing ozone standard allows no more than one violation of the standard each year, averaged over a three-year period. In other words, four violations of the current standard over a three-year period means an area is not attaining the standard.

In its August 1995 draft Ozone Staff Paper, the document in which scientific information is translated into public policy recommendations, EPA indicated it is actively considering changing the form of the standard. Under consideration is a change in the allowable number of "exceedances" (violations of the standard) to as many as 5 violations each year, thus requiring that 16 violations occur over a three-year period before an area would be classified as not meeting the federal ozone standard. This American Lung Association report provides a statistical analysis of the public health implications of such an approach.

DATA SUMMARY

Estimates of the populations-at-risk exposed to ozone levels above the cutoff for the current standard and the two alternative standards were derived for each county above the designated ozone level. The totals of each at-risk population for each of the three different ozone levels are delineated in Table 1. The number in parentheses indicates the proportional contribution of each population-at-risk estimate to the total population in that category. For example, 17.2% percent of adults with asthma reside in counties that exceeded a 0.09 eight hour average ozone level 5 or more times. A total of 514 counties in the U.S. experienced ozone levels above the 0.07 ppm eight hour average, 67 counties experienced ozone levels above the 0.09 ppm eight hour average and 104 counties experienced ozone levels above the current standard of 12 ppm.

Table One: Estimated Populations-at-Risk Living in Counties with Alternative Ozone Levels: .07 Eight Hour Average (One Exceedance), .09 Eight Hour Average (Five Exceedances), and .12 One Hour Average (One Exceedance)

Population-At-Risk	.07 Eight Hour Avg. (1 Exceedance) Ozone Level		.09 Eight Hour Avg. (5 Exceedances) Ozone Level		.12 One Hour Avg. (1 Exceedance) Ozone Level	
	Population	%	Population	%	Population	%
Chronic Diseases						
COPD (1)	8 875,648	(64.0)	2,351,620	(17.0)	3,372,335	(24.3)
Adult Asthma	5,246,240	(64.3)	1,402,788	(17.2)	2,004,717	(24.6)
Pediatric Asthma	2,637,484	(62.5)	713,774	(16.9)	1,017,285	(24.1)
Age Groups						
<5	12,432,639	(63.7)	3,533,499	(18.1)	4,941,592	(25.3)
5-13	20,562,489	(62.3)	5,489,216	(16.6)	7,875,975	(23.9)
65+	20,199,819	(62.6)	4,960,817	(15.4)	7,316,191	(22.7)
Total Population	160,670,258	(63.0)	43,046,537	(16.9)	61,499,578	(24.1)
Number of Counties	514		67		104	

Source: Estimated Prevalence and Incidence of Lung Disease by Lung Association Territory May 1995, American Lung Association; State and County Population Estimates, 1992, U.S. Bureau of the Census; County Design Values for Ozone NAAQS alternatives 1991-1993 AIRS Data Base, U.S. EPA 1. COPD includes chronic bronchitis and emphysema.

Table 2 delineates the total populations affected by the three ozone levels examined in each state. Tables 3-5 report on the populations-at-risk impacted within each state by the 3 ozone levels. Tables 6-8 report on these data on the county level.

STATISTICAL METHODOLOGY

An estimate of the prevalence of the populations-at-risk was derived for each community whose ozone level exceeded the designated cutoff for each of the three alternative ozone levels. To determine the cutoff for each alternative, we followed the method described for the current ozone standard as appears in Appendix H to Part 50 of the Code of Federal Regulations. The current standard defines all values of 125ppm and above as an exceedance of the current standard of 12 ppm. For purposes of ozone measurement, all values between 125 and 134 are rounded to 13 ppm. All counties with levels of 13ppm and higher are listed (Table 8). Similarly, for the .07ppm 8 hour average (1 or more exceedances) alternative standard, we have listed all counties with a measured level of .08ppm and above (Table 6), for the .09ppm 8 hour average (5 or more exceedances) ozone level we have listed all counties of .10ppm and above (Table 7).

Data on the 1992 population of each of the counties in the United States is estimated by the Bureau of the Census. The age-specific breakdown of the population residing within each state has also been estimated by the Census Bureau. Age-specific county populations are calculated by applying estimates of the age-specific population distribution of each state to population of the counties within that state.

The number of pre-adolescent children (≤ 13), and the elderly populations (65+) within each county are estimated by the foregoing method.

National prevalence rates for the medical conditions or status under study as measured by the National Health Interview Survey (NHIS) are applied to the age-specific populations estimated for each county. Estimates of chronic bronchitis and emphysema (collectively, chronic obstructive pulmonary disease) prevalence are calculated for the following age groups <18, 18-44, 45-64 and 65+. All age-specific estimates are added together to estimate the total population with this disease in each county. Estimates of pediatric asthma

prevalence are calculated for those <18. Adult asthma is estimated for the populations aged 18-44, 45-64 and 65+. Similarly, these estimates are added together to calculate the total population with adult asthma in each county.

A respondent to the National Health Interview Survey may indicate the presence of more than one chronic lung disease (i.e. chronic bronchitis and emphysema). As a result, overlap can exist between condition categories, leading to an overestimate of the number of affected individuals. For example, a respondent who reports having both chronic bronchitis and emphysema is represented in the prevalence estimate for both these conditions. These estimates have been derived using a rate based on an unduplicated count of persons with chronic bronchitis, emphysema and asthma. An individual with any one of these conditions is counted only once in the prevalence estimate.

Expected estimates of the local prevalence of these chronic diseases are scaled in direct proportion to the base population of the area and its age distribution. No adjustments are made for other factors that may affect local prevalence (e.g., local distribution of cigarette smokers) since the health surveys that obtain such data are rarely conducted on the county or county sub-division level. Because the estimates do not account for geographic differences in the prevalence of these chronic diseases, the sum of the estimates for each of the counties in the United States may not reflect the national estimate derived by the National Health Interview Survey.

LIMITATIONS OF THE DATA

Estimates of the populations-at-risk have been derived from information provided by EPA on those counties which exceeded the designated ozone levels.

Populations-at-risk estimates should be quoted individually and should not be added together to form totals since the populations-at-risk will overlap (individuals can be over 65 and have COPD, for example), and are not mutually exclusive.

The populations-at-risk represent stationary populations projected as residing in each community as of 1992. The ozone level of the county does not imply responsibility for the disease status of its population.

The projection techniques used to estimate the populations-at-risk for each community produce data that are subject to error when scaling national age-specific prevalence rates of medical conditions to local populations whose exposure to related risk factors is unknown. Additionally, as previously noted, the certainty of the scientific documentation supporting the identification of the populations-at-risk included in this report is highly variable.

The interpretation of these data must take into account limitations of the methodology and the original source of the data base. The source for the data used in this report, the National Health Interview Survey, provides the best available estimates for the age-specific prevalence of the medical conditions included in the projections. The Health Interview Survey defines a condition as chronic if (1) the respondent indicates it was first noticed more than three months before the reference date of the interview or (2) it is the type of condition that ordinarily has a duration of more than three months. Examples of conditions that are considered chronic regardless of their time of onset are diabetes, heart conditions, emphysema and arthritis. Limitations of the methodology used in deriving these estimates are described in the statistical methodology section of this report.

INTERPRETATION OF DATA MATRIX

In the data tables that follow, estimates of the populations-at-risk are listed by county. These numbers reflect estimates of the number of persons within each county who are considered "at-risk" by virtue of a medical condition or their age. Table 6 lists the counties and populations-at-risk residing in areas which were above the measured level necessary to exceed the .07 8-hour average (1 exceedance) ozone level.

Each county with ozone levels above the alternative standard appears as a row in the data matrix. The populations-at-risk appear as column headings. Totals are also provided for the estimated populations-at-risk residing in each state. Below please find an example of the data as it appears in Table 6.

State County	Ozone Level	COPD	Adult Asthma	Pediatric Asthma	< 5	5 - 13	65+	Total Population
Arizona Apache	10	3491	2011	1090	5256	8537	8417	62916
Maricopa	11	122616	70632	38279	184577	299808	295611	2209567
Pima	08	38301	22063	11957	57656	93651	92340	690202
Yuma	08	6523	3757	2036	9819	15948	15725	117538
TOTALS		170931	98464	53363	257308	417944	412094	3080223

This table shows that over 3.0 million people in Arizona reside in areas that have ozone levels above the 07 8-hour average level. In the four counties in Arizona that exceeded the cutoff point for this alternative standard reside the following at-risk populations: 170,931 people with COPD, 98,464 adult asthmatics, 53,363 children with asthma, 257,308 children under age 5, 417,944 children aged 5 - 13, and 412,094 people above age 65.

REFERENCES

- 1 Current Estimates from the National Health Interview Survey United States, 1992. Data from the National Health Interview Survey Series 10, No. 189 (January 1994).
- 2 Irwin, R. Guide to Local Area Populations U.S. Bureau of the Census Technical Paper Number 39 (1972).
- 3 Population Estimates Branch, U.S. Bureau of the Census, Estimates of Resident Population of States and Counties, 1990-92.
- 4 Population Estimates Branch, U.S. Bureau of the Census. State Population Estimates, by Age and Sex 1992.
- 5 Code of Federal Regulations, Appendix K to Part 50. Interpretation of the National Ambient Air Quality Standards for Ozone.

TABLE 2: ESTIMATED TOTAL POPULATIONS AT-RISK LIVING IN COUNTIES WITH ALTERNATIVE OZONE LEVELS: .07 EIGHT HOUR AVERAGE (ONE EXCEEDANCE), .09 EIGHT HOUR AVERAGE (FIVE EXCEEDANCES), AND .12 ONE HOUR AVERAGE (ONE EXCEEDANCE), BY STATE

STATE	.07 EIGHT HOUR AVG. (1 EXCEEDANCE) OZONE LEVEL	.09 EIGHT HOUR AVG. (5 EXCEEDANCES) OZONE LEVEL	.12 ONE HOUR AVG. (1 EXCEEDANCE) OZONE LEVEL
ALABAMA	1,838,448	--	--
ALASKA	--	--	--
ARIZONA	3,080,223	--	2,209,567
ARKANSAS	458,184	--	--
CALIFORNIA	20,555,818	21,124,204	20,980,648
COLORADO	1,803,593	--	238,196
CONNECTICUT	3,175,986	2,022,542	3,175,986
DELAWARE	690,884	455,006	455,006
DISTRICT OF COLUMBIA	585,221	585,221	--
FLORIDA	10,228,467	--	--
GEORGIA	1,752,472	724,763	1,363,669
HAWAII	--	--	--
IDAHO	--	--	--
ILLINOIS	9,281,143	--	--
INDIANA	3,194,764	26,070	89,858
IOWA	674,078	--	--
KANSAS	416,690	--	--
KENTUCKY	2,065,447	--	--
LOUISIANA	2,717,082	--	472,375
MAINE	932,476	--	481,703
MARYLAND	4,004,277	2,422,609	2,186,075
MASSACHUSETTS	5,283,446	336,480	4,067,769
MICHIGAN	7,076,460	514,345	552,553
MINNESOTA	417,361	--	--
MISSISSIPPI	384,380	--	--
MISSOURI	2,652,584	--	1,000,690
MONTANA	--	--	--
NEBRASKA	426,390	--	--
NEVADA	1,114,173	--	--
NEW HAMPSHIRE	849,366	--	246,164
NEW JERSEY	6,723,312	4,621,569	4,141,732
NEW MEXICO	233,577	--	146,619
NEW YORK	11,539,240	1,729,289	4,825,003
NORTH CAROLINA	2,954,921	--	--
NORTH DAKOTA	--	--	--
OHIO	8,180,348	1,473,975	2,474,514
OKLAHOMA	1,337,415	--	--
OREGON	741,861	--	--
PENNSYLVANIA	8,870,594	2,658,357	3,348,353
RHODE ISLAND	753,084	162,493	162,493
SOUTH CAROLINA	1,612,677	--	137,211
SOUTH DAKOTA	--	--	--
TENNESSEE	2,977,616	34,770	--
TEXAS	10,613,507	2,971,755	6,061,167
UTAH	1,128,121	--	--
VERMONT	189,917	--	--
VIRGINIA	2,524,938	1,049,113	1,108,752
WASHINGTON	2,437,771	--	--
WEST VIRGINIA	512,274	--	--
WISCONSIN	3,519,474	133,976	1,553,675
WYOMING	--	--	--
TOTAL:	160,670,288	43,846,637	61,499,878

SOURCE: ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY MAY 1996, AMERICAN LUNG ASSOCIATION, STATE AND COUNTY POPULATION ESTIMATES, 1992, U.S. BUREAU OF THE CENSUS, COUNTY DESIGN VALUES FOR OZONE NAAQS ALTERNATIVES, 1991-1993 AIRS DATA BASE, U.S. ENVIRONMENTAL PROTECTION AGENCY.

NOTE

-- INDICATES NO COUNTIES EXCEEDING OZONE LEVEL IN THAT STATE

TABLE 3: ESTIMATED POPULATIONS-AT-RISK LIVING IN COUNTIES WITH ONE OR MORE ANNUAL EXCEEDANCES OF A 0.07 ppm EIGHT HOUR AVERAGE OZONE LEVEL, BY STATE

STATE	POPULATIONS-AT-RISK						TOTAL POPULATION
	CHRONIC DISEASE			AGE (YEARS)			
	COPD (1)	ADULT ASTHMA	PEDIATRIC ASTHMA	<6	6-13	65+	
ALABAMA	102,273	59,848	30,242	132,392	237,720	238,788	1,838,448
ARIZONA	170,931	86,464	53,383	257,308	417,944	412,064	3,080,223
ARKANSAS	25,981	14,831	7,826	32,802	80,472	68,562	458,184
CALIFORNIA	1,539,948	817,845	493,517	2,552,345	3,777,513	2,999,578	28,556,818
COLORADO	97,221	58,812	30,044	137,021	242,083	181,464	1,803,583
CONNECTICUT	178,277	107,008	47,185	228,214	367,080	442,169	3,175,986
DELAWARE	38,147	22,888	10,890	52,225	86,000	84,965	690,884
DISTRICT OF COLUMBIA	32,337	20,895	7,341	40,009	55,000	77,028	585,221
FLORIDA	586,346	344,088	149,344	714,711	1,188,299	1,884,478	10,228,487
GEORGIA	94,587	58,878	29,572	137,848	231,048	178,407	1,752,472
ILLINOIS	512,150	301,518	153,247	716,790	1,200,218	1,187,405	9,281,143
INDIANA	177,080	104,273	52,480	229,278	414,428	405,385	3,194,784
IOWA	38,238	21,820	11,195	48,453	91,386	104,122	874,878
KANSAS	23,253	13,579	7,121	31,021	58,147	57,921	418,890
KENTUCKY	114,553	87,801	33,862	142,570	268,308	282,386	2,085,447
LOUISIANA	148,088	85,205	49,821	218,143	401,953	305,454	2,717,082
MAINE	52,087	30,884	14,808	62,074	118,412	128,858	932,478
MARYLAND	218,583	132,842	83,108	308,383	495,112	436,719	4,004,277
MASSACHUSETTS	294,815	170,048	78,987	378,887	598,837	735,221	5,283,446
MICHIGAN	390,105	229,295	118,854	535,808	942,911	682,924	7,078,480
MINNESOTA	23,008	13,425	7,137	31,240	58,473	52,455	417,381
MISSISSIPPI	71,215	42,082	8,874	89,774	29,878	55,284	384,380
MISSOURI	148,933	88,289	43,723	192,188	351,585	374,933	2,852,584
NEBRASKA	23,871	13,587	7,410	31,814	60,474	60,489	428,300
NEVADA	80,804	38,784	17,881	68,781	140,282	121,794	1,114,173
NEW HAMPSHIRE	46,511	28,082	13,500	62,284	108,824	98,879	648,386
NEW JERSEY	378,536	225,321	101,750	483,437	778,915	908,820	8,723,312
NEW MEXICO	12,710	7,253	4,388	16,753	38,291	25,521	233,577
NEW YORK	642,747	384,241	178,485	867,534	1,367,418	1,512,329	11,539,240
NORTH CAROLINA	183,329	98,417	45,828	215,849	351,408	385,488	2,954,921
OHIO	455,884	287,708	133,087	582,787	1,058,925	1,081,249	8,180,348
OKLAHOMA	74,883	43,085	22,713	97,241	183,984	181,412	1,337,415
OREGON	41,481	24,215	12,128	52,877	87,814	102,258	741,881
PENNSYLVANIA	495,755	289,518	145,021	629,874	1,058,742	1,222,717	8,870,584
RHODE ISLAND	42,495	25,385	11,091	53,342	86,468	115,215	753,084
SOUTH CAROLINA	99,300	58,007	30,143	137,384	234,958	208,533	1,812,877
TENNESSEE	185,469	88,847	48,854	208,781	368,800	378,424	2,877,818
TEXAS	571,213	334,200	193,492	901,321	1,529,374	1,078,324	10,815,507
UTAH	59,577	31,828	25,889	110,868	208,858	99,732	1,128,121
VERMONT	8,329	5,811	2,706	11,888	22,008	20,300	189,917
VIRGINIA	137,533	84,297	39,141	184,485	308,018	275,084	2,524,838
WASHINGTON	133,433	79,194	40,748	185,311	327,549	284,473	2,437,771
WEST VIRGINIA	29,142	17,048	7,684	30,856	62,305	77,808	512,274
WISCONSIN	195,818	115,843	59,389	252,773	484,991	470,895	3,519,474
TOTALS:	6,875,848	5,246,240	2,637,484	12,432,838	20,562,489	20,199,818	180,870,258

SOURCE: ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY, MAY 1986, AMERICAN LUNG ASSOCIATION; STATE AND COUNTY POPULATION ESTIMATES, 1992, U.S. BUREAU OF THE CENSUS; COUNTY DESIGN VALUES FOR OZONE NAAQS ALTERNATIVES, 1991-1993 AIRS DATA BASE, U.S. ENVIRONMENTAL PROTECTION AGENCY

TABLE 4: ESTIMATED POPULATIONS-AT-RISK LIVING IN COUNTIES WITH FIVE OR MORE ANNUAL EXCEEDANCES OF A 8.08 ppm EIGHT HOUR AVERAGE OZONE LEVEL

STATE	POPULATIONS-AT-RISK						TOTAL POPULATION
	CHRONIC DISEASE			AGE (YEARS)			
	COPD (1)	ADULT ASTHMA	PEDIATRIC ASTHMA	<6	6-13	65+	
CALIFORNIA	1,138,178	678,877	365,080	1,888,101	2,794,421	2,218,942	21,124,204
CONNECTICUT	113,531	68,148	30,038	145,332	233,788	281,680	2,022,542
DELAWARE	25,123	15,074	7,172	34,385	68,838	56,878	455,006
DISTRICT OF COLUMBIA	32,337	20,896	7,341	40,009	56,000	77,028	585,221
GEORGIA	38,122	23,822	12,230	68,828	95,853	72,858	724,783
INDIANA	7,448	851	428	1,871	3,382	3,308	28,070
MARYLAND	132,250	80,431	38,180	188,881	299,848	295,427	2,422,890
MASSACHUSETTS	18,775	11,403	4,904	23,988	38,125	46,823	338,480
MICHIGAN	28,384	18,888	8,838	38,846	68,838	82,721	514,245
NEW JERSEY	258,831	154,884	69,842	338,186	536,422	624,718	4,821,689
NEW YORK	85,323	57,583	26,745	130,010	204,823	228,840	1,729,289
OHIO	82,146	48,237	23,877	108,811	190,442	194,828	1,473,875
PENNSYLVANIA	148,589	88,784	43,480	188,782	318,887	388,428	2,858,357
RHODE ISLAND	8,859	5,477	2,383	11,810	18,882	24,880	182,483
TENNESSEE	1,932	1,152	547	2,448	4,283	4,430	34,770
TEXAS	158,938	93,875	54,177	252,388	428,221	301,828	2,871,755
VIRGINIA	57,145	35,025	16,283	78,854	127,151	114,288	1,048,113
WISCONSIN	7,452	4,328	2,280	9,822	16,482	17,828	133,878
TOTALS:	2,351,820	1,402,788	713,774	3,633,498	6,489,218	4,960,817	43,048,637

SOURCE: ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY, MAY 1986, AMERICAN LUNG ASSOCIATION; STATE AND COUNTY POPULATION ESTIMATES, 1992, U.S. BUREAU OF THE CENSUS; COUNTY DESIGN VALUES FOR OZONE NAAQS ALTERNATIVES, 1991-1993 AIRS DATA BASE, U.S. ENVIRONMENTAL PROTECTION AGENCY

1. COPD INCLUDES CHRONIC BRONCHITIS AND EMPHYSEMA.

TABLE 8. ESTIMATED POPULATIONS-AT-RISK LIVING IN COUNTIES WITH ONE OR MORE ANNUAL EXCEEDANCES OF A 0.12 ppm ONE HOUR AVERAGE OZONE LEVEL, BY STATE

STATE	POPULATIONS-AT-RISK						TOTAL POPULATION
	CHRONIC DISEASE			AGE (YEARS)			
	COPD (1)	ADULT ASTHMA	PEDIATRIC ASTHMA	<6	6-13	65+	
ARIZONA	122,818	70,832	38,279	184,577	298,808	295,611	2,208,587
CALIFORNIA	1,131,437	874,363	362,569	1,875,269	2,775,430	2,203,862	20,980,848
COLORADO	12,840	7,787	3,958	18,707	31,869	23,985	238,198
CONNECTICUT	178,277	107,008	47,185	228,214	367,060	442,189	3,175,866
DELAWARE	25,123	15,074	7,172	34,365	56,838	55,978	455,008
GEORGIA	73,810	44,258	23,011	107,108	179,788	137,270	1,363,889
INDIANA	4,989	2,928	1,473	6,434	11,630	11,378	89,858
LOUISIANA	25,746	14,813	8,082	37,577	69,881	53,104	472,375
MAINE	26,807	15,958	7,547	32,088	61,170	85,428	461,703
MARYLAND	119,337	72,578	34,452	188,346	270,299	239,512	2,186,075
MASSACHUSETTS	228,979	137,851	59,260	289,999	490,898	568,053	4,087,789
MICHIGAN	30,481	17,904	9,281	41,858	73,828	67,300	552,523
MISSOURI	56,185	32,545	18,488	72,522	132,826	141,444	1,000,890
NEW HAMPSHIRE	13,480	8,139	3,913	18,045	31,568	28,847	246,184
NEW JERSEY	231,857	138,803	62,860	303,970	478,832	559,856	4,141,732
NEW MEXICO	7,878	4,553	2,755	12,389	22,153	16,020	146,819
NEW YORK	268,757	180,866	74,823	382,750	571,770	632,363	4,825,003
OHIO	137,805	80,980	40,252	179,315	318,715	327,072	2,474,514
PENNSYLVANIA	187,131	108,284	54,741	237,758	398,886	461,535	3,348,253
RHODE ISLAND	9,189	5,477	2,363	11,510	16,862	24,880	162,493
SOUTH CAROLINA	7,517	4,467	2,282	10,389	17,785	15,851	137,211
TEXAS	327,285	191,485	110,864	516,425	878,278	817,842	6,081,107
VIRGINIA	89,394	57,018	17,187	81,011	134,379	120,786	1,108,752
WISCONSIN	88,278	50,188	28,208	111,587	214,100	207,877	1,553,875
TOTALS	3,377,335	2,004,717	1,017,265	4,841,592	7,675,975	7,316,191	61,499,578

SOURCE: ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY, MAY 1985. AMERICAN LUNG ASSOCIATION. STATE AND COUNTY POPULATION ESTIMATES 1992. U.S. BUREAU OF THE CENSUS. COUNTY DESIGN VALUES FOR OZONE MAASG ALTERNATIVE 8, 1981-1993. AQS DATA BASE. U.S. ENVIRONMENTAL PROTECTION AGENCY.

1. COPD INCLUDES CHRONIC BRONCHITIS AND EMPHYSEMA.

TABLE 8. ESTIMATED POPULATIONS-AT-RISK LIVING IN COUNTIES WITH ONE OR MORE ANNUAL EXCEEDANCES OF A 0.07 ppm EIGHT HOUR AVERAGE OZONE LEVEL.

COUNTY	OZONE LEVEL (1)	POPULATIONS-AT-RISK						TOTAL POPULATION
		CHRONIC DISEASE			AGE (YEARS)			
		COPD (2)	ADULT ASTHMA	PEDIATRIC ASTHMA	<6	6-13	65+	
ALABAMA								
CLAY CO	0.08	742	436	218	890	1,724	1,732	15,334
ELMORE CO	0.08	2,921	1,712	864	3,781	6,790	8,220	52,510
JEFFERSON CO	0.10	36,586	21,445	10,818	47,381	85,040	85,423	657,874
LAWRENCE CO	0.08	1,793	1,051	530	2,321	4,188	4,188	32,232
MADISON CO	0.08	13,978	8,192	4,133	18,092	32,486	32,821	251,229
MOBILE CO	0.08	21,853	12,882	6,403	28,020	50,330	50,868	389,254
MONTGOMERY CO	0.08	11,880	7,011	3,537	16,482	27,800	27,828	214,888
MOULDER CO	0.08	6,773	3,384	1,707	7,473	13,418	13,478	103,770
ORHOLBY CO	0.10	5,867	3,486	1,784	7,724	13,889	13,832	107,281
STUTLER CO	0.08	922	529	267	1,187	2,088	2,105	16,208
TOTALS		102,273	59,948	30,242	132,382	237,720	238,788	1,838,448
ARIZONA								
APACHE CO	0.10	3,481	2,011	1,080	3,258	6,537	6,417	62,818
AVARCOOP 4 CO	0.11	122,818	70,832	38,278	184,877	298,808	295,611	2,208,587
PIMA CO	0.08	36,301	22,083	11,957	57,856	93,851	92,340	890,202
YUMA CO	0.08	8,523	5,157	2,038	9,618	15,848	15,725	117,538
TOTALS		170,831	98,464	53,363	257,308	417,944	413,064	3,080,223
ARKANSAS								
CRITTENDEN CO	0.08	2,818	1,610	828	3,538	6,564	7,442	49,720
MISSISSIPPI CO	0.10	3,120	1,782	918	3,918	7,287	8,238	56,080
PLASKI CO	0.09	20,924	11,439	5,582	25,446	46,642	57,852	353,204
TOTALS		25,861	14,831	7,628	32,902	60,473	69,542	458,184
CALIFORNIA								
ALAMEDA CO	0.08	70,514	42,028	22,598	118,872	172,872	137,351	1,307,572
AMADOR CO	0.08	1,718	1,024	503	2,848	4,218	3,247	31,883
BUTTE CO	0.08	10,198	6,056	3,258	18,837	24,818	19,788	188,277
COLUSA CO	0.08	908	541	291	1,508	2,227	1,789	16,837
CONTRA COSTA CO	0.08	45,331	27,018	14,527	75,132	111,187	88,297	840,586
EL DORADO CO	0.11	7,452	4,441	2,388	12,350	18,278	14,818	138,177
FRESNO CO	0.12	38,082	22,880	12,196	63,088	93,342	74,118	705,813
GLENN CO	0.08	1,378	870	441	2,280	3,374	2,878	25,508
IMPERIAL CO	0.12	6,958	4,146	2,228	11,528	17,081	13,548	128,872
INYO CO	0.08	991	591	318	1,643	2,432	1,831	18,381
KERN CO	0.12	31,892	18,888	10,157	52,827	77,741	61,731	587,880
KINGS CO	0.08	5,791	3,452	1,858	9,598	14,205	11,280	107,384
LOS ANGELES CO	0.18	468,242	291,004	156,470	809,223	1,197,894	951,010	6,053,846
MADERA CO	0.11	8,340	3,183	1,711	8,851	13,086	10,402	89,023
MARIPOSA CO	0.10	827	493	265	1,371	2,029	1,811	15,338
MERCED CO	0.11	10,198	6,078	3,268	18,803	25,018	19,864	189,107

MONROE CO	0 10	537	320	172	890	1 317	1 046		8 956
MONTEREY CO	0 08	19 862	11 838	6 365	32 921	48 723	36 689		368 317
NAPA CO	0 08	6 108	2 678	1 957	10 120	14 877	11 863		113 220
NEVADA CO	0 08	4 465	2 833	1 437	7 434	11 003	8 737		83 178
ORANGE CO	0 13	133 809	79 868	42 843	222 063	328 701	261 000		2 484 789
PLACER CO	0 11	10 083	6 015	3 234	16 728	24 757	19 859		187 149
PLUMAS CO	0 08	1 117	868	358	1 851	2 798	2 175		20 707
RIVERSIDE CO	0 19	80 482	41 413	22 287	115 181	170 441	135 341		1 248 436
SACRAMENTO CO	0 12	58 956	35 138	18 894	97 715	144 818	114 836		1 083 237
SAN BENITO CO	0 08	2 071	1 234	864	3 432	5 078	4 033		38 365
SAN BERNARDINO CO	0 18	82 743	49 317	26 517	137 141	202 871	161 171		1 534 343
SAN DIEGO CO	0 12	140 289	83 903	44 953	232 485	344 081	273 222		2 801 055
SAN JOSE CO	0 08	27 184	16 203	8 712	45 058	68 884	52 951		504 081
SAN LUIS OBISPO CO	0 08	11 864	7 089	3 812	16 714	29 177	23 560		230 560
SANTA BARBARA CO	0 10	20 251	12 070	6 490	33 564	49 878	39 446		375 522
SANTA CLARA CO	0 08	82 430	49 130	26 417	136 821	202 202	160 560		1 528 527
SHASTA CO	0 08	6 498	5 086	2 724	14 088	20 848	16 566		157 509
SOLANO CO	0 08	18 518	11 632	6 254	32 346	47 873	38 014		361 890
SONOMA CO	0 08	21 825	12 889	6 830	35 841	53 048	42 121		400 982
STANISLAUS CO	0 10	21 313	12 703	6 830	35 325	52 281	41 514		395 216
SUTTER CO	0 10	3 746	2 233	1 201	6 209	9 188	7 297		86 498
TEHAMA CO	0 08	2 799	1 668	897	4 639	6 688	5 452		61 903
TULARE CO	0 11	17 854	10 642	5 722	29 592	43 797	34 778		331 081
TUOLUMNE CO	0 08	2 737	1 631	677	4 537	6 714	5 332		50 757
VENTURA CO	0 13	37 025	22 068	11 686	61 365	90 822	72 118		686 560
YOLO CO	0 08	8 809	4 855	2 503	12 843	19 158	15 211		144 811
TOTALS		1 539 848	817 845	493 517	2 562 345	3 777 513	2 969 578		28 566 916

COLORADO

ADAMS CO	0 08	15 183	8 188	4 892	21 400	37 804	28 340		291 877
ARAPAHOE CO	0 08	22 647	13 724	7 011	31 877	56 487	42 346		420 882
BOULDER CO	0 10	12 840	7 787	3 988	18 087	31 989	23 996		236 198
BRADWELL CO	0 08	2 963	2 389	1 221	5 320	9 838	7 378		73 308
JEFFERSON CO	0 08	24 566	14 856	7 589	34 811	61 141	45 834		458 534
LARIMER CO	0 08	10 680	6 480	3 300	15 063	26 591	18 834		198 124
WELD CO	0 08	7 323	4 430	2 282	10 322	18 233	13 869		135 858
TOTALS		97 221	58 812	30 044	137 031	242 083	181 464		1 803 563

CONNECTICUT

FAIRFIELD CO	0 12	48 318	27 822	12 307	58 848	95 783	115 381		828 713
HARTFORD CO	0 11	47 846	28 538	12 578	60 863	97 897	117 828		847 008
LITCHFIELD CO	0 10	8 907	5 946	2 821	12 682	20 389	24 572		177 409
MIDDLETOWN CO	0 12	8 112	4 689	2 148	10 384	18 702	20 120		144 807
NEW HAVEN CO	0 12	44 987	26 991	11 898	57 562	92 588	111 533		890 076
NEW LONDON CO	0 11	13 838	8 384	3 687	17 838	28 892	34 863		248 248
TOLLAND CO	0 12	7 294	4 378	1 930	6 337	15 019	18 092		129 846
TOTALS		176 277	107 000	47 180	228 214	367 080	442 189		3 175 986

DELAWARE

KENT CO	0 08	8 406	3 848	1 829	8 773	14 447	14 278		116 082
NEW CASTLE CO	0 12	25 123	15 074	7 172	34 388	56 838	55 978		456 008
SUSSEX CO	0 11	6 816	3 959	1 859	6 267	14 814	14 740		118 818
TOTALS		38 147	22 889	10 880	52 225	96 000	94 996		690 884

DISTRICT OF COLUMBIA

DISTRICT OF COLUMBIA	0 11	32 337	20 888	7 341	40 008	56 000	77 028		585 221
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FLORIDA

BREVARD CO	0 08	24 811	14 318	6 214	29 736	48 808	78 408		425 863
BROWARD CO	0 08	75 868	43 775	19 000	90 828	148 832	238 745		1 301 274
DADE CO	0 08	117 070	67 848	29 318	140 308	229 361	398 846		2 007 972
DADE CO	0 08	40 862	23 577	10 233	49 877	80 052	129 124		702 852
ESCAMBIA CO	0 08	15 796	9 114	3 956	18 932	30 848	48 917		270 336
HILLSBOROUGH CO	0 08	50 056	28 842	12 538	59 891	98 084	158 178		856 562
LEON CO	0 08	11 838	6 830	2 868	14 188	23 192	37 409		203 045
MANATEE CO	0 08	12 833	7 269	3 164	15 140	24 749	39 820		216 874
ORANGE CO	0 08	41 862	24 038	10 433	49 931	81 618	131 653		714 578
PALM BEACH CO	0 08	52 511	30 298	13 150	62 933	102 873	186 836		900 856
PASCAGO CO	0 08	18 508	9 568	4 149	19 884	32 456	52 350		284 143
PINELLAS CO	0 08	49 847	28 781	12 483	58 741	97 854	157 519		854 978
POLK CO	0 08	24 427	14 064	6 117	29 278	47 856	77 181		418 378
ST JOHNS CO	0 08	5 287	3 039	1 318	6 312	10 318	18 644		90 340
SARASOTA CO	0 08	18 447	9 480	4 119	19 712	32 222	51 974		282 104
SEMIWOLE CO	0 08	18 054	10 417	4 521	21 837	35 389	57 060		306 864
VOLUSIA CO	0 08	22 032	13 058	5 868	27 124	44 337	71 517		368 174
TOTALS		596 348	344 086	149 344	714 711	1 168 298	1 884 478		10 228 487

GEORGIA

DAWSON CO	0 11	30 418	18 280	8 508	44 281	74 294	56 725		563 817
DODD CO	0 11	4 089	2 467	1 272	5 921	9 839	7 589		75 388
FLYTON CO	0 13	36 828	21 877	11 234	52 292	87 774	87 017		688 795
MURDOCK CO	0 08	10 080	6 048	3 145	14 838	24 871	18 780		186 789
RICHMOND CO	0 08	10 927	6 570	3 418	15 900	26 888	20 377		202 434
ROCKDALE CO	0 11	3 185	1 915	968	4 834	7 778	5 939		56 896
TOTALS		84 567	58 878	29 572	137 846	231 248	176 407		1 752 472

ILLINOIS

ADAMS CO	0 08	3 868	2 158	1 098	5 148	8 508	8 381		89 329
CHAMPAIGN CO	0 08	9 858	5 703	2 898	13 569	22 703	22 082		178 178
COOK CO	0 10	284 210	187 323	85 042	396 883	608 044	647 835		5 139 341
DU PAGE CO	0 08	45 132	28 571	13 506	63 342	105 788	102 878		818 118
EFFINGHAM CO	0 08	1 775	1 084	531	2 491	4 156	4 046		32 091
JERSEY CO	0 08	1 161	684	347	1 829	2 721	2 848		29 884
KANE CO	0 08	18 450	10 862	5 521	25 894	43 237	42 056		333 828
LAKE CO	0 10	29 820	17 615	8 953	41 983	70 118	68 201		541 407
LIVINGSTON CO	0 10	2 193	1 291	656	3 078	5 140	5 000		38 864
LOGAN CO	0 08	1 696	998	507	2 380	3 974	3 868		30 887

MCHEMRY CO	0 06	11,063	6,513	3,310	15,527	25,927	25,216	200,066
MADON CO	0 09	6,507	3,831	1,847	8,133	15,248	14,833	117,898
MADCOUPR CO	0 08	2,842	1,555	790	3,790	8,190	8,021	47,796
MADISON CO	0 08	14,006	8,245	4,191	19,856	32,822	31,824	253,290
PEORIA CO	0 08	10,151	5,978	3,037	14,246	23,788	23,138	183,854
RANDOLPH CO	0 08	1,904	1,121	570	2,872	4,462	4,340	34,432
ROCK ISLAND CO	0 08	8,268	4,878	2,480	11,832	19,423	18,892	148,874
ST CLAIR CO	0 08	14,551	8,567	4,354	20,422	34,100	33,168	263,124
SANGAMON CO	0 09	10,030	5,965	3,001	14,078	23,508	22,854	191,360
WILL CO	0 08	20,797	12,228	6,214	29,145	48,968	47,336	375,518
WINNEBAGO CO	0 08	14,346	8,447	4,283	20,137	33,825	32,705	256,454
TOTALS		512,150	301,518	153,247	718,790	1,200,218	1,187,405	8,261,143

INDIANA

ALLEN CO	0 10	18,908	9,857	5,011	21,894	38,574	38,700	308,075
BARTHOLOMEW CO	0 04	3,330	2,138	1,078	4,701	8,498	8,311	65,498
CARRROLL CO	0 09	1,071	831	317	1,387	2,507	2,452	19,328
CLARK CO	0 11	4,969	2,928	1,473	6,434	11,830	11,378	89,858
ELIHART CO	0 09	8,830	5,200	2,817	11,434	20,887	20,215	159,317
HAMILTON CO	0 09	8,722	3,959	1,992	8,705	15,734	16,390	121,293
HANDCOCK CO	0 10	2,533	1,551	780	3,409	6,183	6,028	47,507
HUNTINGTON CO	0 09	1,978	1,185	586	2,581	4,829	4,528	35,886
JASPER CO	0 09	1,440	848	427	1,865	3,371	3,298	25,980
LAKE CO	0 10	28,703	15,728	7,915	34,579	62,502	61,136	481,816
LA PORTE CO	0 10	6,034	3,554	1,789	7,814	14,124	13,815	106,878
MADISON CO	0 08	7,291	4,294	2,181	9,441	17,064	16,891	131,548
MARION CO	0 10	45,049	26,530	13,352	58,335	105,441	103,136	812,835
MORGAN CO	0 09	3,252	1,915	964	4,211	7,811	7,444	58,870
PORTER CO	0 10	7,480	4,405	2,217	9,887	17,509	17,128	134,972
POSEY CO	0 11	1,445	851	426	1,871	3,382	3,308	28,070
ST JOSEPH CO	0 09	13,885	8,177	4,115	17,978	32,498	31,768	250,528
VANDERBURGH CO	0 10	9,220	5,430	2,733	11,939	21,579	21,108	168,363
VIGO CO	0 09	5,937	3,488	1,780	7,888	13,895	13,582	107,124
WARRICK CO	0 10	2,584	1,527	766	3,348	6,047	5,915	46,818
TOTALS		177,060	104,273	52,480	229,278	414,478	405,365	3,194,784

IOWA

LINN CO	0 08	8,808	5,596	2,871	11,915	23,439	26,706	172,882
POLK CO	0 09	18,180	10,848	5,818	23,818	45,859	55,550	333,861
SCOTT CO	0 08	8,905	5,024	2,578	10,886	21,042	23,975	154,210
VAN BUREN CO	0 08	438	250	128	532	1,048	1,192	7,715
TOTALS		38,238	21,620	11,195	46,553	81,388	104,122	674,078

KANSAS

SEDGWICK CO	0 08	23,253	13,378	7,121	31,021	58,147	57,921	418,880
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KENTUCKY

BELL CO	0 08	1,711	1,010	503	2,129	3,977	3,918	30,844
BOONE CO	0 09	3,500	2,085	1,028	4,356	8,137	8,107	63,107
BOYD CO	0 09	2,842	1,877	835	3,537	6,806	6,508	51,234
BULLITT CO	0 10	2,836	1,873	833	3,529	6,592	6,486	51,128
CAMPBELL CO	0 09	4,718	2,783	1,386	5,870	10,984	10,803	83,024
CHRISTIAN CO	0 08	3,780	2,231	1,111	4,705	8,789	8,880	68,183
DAVIESS CO	0 08	4,928	2,907	1,447	6,130	11,451	11,283	88,813
EDMONSON CO	0 08	569	336	187	708	1,323	1,304	10,281
FAYETTE CO	0 09	12,868	7,812	3,790	18,063	29,985	29,545	232,562
GALLATIN CO	0 08	1,878	1,109	552	2,232	4,388	4,323	33,874
GREENUP CO	0 10	2,050	1,218	606	2,564	4,789	4,718	37,142
HANCOCK CO	0 09	437	258	129	544	1,017	1,002	7,887
HARDIN CO	0 09	4,684	2,784	1,378	5,830	10,869	10,729	84,456
HENDERSON CO	0 09	2,429	1,434	714	3,023	6,847	5,585	43,801
JEFFERSON CO	0 10	37,208	21,958	10,833	48,306	88,494	86,224	670,837
JESSAMINE CO	0 08	1,794	1,059	527	2,233	4,172	4,110	32,355
KENTON CO	0 09	7,882	4,888	2,340	8,909	18,509	18,237	143,550
LAWRENCE CO	0 09	818	482	240	1,018	1,888	1,870	14,720
LIVINGSTON CO	0 09	508	300	149	632	1,181	1,183	8,157
MACRACKEN CO	0 09	3,533	2,085	1,038	4,397	8,214	8,083	63,707
MCLAIN CO	0 09	535	316	157	666	1,245	1,227	9,855
OLDHAM CO	0 09	2,022	1,193	564	2,517	4,701	4,832	36,481
PERRY CO	0 08	1,722	1,018	508	2,143	4,004	3,948	31,052
PIKE CO	0 08	4,068	2,401	1,195	6,083	9,457	9,318	73,351
PULASKI CO	0 08	2,858	1,686	839	3,555	6,840	6,542	51,488
SCOTT CO	0 08	1,403	826	412	1,748	3,261	3,213	25,288
SIMPSON CO	0 08	860	508	253	1,071	2,000	1,870	15,510
TOTALS		114,563	67,601	33,662	142,570	268,308	262,368	2,065,447

LOUISIANA

ASCENSION PAR	0 11	3,322	1,911	1,117	4,848	9,018	8,851	80,944
BEAUREGARD PAR	0 08	1,895	975	570	2,474	4,800	3,486	31,064
BOSSIER PAR	0 09	4,713	2,712	1,388	8,878	12,793	9,721	86,474
CADDO PAR	0 09	13,425	7,724	4,517	19,595	36,440	27,892	248,325
CALCASIEU PAR	0 09	9,348	5,378	3,145	13,843	25,372	19,281	171,807
EAST BATON ROUGE PAR	0 10	21,348	12,281	7,181	31,154	57,938	44,027	361,832
IBERVILLE PAR	0 10	1,894	974	570	2,472	4,587	3,483	31,073
JEFFERSON PAR	0 08	24,848	14,354	8,393	36,413	67,718	51,459	457,738
LAFAYETTE PAR	0 08	9,337	5,372	3,141	13,828	25,343	19,259	171,313
LAFOURCHE PAR	0 08	4,717	2,720	1,389	8,889	12,829	9,748	86,723
LIVINGSTON PAR	0 09	4,030	2,310	1,358	5,863	10,940	8,313	73,848
ORLEANS PAR	0 08	26,684	15,353	8,077	38,947	72,429	66,040	488,886
OUACHITA PAR	0 08	7,898	4,544	2,857	11,528	21,437	18,291	144,910
POINTE COUPEE PAR	0 09	1,238	711	418	1,804	3,356	2,550	22,683
ST BERNARD PAR	0 09	3,852	2,101	1,229	5,330	9,912	7,532	67,022
ST CHARLES PAR	0 08	2,418	1,381	814	3,530	6,584	4,688	44,372
ST JAMES PAR	0 08	1,131	851	381	1,651	3,070	2,333	20,753
ST JOHN THE BAPTIST PAR	0 09	2,244	1,291	755	3,278	6,092	4,829	41,779
ST MARY PAR	0 08	3,182	1,819	1,064	4,918	8,583	8,522	58,018
WEST BATON ROUGE PAR	0 10	1,079	621	363	1,575	2,929	2,278	19,799
TOTALS		148,088	85,205	48,821	218,143	401,953	305,454	2,717,082

MAINE										
CLAMBERLAND CO	0 11	13 851	8 097	3 829	16 768	31 033	33 193	244 378		
HANCOCK CO	0 10	2 879	1 586	751	3 193	8 515	8 515	47 963		
KENNEBEC CO	0 06	8 543	3 681	1 835	7 798	14 878	15 811	117 143		
KNOX CO	0 12	2 053	1 218	578	2 447	4 868	4 963	35 780		
OXFORD CO	0 08	2 838	1 743	854	3 502	8 681	7 146	52 157		
PENOBSCOT CO	0 09	8 177	4 850	2 294	8 745	18 589	18 884	148 388		
SAGadahOC CO	0 10	1 897	1 125	532	2 261	4 313	4 913	33 963		
SOMERSET CO	0 08	2 836	1 687	795	3 380	8 447	8 898	50 770		
WASHINGTON CO	0 10	2 005	1 180	562	2 390	4 568	4 878	35 897		
YORK CO	0 11	8 306	5 520	2 810	11 090	21 158	22 879	188 902		
TOTALS		52 087	30 884	14 609	62 074	118 412	128 858	932 478		
MARYLAND										
ALLEGANY CO	0 08	4 070	2 475	1 175	5 741	8 218	8 188	74 550		
ANNE ARUNDEL CO	0 11	24 099	14 857	8 957	33 998	54 585	48 368	441 464		
BALTIMORE CO	0 11	38 493	23 411	11 113	54 302	87 187	77 257	708 138		
CARROLL CO	0 11	7 122	4 331	2 058	10 047	18 132	14 294	130 466		
Cecil CO	0 11	4 064	2 490	1 182	5 779	9 273	8 217	74 904		
CHARLES CO	0 11	5 790	3 521	1 872	8 188	13 115	11 821	108 068		
HARFORD CO	0 12	10 872	6 490	3 081	15 066	24 172	21 419	195 489		
KENT CO	0 11	1 003	810	290	1 418	2 272	2 013	18 458		
MONTGOMERY CO	0 10	42 838	25 830	12 309	80 145	98 870	85 971	781 022		
PRINCE GEORGE'S CO	0 11	40 978	24 820	11 829	57 804	97 810	82 239	750 814		
BALTIMORE CITY	0 08	39 837	24 108	11 443	55 348	88 779	79 553	728 986		
TOTALS		218 583	132 842	63 108	308 363	486 112	438 718	4 004 277		
MASSACHUSETTS										
BARNSTABLE CO	0 11	10 548	6 408	2 754	13 478	21 418	28 301	188 008		
BERKSHIRE CO	0 10	7 838	4 637	1 864	9 756	15 503	18 800	136 828		
BIRCH CO	0 10	28 268	17 188	7 343	38 599	57 399	70 488	508 363		
BRISTOL CO	0 11	37 388	22 705	8 784	47 764	75 812	83 232	888 984		
BRISTOL CO	0 11	25 229	15 322	6 586	32 234	51 229	62 818	452 140		
HAMPDEN CO	0 11	8 229	4 988	2 149	10 254	18 708	20 522	147 474		
MIDDLESEX CO	0 11	77 807	47 254	20 321	89 410	157 982	184 040	1 384 408		
PLYMOUTH CO	0 10	24 533	14 898	8 407	31 344	49 815	81 181	438 958		
SUFFOLK CO	0 08	35 868	21 321	9 218	45 218	68 423	88 947	638 192		
WORCESTER CO	0 11	39 515	23 999	10 320	50 488	60 238	88 548	708 184		
TOTALS		294 813	179 048	78 987	378 867	586 637	735 221	5 283 446		
MICHIGAN										
ALLEGAN CO	0 11	5 131	3 018	1 583	7 048	12 402	11 360	83 078		
BENZIE CO	0 11	886	408	212	856	1 881	1 838	12 118		
BERRIEN CO	0 10	8 901	5 332	2 712	12 228	21 815	18 880	181 488		
CASS CO	0 10	7 707	4 581	825	3 718	8 844	8 988	48 112		
CLINTON CO	0 08	3 274	1 925	998	4 487	7 814	7 243	56 387		
DELTA CO	0 11	2 108	1 238	642	2 883	5 081	4 859	34 208		
DICKINSON CO	0 08	1 488	875	454	2 048	3 800	3 284	27 014		
GENESEE CO	0 08	23 888	14 047	7 281	32 824	57 783	52 863	433 508		
HURON CO	0 08	1 978	1 133	587	2 848	4 891	4 288	34 977		
INGHAM CO	0 09	15 535	9 131	4 311	21 337	37 548	34 383	281 708		
KALAMAZOO CO	0 08	12 438	7 312	3 790	17 085	30 087	27 518	225 848		
KENT CO	0 10	28 225	18 580	8 599	38 787	68 222	62 434	511 982		
LENAWEE CO	0 08	5 189	3 050	1 581	7 127	12 543	11 478	84 137		
MACOMB CO	0 10	40 145	23 588	12 231	55 138	87 033	88 801	728 220		
MASON CO	0 13	1 456	858	444	2 000	3 520	3 222	28 420		
MONROE CO	0 08	7 495	4 426	2 284	10 298	18 118	18 580	138 862		
MONTCALM CO	0 10	3 057	1 797	831	4 189	7 388	8 781	56 446		
MUSKEGON CO	0 11	8 929	5 248	2 721	12 265	21 583	18 782	181 880		
OAKLAND CO	0 08	81 868	36 248	18 788	84 898	149 051	136 407	1 118 011		
OCEANA CO	0 11	1 285	744	388	1 738	3 058	2 798	22 954		
OTTAWA CO	0 13	10 879	6 383	3 314	14 839	26 288	24 058	187 297		
ST CLAIR CO	0 11	8 274	4 863	2 521	11 364	18 888	18 302	150 085		
VAN BUREN CO	0 08	3 887	2 344	1 215	5 477	8 838	8 820	73 311		
WASHTENAW CO	0 10	15 878	9 333	4 838	21 808	38 378	35 123	288 028		
WAYNE CO	0 10	115 558	87 821	35 207	158 717	279 308	255 814	2 096 179		
TOTALS		380 108	229 295	118 854	535 809	842 911	882 924	7 078 480		
MINNESOTA										
ANKA CO	0 08	14 278	8 331	4 429	19 385	38 285	32 560	258 988		
WASHINGTON CO	0 08	8 731	5 094	2 708	11 854	22 188	18 805	158 373		
TOTALS		23 008	13 425	7 137	31 240	58 473	52 565	417 361		
MISSISSIPPI										
ADAMS CO	0 08	1 818	1 092	630	2 701	4 888	4 335	34 749		
DE SOTO CO	0 09	4 085	2 327	1 343	5 753	10 842	8 234	74 020		
FRANKLIN CO	0 08	451	257	148	638	1 174	1 018	8 187		
HANCOCK CO	0 08	1 838	1 047	804	2 588	4 787	4 154	33 297		
JACKSON CO	0 08	8 878	3 803	2 195	8 404	17 388	15 084	120 982		
MADISON CO	0 08	3 213	1 830	1 058	4 524	8 388	7 282	54 211		
SHARKEY CO	0 08	385	218	127	543	904	871	6 880		
WARREN CO	0 08	2 847	1 508	870	3 728	6 698	5 884	47 984		
TOTALS		21 215	12 082	8 874	28 875	56 264	47 964	384 380		
MISSOURI										
CLAY CO	0 08	8 822	5 174	2 823	11 528	21 085	22 485	158 080		
JACKSON CO	0 08	38 800	20 821	10 484	48 838	84 041	88 882	634 087		
JEFFERSON CO	0 08	10 010	5 798	2 838	12 817	23 831	25 201	178 288		
MONROE CO	0 08	498	289	148	643	1 177	1 256	8 877		
PLATTE CO	0 08	3 481	2 005	1 018	4 488	8 170	8 713	81 843		
ST CHARLES CO	0 10	12 701	7 357	3 730	18 380	29 983	31 878	228 215		
ST LOUIS CO	0 11	58 189	32 548	18 488	72 502	132 838	141 444	1 020 880		
CHARLES CITY	0 08	21 545	12 480	6 327	27 802	50 882	54 238	383 733		
TOTALS		148 833	88 289	43 733	192 188	361 565	374 833	2 852 584		

NEBRASKA

DOUGLAS CO	0 08	23,871	13,587	7,410	31,814	80,474	80,488	428,380
NEVADA								
CLARK CO	0 08	46,275	27,803	13,571	67,380	108,304	92,438	845,833
WASHOE CO	0 09	14,822	8,861	4,310	21,401	33,758	29,365	288,540
TOTALS		60,904	36,764	17,881	66,791	140,062	121,794	1,114,173

NEW HAMPSHIRE

CHESHIRE CO	0 08	3,867	2,338	1,122	5,177	9,056	6,304	70,818
COOS CO	0 08	1,842	1,138	548	2,320	4,408	4,042	34,372
HILLSBOROUGH CO	0 10	18,021	11,243	5,408	24,828	43,808	39,888	340,052
MERRIMACK CO	0 08	8,588	3,864	1,908	8,788	16,378	14,098	118,882
ROCKINGHAM CO	0 11	13,480	8,138	3,813	13,846	21,568	28,847	248,164
SULLIVAN CO	0 08	2,069	1,265	608	2,905	4,908	4,500	38,288
TOTALS		46,811	28,082	13,500	62,264	108,924	99,879	849,368

NEW JERSEY

ATLANTIC CO	0 11	12,840	7,688	3,472	16,838	28,580	31,013	229,430
BERGEN CO	0 10	46,783	27,863	12,637	61,281	98,735	112,868	834,983
BURLINGTON CO	0 12	22,269	13,328	6,018	29,183	46,067	53,750	387,831
CAMDEN CO	0 12	28,438	17,018	7,684	37,264	68,823	88,833	507,735
CLATSOPLAND CO	0 11	7,756	4,641	2,096	10,184	18,045	18,721	138,484
ESSEX CO	0 08	43,318	25,820	11,705	68,763	89,803	104,847	773,420
GLOUCESTER CO	0 12	13,208	7,838	3,588	17,384	27,442	32,018	236,867
HUDSON CO	0 12	31,080	18,588	8,380	40,729	64,253	73,015	564,860
HUNTERDON CO	0 11	6,268	3,751	1,684	8,214	12,888	15,128	111,813
MERCER CO	0 13	18,362	10,882	4,988	24,080	37,864	44,296	327,894
MIDDLESEX CO	0 11	38,333	22,838	10,368	50,234	78,298	92,821	684,458
MONMOUTH CO	0 12	31,898	18,898	8,388	41,535	65,884	78,468	588,828
MORRIS CO	0 12	23,878	14,348	6,480	31,423	48,803	57,878	428,168
OCLEAN CO	0 12	24,548	14,688	6,833	32,188	50,780	58,248	438,315
UNION CO	0 10	17,879	10,533	4,458	36,207	57,195	66,887	493,340
TOTALS		378,538	225,321	101,750	483,437	778,915	908,820	8,723,312

NEW MEXICO

DONA ANA CO	0 08	1,878	4,563	2,758	17,388	22,153	18,020	148,818
LOS ALAMOS CO	0 08	988	588	342	1,537	2,747	1,888	18,178
SANDOVAL CO	0 08	3,742	2,136	1,292	5,818	10,382	7,515	68,778
TOTALS		12,710	7,253	4,388	18,783	35,291	25,821	233,577

NEW YORK

ALBANY CO	0 08	18,314	8,783	4,530	22,019	34,707	38,388	292,888
BRONX CO	0 08	88,841	38,778	18,478	88,813	141,883	158,898	1,184,814
CHAUTAUQUA CO	0 08	7,880	4,717	2,181	10,850	18,788	18,588	141,858
CHEMUNG CO	0 08	5,303	3,170	1,472	7,157	11,282	12,477	95,203
CATTARAUGUS CO	0 10	14,841	8,783	4,088	18,782	31,148	34,450	282,858
FRYE CO	0 10	34,187	32,378	15,037	73,088	118,218	127,428	872,288
ESSEX CO	0 10	2,080	1,250	580	2,821	4,447	4,918	37,528
HAMILTON CO	0 08	300	178	83	404	637	708	5,378
HERKIMER CO	0 08	3,685	2,202	1,023	4,874	7,641	8,772	68,188
JEFFERSON CO	0 11	6,331	3,783	1,758	8,545	13,488	14,897	113,883
MADISON CO	0 10	3,988	2,368	1,098	5,342	8,220	8,313	71,058
MONROE CO	0 08	40,381	24,122	11,204	54,483	85,845	84,842	724,418
NEW YORK CO	0 08	82,842	48,584	23,030	111,950	178,458	195,157	1,488,088
NAGARA CO	0 10	12,344	7,378	3,427	18,881	28,281	29,044	221,812
ONEIDA CO	0 08	14,047	8,387	3,900	18,880	29,884	33,051	252,185
ONTARIO CO	0 10	26,381	15,777	7,328	38,821	68,147	82,087	673,808
QUEENS CO	0 11	138,878	64,887	30,174	168,881	231,200	258,702	1,851,034
RICHMOND CO	0 11	21,784	13,023	6,048	29,402	46,344	51,255	381,088
SARATOGA CO	0 08	6,340	3,780	1,780	8,567	13,888	14,817	113,818
SCHENECTADY CO	0 08	10,483	6,273	2,914	14,832	22,242	24,880	188,387
SULLY CO	0 12	74,538	44,560	20,887	100,880	158,578	179,388	1,338,204
ULSTER CO	0 10	8,424	5,634	2,817	12,720	20,050	22,174	188,183
WAYNE CO	0 10	5,088	3,041	1,412	6,888	10,821	11,887	91,313
WESTCHESTER CO	0 11	48,118	29,384	13,838	88,298	134,487	115,571	881,822
TOTALS		642,747	384,241	178,488	867,834	1,387,618	1,512,328	11,538,240

NORTH CAROLINA

CALDWELL CO	0 08	3,987	2,380	1,113	5,188	8,538	8,877	71,788
CAMDEN CO	0 10	338	205	95	448	730	780	6,142
CLATSOPLAND CO	0 08	18,328	8,238	4,301	20,779	32,880	34,382	277,322
DAVE CO	0 08	1,572	647	441	2,058	3,382	3,517	28,430
DURHAM CO	0 08	2,242	1,361	628	2,837	4,824	5,018	40,588
DURHAM CO	0 08	10,388	6,264	2,917	13,818	22,387	23,283	188,077
EDGEcombe CO	0 10	3,108	1,872	872	4,088	6,884	6,952	56,202
FORSYTH CO	0 10	14,878	8,028	4,028	18,820	32,225	33,817	270,871
FRANKLIN CO	0 10	1,384	1,264	588	2,747	4,812	4,883	37,840
GRAHAMVILLE CO	0 10	2,188	1,308	608	2,837	4,858	4,848	38,178
GUILFORD CO	0 08	18,773	11,818	6,848	25,802	42,543	44,248	367,377
HAYWOOD CO	0 08	2,854	1,588	745	3,477	5,711	6,840	48,018
JOHNSON CO	0 08	4,780	2,888	1,338	6,235	10,241	10,882	86,117
LINCOLN CO	0 08	2,808	1,781	818	3,808	6,251	6,502	52,888
MARTIN CO	0 08	1,384	840	391	1,827	3,020	3,103	25,028
MICKLENSBURG CO	0 10	29,723	17,810	8,338	38,854	63,848	68,813	637,738
NEW HANOVER CO	0 08	7,084	4,257	1,882	6,284	10,188	10,808	127,808
PERSON CO	0 08	1,711	1,031	480	2,241	3,881	3,828	30,882
PUTT CO	0 08	8,214	3,744	1,744	8,140	13,370	13,808	112,828
ROCKINGHAM CO	0 08	4,808	2,888	1,348	6,284	10,338	10,782	88,827
WAKE CO	0 10	25,288	15,225	7,088	33,088	64,384	68,844	487,138
YANCEY CO	0 08	868	522	243	1,138	1,884	1,830	15,873
TOTALS		163,328	98,417	45,828	213,848	351,408	368,488	2,854,821

OHIO

ALLIEN CO	0 08	8,140	3,808	1,792	7,884	14,238	14,883	110,178
ASHTABULA CO	0 10	5,828	3,303	1,642	7,313	13,040	13,340	100,824

BUTLER CO	0 10	17 000	8 863	4 982	22 105	36 412	40 318	306,041
CLARK CO	0 10	8 242	4 840	2 408	10 717	19 108	19,848	147,881
CLEMONT CO	0 08	8 814	5 178	2 573	11 481	20,426	20,808	158,180
CLINTON CO	0 11	7 044	1,201	587	3 858	4 740	4,848	36 986
CUYAHOGA CO	0 12	78 847	46 182	22 958	102,283	182,352	188,238	1,411,200
FRANKLIN CO	0 10	55,290	32 467	16 138	71 892	128 182	131 132	962,005
HAMILTON CO	0 11	48 586	28 537	14 185	63 191	112 868	115 261	872,026
JEFFERSON CO	0 10	4 437	2 808	1,295	5 770	10,288	10,524	78 823
JONES CO	0 10	2 702	1 586	789	3 512	8 284	8 408	48 478
LAKE CO	0 10	12,285	7,214	3,559	15 874	28 481	29 138	220,438
LAWRENCE CO	0 11	3 517	2 086	1 027	4 573	8 153	8 341	63 105
LICKING CO	0 10	7 355	4 318	2 147	9 584	17,082	17 444	131 878
LOGAN CO	0 10	2 438	1 430	711	3 187	6 646	5 778	43 701
LORAIN CO	0 08	15 418	9 084	4 501	20,046	35 748	36 570	278 879
LUCAS CO	0 10	25 720	15 103	7 507	33,443	66 828	61 000	461 808
MADEIRA CO	0 08	2 171	1,275	634	2 823	5 033	5 149	38 862
MAHONING CO	0 10	14 802	8 892	4 321	19 247	34 317	35 107	265 807
MEDINA CO	0 10	7 182	4,208	2 080	9 312	18 804	18 888	128 813
MIAMI CO	0 08	5 284	3 105	1 544	6 878	12 281	12 543	94 884
MONTGOMERY CO	0 10	32,248	18 938	9 413	41 831	74 782	78 483	578 462
PORTAGE CO	0 10	8 148	4 785	2 378	10 585	18 881	19 326	146 200
PREBLE CO	0 08	7 230	1 338	665	2,984	5 285	5 407	40 804
STARBUCK CO	0 10	20 738	12 178	6 053	28 868	48 080	49 188	372 125
SUMMIT CO	0 11	29 158	17 122	8 511	37 512	67 588	89 183	523 181
TRUMBULL CO	0 10	12 807	7 520	3 738	18 053	29 861	30 378	229 800
TUSCARAWAS CO	0 08	4 786	2 798	1 391	6 187	11 049	11 303	85 518
UNION CO	0 10	1 878	1 103	548	2 441	4 353	4 453	33 880
WARREN CO	0 10	8 677	3 821	1 948	8 882	15 481	15 837	119 818
WASHINGTON CO	0 11	3 488	2 054	1 021	4 548	8 110	8 295	52 788
TOTALS		456,884	287 708	133,087	562 787	1,068,825	1 081,248	8 180,348

OKLAHOMA

CLEVELAND CO	0 08	10 129	5 841	3 080	13 188	24 800	24 804	181 888
MACLAIR CO	0 08	1 310	756	399	1 708	3,221	3 182	23 487
OKLAHOMA CO	0 08	34 214	19 730	10 408	44 548	84 110	83 111	812 713
TULSA CO	0 10	29 029	16 738	8 828	37 797	71 362	70 514	518 847
TOTALS		74 683	43 085	22 713	87 241	163,884	161 412	1,337 415

OREGON

CLACKAMAS CO	0 10	16 883	8 880	4 864	21 882	38 087	40 828	298 808
JACKSON CO	0 08	8 812	5 029	2 518	10 841	20 275	21 240	154 000
LANE CO	0 08	18 258	8 483	4 758	20 854	38 272	40 283	290 888
TOTALS		41 461	24 213	12 128	52,877	97 614	102 356	741 881

PENNSYLVANIA

ALLEGHENY CO	0 11	74 878	43 882	21 818	84 781	158 888	183 832	1 334 388
BEAVER CO	0 10	10 544	8 187	3 084	13 388	22 478	28 008	188 888
BERKS CO	0 11	19 177	11 188	5 810	24 388	40 877	47 298	343 138
BLAIR CO	0 08	7 338	4 288	2 147	8 325	15 844	18 101	131 318
BUCKS CO	0 11	31 088	18 188	9 084	36 500	68 288	78 877	588 278
CAMBERA CO	0 10	9 058	5 288	2 850	11 510	19 210	22 343	162 088
DAUPHIN CO	0 10	13 528	7 888	3 987	17 188	29 832	33 381	242 028
DELAWARE CO	0 11	30 711	17 838	8 884	36 518	68 482	75 744	548 808
ERIE CO	0 08	15 827	9 128	4 571	19 858	33 310	38 842	278 818
LACKAWANNA CO	0 11	12 158	7 088	3 568	15 443	25 808	28 878	217 484
LANCASTER CO	0 10	24 278	14 178	7 102	30 847	51 763	69 881	434 428
LAWRENCE CO	0 08	5 383	3 148	1 577	6 851	11 485	13 300	98 488
LEHIGH CO	0 10	18 544	9 882	4 840	21 020	35 285	40 804	298 827
LUZERNE CO	0 10	18 383	10 738	5 377	23 388	38 188	46 338	328 827
LYCOMING CO	0 08	8 733	3 832	1 889	9 854	14 351	16 808	120 488
MERCER CO	0 10	8 823	3 888	1 888	8 888	14 348	18 828	122 081
MONTGOMERY CO	0 10	38 582	22 520	11 280	48 888	82 188	85 108	688 888
NORTHAMPTON CO	0 10	14 108	8 238	4 128	17 822	30 087	34 780	252 388
PERRY CO	0 10	2 370	1 384	683	3 011	6 052	6 848	42 408
PHILADELPHIA CO	0 11	88 788	50 872	25 382	110 243	184 888	214 008	1 582 872
WASHINGTON CO	0 10	11 518	8 728	3 288	14 821	24 847	28 802	208 084
WESTMORELAND CO	0 08	20 818	12 218	6 118	28 878	44 580	41 883	314 300
YORK CO	0 10	18 587	11 421	5 721	24 848	41 887	48 234	348 832
TOTALS		495 756	289 518	145 021	629 874	1,058 748	1,222 717	8 670 584

RHODE ISLAND

KENT CO	0 12	9 188	5 477	2 383	11 510	18 882	24 880	162 483
PROVIDENCE CO	0 08	33 325	19 808	8 888	41 833	67 827	80 355	580 581
TOTALS		42 466	25 286	11 001	53 342	86 488	115 218	753 084

SOUTH CAROLINA

ABBEVILLE CO	0 08	1 318	784	400	1 824	3 120	2 783	24 072
ANDERSON CO	0 08	7 043	4 188	2 138	9 744	18 888	14 881	128 888
ANDERSON CO	0 08	8 123	4 827	2 488	11 238	18 218	17 140	148 278
BARNWELL CO	0 08	1 158	687	351	1 588	2 734	2 438	21 088
BERKELEY CO	0 08	7 480	4 433	2 288	10 321	17 882	15 742	138 184
CHARLESTON CO	0 08	18 888	9 818	5 088	23 084	38 478	35 207	304 378
CHESTER CO	0 08	2 488	1 458	758	3 288	5 811	5 271	46 882
CHESTER CO	0 08	1 788	1 083	543	2 478	4 233	3 778	32 888
DARLINGTON CO	0 08	3 488	2 072	1 058	4 423	8 248	7 357	63 842
EDGEFIELD CO	0 08	1 022	807	310	1 414	2 418	2 157	18 880
OCONEE CO	0 08	3 231	1 920	981	4 470	7 845	8 817	58 878
PICKENS CO	0 08	5 404	3 211	1 641	7 477	12 787	11 403	98 882
ROCKLAND CO	0 10	18 108	8 571	4 888	22 283	38 108	33 888	278 084
SPARTANBURG CO	0 08	12 757	7 581	3 873	17 850	30 188	28 818	232 378
UNION CO	0 08	1 878	998	508	2 318	3 984	3 538	30 878
WILLIAMSBURG CO	0 08	2 030	1 208	618	2 808	4 803	4 283	37 082
YORK CO	0 11	7 517	4 487	2 282	10 389	17 785	15 881	127 211
TOTALS		98 300	58 007	30 143	137 384	234 888	208 533	1 812 877

TENNESSEE

ANDERSON CO	0 08	3 918	2 338	1 110	4 888	8 887	8 888	70 828
BLOUNT CO	0 08	5 023	2 995	1 422	8 368	11 138	11 518	80 400
DAVIDSON CO	0 08	28 773	17 153	8 147	36 474	63 781	68 878	617 888

FAYETTE CO	0 08	1 444	861	409	1 831	3 202	3 312	25 885
HAMILTON CO	0 09	18 039	9 582	4 542	20 332	35 554	36 777	288 837
HAYWOOD CO	0 10	1 082	845	308	1 372	2 399	2 461	16 474
JEFFERSON CO	0 10	1 932	1 53	547	2 449	4 283	4 430	44 300
KNOX CO	0 10	19 314	11 514	5 489	24 484	42 814	44 288	347 883
MAHON CO	0 08	4 458	2 558	1 282	5 861	8 883	10 223	80 230
MAURY CO	0 08	3 320	1 979	940	4 208	7 359	7 612	59 740
RUTHERFORD CO	0 08	7 153	4 265	2 023	9 068	15 857	18 403	126 731
SEVIER CO	0 09	3 038	1 811	860	3 851	6 734	8 966	54 870
SHELBY CO	0 10	46 848	27 867	13 293	56 512	104 066	107 848	844 847
SULLYVAH CO	0 09	8 150	4 858	2 308	10 332	18 087	19 880	148 978
SUMNER CO	0 11	5 908	3 578	1 598	7 933	13 296	13 753	107 837
WILLIAMSON CO	0 09	4 929	2 938	1 385	8 244	10 918	11 294	88 840
WILSON CO	0 09	3 954	2 357	1 120	5 013	8 785	9 087	71 180
TOTALS		185 460	98 647	46 654	208 781	366 800	379 424	2,877,818

TEXAS

BEJAR CO	0 08	98 385	38 828	22 480	104 717	177 685	125 282	1,233 086
BRAZORIA CO	0 11	10 871	8 418	3 718	17 312	29 375	20 312	203 857
COLLIN CO	0 10	15 856	9 156	5 303	24 702	41 914	29 552	290 873
DALLAS CO	0 10	102 878	80 249	34 883	162 489	278 714	194 390	1,913 385
DENTON CO	0 11	15 863	9 281	5 373	25 031	42 473	29 848	294 780
EL PASO CO	0 09	4 743	2 774	1 808	7 481	12 983	8 850	58 627
EL PASO CO	0 09	33 824	19 789	11 457	53 371	80 581	63 852	628 472
GALVESTON CO	0 12	12 275	7 182	4 158	18 389	32 889	23 173	228 084
GREGG CO	0 09	5 810	3 389	1 958	9 187	15 565	10 887	107 845
HARDIN CO	0 09	2 340	1 389	793	3 083	8 298	4 418	43 487
HARRIS CO	0 13	156 838	93 575	54 177	252 388	428 221	301 822	2,971 755
JEFFERSON CO	0 11	13 082	7 890	4 336	20 858	35 053	24 715	243 257
KALPHERN CO	0 08	2 829	1 714	982	4 822	7 842	5 529	54 424
MUESES CO	0 08	10 180	9 472	5 484	25 548	43 347	30 583	300 815
ORANGE CO	0 11	4 471	2 818	1 518	7 056	11 972	8 441	83 080
TARRANT CO	0 12	95 898	38 418	22 244	103 815	178 815	123 883	1,220 119
TRAVIS CO	0 09	33 000	19 307	11 178	52 071	88 354	62 298	613 169
TYLER CO	0 08	958	561	325	1 512	2 588	1 808	17 810
VICTORIA CO	0 09	4 446	2 428	1 405	6 543	11 102	8 787	77 642
TOTALS		571 213	334 200	193 482	801 321	1 529 374	1 078 324	10,813 507

UTAH

DAVIS CO	0 08	10 980	5 841	4 589	16 885	36 883	17 877	188 883
SALT LAKE CO	0 08	40 322	21 540	17 522	75 036	141 221	87 500	783 828
WEBER CO	0 08	5 895	4 845	3 778	16 180	30 452	14 556	164 842
TOTALS		58 177	31 826	25 889	110 898	208 856	99 732	1,128 121

VERMONT

BENNINGTON CO	0 10	1 982	1 180	570	2 488	4 828	4 288	35 790
CHITTENDEN CO	0 09	1 368	4 431	2 139	6 371	17 380	18 031	134 187
TOTALS		8 329	5 811	2 709	8 859	22 208	20 300	169 977

VIRGINIA

AMHERST CO	0 08	1 581	988	450	2 121	3 518	3 183	29 031
ARLINGTON CO	0 10	8 348	5 778	2 890	12 537	20 795	18 892	171 582
AUGUSTA CO	0 08	3 056	1 879	873	4 113	6 822	8 132	58 287
CAROLINE CO	0 08	1 084	870	311	1 467	2 433	2 187	20 078
CHARLES CITY CO	0 10	347	212	99	465	771	683	6 363
CHESTERFIELD CO	0 10	12 268	7 518	3 491	18 458	27 297	24 536	225 220
FAYETTE CO	0 11	46 882	28 012	13 285	62 818	103 869	83 363	853 820
FLOUWER CO	0 09	2 781	1 692	786	3 703	6 143	5 522	50 898
FREDERICK CO	0 08	6 813	4 807	2 44	4 505	5 814	5 228	47 875
HANOVER CO	0 10	3 688	2 281	1 060	4 948	8 208	7 378	70 625
HENRICO CO	0 10	12 158	7 451	3 458	18 308	27 047	24 311	223 189
MAHON CO	0 08	858	401	186	879	1 487	1 310	12 025
PRINCE WILLIAM CO	0 10	12 504	7 684	3 558	18 773	27 823	25 008	229 585
ROANOKE CO	0 08	4 351	2 867	1 238	5 837	9 682	8 702	78 882
STAFFORD CO	0 10	3 882	2 387	1 099	5 180	8 583	7 724	70 800
WARREN CO	0 09	1 510	929	430	2 028	3 380	3 020	27 724
WYTHE CO	0 08	1 402	858	399	1 861	3 119	2 804	25 738
ALEXANDRIA CITY	0 10	6 182	3 777	1 754	8 288	13 712	12 325	113 314
FAYETTE CITY	0 11	1 117	688	318	1 498	2 488	2 234	20 511
HAMPTON CITY	0 10	7 488	4 575	2 124	10 013	18 810	14 830	137 048
SUFFOLK CITY	0 10	2 902	1 719	878	3 893	6 457	5 804	53 278
TOTALS		137 533	84 287	38 141	184 486	308 018	275 054	2,524 838

WASHINGTON

CLARK CO	0 08	14 783	8 486	4 358	19 808	35 013	30 408	280 588
KING CO	0 08	85 253	50 588	28 034	118 389	208 277	181 755	1,567 837
PERCE CO	0 08	33 917	20 130	10 357	47 104	83 258	72 308	818 648
TOTALS		133 953	79 184	40 748	185 311	327 548	284 473	2,437 071

WEST VIRGINIA

CABELL CO	0 10	5 484	3 208	1 480	5 789	11 724	14 841	98 388
GAYNESVILLE CO	0 08	2 007	1 174	542	2 111	4 291	3 568	35 780
HANCOCK CO	0 08	2 001	1 170	540	2 100	4 278	3 542	35 770
KANAWHA CO	0 08	11 820	6 913	3 188	12 434	25 270	31 867	207 789
OHIO CO	0 08	2 854	1 889	770	3 022	8 101	7 819	50 186
WOOD CO	0 10	4 877	2 911	1 343	5 238	10 841	13 289	87 492
TOTALS		29 142	17 048	7 664	30 856	62 306	77 808	512 274

WISCONSIN

BROWN CO	0 08	11 200	6 502	3 387	14 482	27 748	26 841	201 388
COLUMBIA CO	0 08	2 598	1 507	787	3 352	8 432	8 246	46 877
DANE CO	0 09	21 154	12 280	6 418	27 314	52 407	50 884	380 308
DODGE CO	0 08	4 329	2 512	1 313	5 580	10 728	10 414	77 838
DOOR CO	0 10	1 295	835	438	1 858	3 389	3 481	25 889
FLORENCE CO	0 08	278	160	84	358	684	684	4 983
FOND DU LAC CO	0 08	5 098	2 958	1 548	8 880	12 825	12 258	81 820
JEFFERSON CO	0 09	3 847	2 233	1 187	4 987	8 531	8 254	66 183

KENOSHA CO	0 12	7 452	4 326	2 290	9 622	16 462	17 928	133 878
KEWAUNEE CO	0 08	1 054	612	320	1 361	2 810	2 536	18 843
MANITOWOC CO	0 10	4 520	2 824	1 371	5 836	11 167	10 872	81 254
MARATHON CO	0 08	6 566	3 811	1 991	8 478	16 296	15 783	118 040
MILWAUKEE CO	0 11	52 846	30 736	16 057	88 365	131 172	127 356	951 884
OUTAGAMIE CO	0 08	8 003	4 648	2 427	10 334	16 827	16 251	143 880
OSHAUKEE CO	0 10	4 235	2 458	1 284	6 499	10 483	10 188	78 146
RAVINE CO	0 10	6 965	5 796	3 028	12 892	24 737	24 818	179 808
ROCK CO	0 09	7 841	4 810	2 408	10 253	18 873	18 101	142 761
SHEBOYGAN CO	0 11	5 843	3 392	1 772	7 544	14 478	14 064	106 039
VERNON CO	0 08	1 447	840	439	1 868	3 584	3 480	26 007
WALWORTH CO	0 10	4 314	2 505	1 306	5 571	10 689	10 378	77 565
WASHINGTON CO	0 08	5 850	3 280	1 713	7 295	13 997	13 581	101 578
WAUKESHA CO	0 09	17 818	10 343	6 463	23 005	44 139	42 856	320 306
WINNEBAGO CO	0 08	6 054	4 075	2 443	10 389	16 953	16 373	144 795
TOTALS		195 819	113 643	59 389	252 773	484 891	470 895	3,518 474

SOURCE ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY, MAY 1995. AMERICAN LUNG ASSOCIATION. STATE AND COUNTY POPULATION ESTIMATES 1992. U.S. BUREAU OF THE CENSUS. COUNTY DESIGN VALUES FOR OZONE NAQS ALTERNATIVES 1991-1993 AIRS DATA BASE. U.S. ENVIRONMENTAL PROTECTION AGENCY.

NOTES

1 THE OZONE LEVELS LISTED HERE REPRESENT THE 4th HIGHEST EIGHT HOUR OZONE LEVEL GREATER THAN OR EQUAL TO 075 ppm RECORDED IN EACH COUNTY DURING 1991-1993. 075 WAS SELECTED AS OUR CUTOFF POINT FOR INCLUSION BASED ON THE ACTUAL MONITORING LEVEL REQUIRED TO DEMONSTRATE A VIOLATION OF THE ALTERNATIVE STANDARD FOR OZONE OF 07 ppm. FOR COUNTIES WITH ONLY TWO YEARS OF COMPLETE DATA THE 3rd HIGHEST OZONE LEVEL WAS USED. FOR COUNTIES WITH ONLY ONE YEAR OF COMPLETE DATA THE 2nd HIGHEST OZONE LEVEL WAS USED.

2 COPD INCLUDES CHRONIC BRONCHITIS AND EMPHYSEMA.

TABLE 7. ESTIMATED POPULATIONS-AT-RISK LIVING IN COUNTIES WITH FIVE OR MORE ANNUAL EXCEEDANCES OF A 0.08 ppm EIGHT HOUR AVERAGE OZONE LEVEL.

COUNTY	OZONE LEVEL (1)	POPULATIONS-AT-RISK						TOTAL POPULATION
		CHRONIC DISEASE			AGE (YEARS)			
		COPD (2)	ADULT ASTHMA	PEDIATRIC ASTHMA	<6	6-13	65+	
CALIFORNIA								
EL DORADO CO	0 10	7 462	4 441	2 388	12 360	14 278	14 814	138 177
FRESNO CO	0 11	36 052	22 890	12 995	63 088	63 342	74 118	705 813
IMPERIAL CO	0 10	6 955	4 145	2 229	11 528	11 051	13 544	128 872
KERN CO	0 11	31 892	18 688	10 157	52 527	77 741	61 731	587 850
LOS ANGELES CO	0 17	484 242	291 004	156 470	808 223	1 167 984	951 019	6 053 845
MADERA CO	0 10	5 340	3 183	1 711	8 851	13 099	10 402	96 023
MARIPOSA CO	0 10	827	483	265	1 371	2 029	1 811	15 338
MERCED CO	0 10	10 198	6 078	3 298	16 903	25 018	18 864	189 107
ORANGE CO	0 11	133 999	79 866	42 943	222 093	328 701	281 009	2 484 789
PLACER CO	0 10	10 083	6 015	3 234	16 728	24 757	18 859	167 149
RIVERSIDE CO	0 18	69 482	41 413	22 287	115 181	170 441	135 341	1 258 436
SACRAMENTO CO	0 11	58 956	35 136	18 894	97 715	144 819	114 836	1 203 237
SAN BERNARDINO CO	0 17	82 743	49 317	26 517	137 141	202 871	161 171	1 534 343
SAN DIEGO CO	0 11	140 299	83 603	44 953	232 485	344 061	273 222	2 801 055
TULARE CO	0 10	17 854	10 842	5 722	29 592	43 787	34 778	331 061
VENTURA CO	0 12	37 025	22 058	11 866	61 365	90 822	72 116	685 580
TOTALS		1 139 178	678 977	365 080	1 858 101	2 794 421	2 218 942	21 124 204
CONNECTICUT								
FAIRFIELD CO	0 10	46 518	27 922	12 307	58 848	95 783	115 381	628 713
MIDDLESEX CO	0 10	8 112	4 908	2 148	10 364	18 702	20 120	144 507
NEW HAVEN CO	0 11	44 967	26 991	11 896	57 562	92 586	111 533	801 079
NEW LONDON CO	0 10	13 935	6 364	3 887	17 838	28 692	34 563	248 248
TOTALS		113 531	68 146	30 036	145 332	233 765	281 596	2 022 542
DELAWARE								
NEW CASTLE CO	0 11	28 123	15 074	7 172	34 395	58 838	55 879	456 006
DISTRICT OF COLUMBIA								
DISTRICT OF COLUMBIA	0 10	37 337	20 896	7 341	40 009	55 000	77 026	585 221
GEORGIA								
FULTON CO	0 10	35 838	21 807	11 234	52 292	67 774	67 017	685 785
ROCKDALE CO	0 10	3 185	1 915	998	4 634	7 778	5 039	58 968
TOTALS		39 122	23 522	12 230	56 926	95 653	72 956	724 763
INDIANA								
POSBY CO	0 11	1 445	851	428	1 871	3 382	3 308	26 070
MARYLAND								
ANNE ARUNDEL CO	0 10	24 098	14 057	6 957	33 896	54 586	48 368	441 464
BALTIMORE CO	0 10	38 483	23 411	11 113	54 302	67 187	77 257	705 138
CARROLL CO	0 10	7 122	4 331	2 056	10 947	16 132	14 294	130 466
Cecil CO	0 10	4 084	2 480	1 182	5 776	8 273	8 217	74 864
CHARLES CO	0 10	5 780	3 521	1 672	8 168	13 115	11 621	106 068
HARFORD CO	0 10	10 872	6 480	3 081	15 056	24 172	21 419	185 483
KENT CO	0 10	1 003	610	290	1 415	2 272	2 013	16 372
PRINCE GEORGE'S CO	0 10	40 878	24 920	11 679	57 804	92 810	82 239	750 814
TOTALS		132 250	80 431	38 180	186 581	299 546	265 427	2 422 809
MASSACHUSETTS								
BARNSTABLE CO	0 10	10 546	6 405	2 754	13 479	21 415	26 301	186 008
HAMPshire CO	0 10	5 229	4 965	2 149	10 514	16 709	20 522	147 474
TOTALS		16 775	11 403	4 904	23 993	38 125	46 823	336 480

MICHIGAN

ALLEGAN CO	0 10	5,131	3,018	1,563	7,048	12,402	11,350	83,078
BENZIE CO	0 10	895	409	212	955	1,661	1,538	12,618
MASON CO	0 11	1,456	856	444	2,000	3,520	3,222	26,420
MUSKEGON CO	0 10	8,929	5,249	2,721	12,285	21,583	18,752	181,880
OCEANA CO	0 11	1,285	744	388	1,738	3,058	2,796	22,954
OTTAWA CO	0 11	10,878	6,393	3,314	14,839	25,289	24,059	187,297
TOTALS		28,354	16,666	8,639	38,945	66,536	62,721	514,345

NEW JERSEY

ATLANTIC CO	0 10	12,849	7,689	3,472	16,838	26,580	31,013	229,430
BURLINGTON CO	0 12	22,299	13,325	6,918	29,183	46,067	53,750	387,831
CAMDEN CO	0 11	28,406	17,016	7,854	37,264	56,823	69,633	507,736
CLAMBERLAND CO	0 10	7,756	4,641	2,098	10,164	16,045	16,721	138,484
GLOUCESTER CO	0 11	13,296	7,938	3,585	17,364	27,442	32,018	238,867
HUDSON CO	0 10	31,080	18,598	8,399	40,729	64,293	78,015	554,950
HUNTERDON CO	0 10	6,258	3,751	1,694	8,214	12,965	15,128	111,813
MERCER CO	0 11	16,352	10,982	4,959	24,050	37,864	44,296	327,894
MIDDLESEX CO	0 10	38,333	22,838	10,358	50,234	79,296	92,521	684,458
MONMOUTH CO	0 10	31,895	18,958	8,565	41,535	65,564	78,499	565,928
MORRIS CO	0 10	23,879	14,349	6,480	31,423	49,603	67,878	428,156
OCEAN CO	0 10	24,548	14,689	6,633	32,169	50,780	58,249	438,315
TOTALS		258,831	154,864	69,942	339,186	535,422	624,718	4,621,569

NEW YORK

RICHMOND CO	0 10	21,784	13,023	6,048	29,402	46,344	51,255	391,085
SUFFOLK CO	0 10	74,539	44,560	20,897	100,808	158,579	175,385	1,338,204
TOTALS		96,323	57,583	26,745	130,010	204,923	226,640	1,729,289

OHIO

CUYAHOGA CO	0 10	78,647	46,182	22,958	102,263	162,332	166,828	1,411,209
WASHINGTON CO	0 10	3,498	2,054	1,021	4,548	6,110	6,298	62,786
TOTALS		82,145	48,237	23,977	106,811	190,442	194,825	1,473,875

PENNSYLVANIA

BUCKS CO	0 10	31,089	18,158	9,094	39,500	66,289	76,677	556,279
DELAWARE CO	0 10	30,711	17,835	8,684	39,018	65,482	75,744	548,508
PHILADELPHIA CO	0 10	86,789	50,673	25,382	110,243	184,956	214,008	1,552,572
TOTALS		148,569	86,764	43,460	166,782	316,667	366,428	2,656,357

RHODE ISLAND

KENT CO	0 10	9,186	5,477	2,393	11,510	18,682	24,860	162,483
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TENNESSEE

JEFFERSON CO	0 10	1,932	1,152	547	2,449	4,283	4,430	34,770
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TEXAS

HARRIS CO	0 10	159,938	93,575	54,177	252,368	428,221	301,926	2,971,755
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VIRGINIA

ARLINGTON CO	0 10	9,348	5,728	2,880	12,537	20,795	18,882	171,582
FAIRFAX CITY	0 10	1,117	685	318	1,499	2,488	2,234	20,511
FAIRFAX CO	0 19	48,882	28,812	13,285	62,818	103,869	93,363	851,020
TOTALS		57,145	35,025	16,263	76,654	127,151	114,289	1,049,113

WISCONSIN

KENOSHA CO	0 10	7,452	4,328	2,280	8,822	15,462	17,928	133,978
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SOURCE: ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY, MAY 1995. AMERICAN LUNG ASSOCIATION, STATE AND COUNTY POPULATION ESTIMATES, 1992. U.S. BUREAU OF THE CENSUS, COUNTY DESIGN VALUES FOR OZONE NAAQS ALTERNATIVES 1991-1993. AIRS DATA BASE. U.S. ENVIRONMENTAL PROTECTION AGENCY.

NOTES

1. THE OZONE LEVELS LISTED HERE REPRESENT THE 10th HIGHEST EIGHT HOUR OZONE LEVEL GREATER THAN OR EQUAL TO .085 ppm RECORDED IN EACH COUNTY DURING 1991-1993. .085 WAS SELECTED AS OUR CUTOFF POINT FOR INCLUSION BASED ON THE ACTUAL MONITORING LEVEL REQUIRED TO DEMONSTRATE A VIOLATION OF THE ALTERNATIVE STANDARD FOR OZONE OF .08 ppm. FOR COUNTIES WITH ONLY TWO YEARS OF COMPLETE DATA THE 11th HIGHEST OZONE LEVEL WAS USED. FOR COUNTIES WITH ONLY ONE YEAR OF COMPLETE DATA THE 8th HIGHEST OZONE LEVEL WAS USED.

2. COPD INCLUDES CHRONIC BRONCHITIS AND EMPHYSEMA.

TABLE 8: ESTIMATED POPULATIONS-AT-RISK LIVING IN COUNTIES WITH ONE OR MORE ANNUAL EXCEEDANCES OF A 0.12 ppm ONE HOUR AVERAGE OZONE LEVEL.

COUNTY	OZONE LEVEL (1)	POPULATIONS-AT-RISK						TOTAL POPULATION
		CHRONIC DISEASE			AGE (YEARS)			
		COPD (2)	ADULT ASTHMA	PEDIATRIC ASTHMA	<6	6-13	85+	
ARIZONA								
MARICOPA CO	0 15	122,816	70,832	38,279	164,577	298,806	295,811	2,208,587
CALIFORNIA								
FRESNO CO	0 18	38,052	22,680	12,195	83,088	93,342	74,119	705,813
IMPERIAL CO	0 17	6,955	4,145	2,229	11,528	17,081	13,548	128,672
KERN CO	0 18	31,692	18,889	10,157	52,527	77,741	61,731	587,680

LOS ANGELES CO	0.30	468,242	291,004	156,470	806,223	1,187,864	851,019	9,053,845
MADERA CO	0.13	5,340	3,183	1,711	8,851	13,099	10,422	99,023
MERCED CO	0.13	10,198	8,078	3,268	18,903	25,018	18,864	189,107
MICHIGAN CO	0.13	537	320	172	660	1,317	1,048	8,956
ORANGE CO	0.19	133,999	79,866	42,943	222,003	328,701	261,008	2,484,789
PLACER CO	0.15	10,083	8,015	3,234	18,728	24,757	18,859	187,149
RIVERSIDE CO	0.24	69,482	41,413	22,287	115,181	170,441	135,341	1,268,435
SACRAMENTO CO	0.15	58,956	35,139	18,884	97,715	144,819	114,836	1,083,237
SAN BERNARDINO CO	0.25	82,743	49,317	26,517	137,141	202,871	181,171	1,534,343
SAN DIEGO CO	0.15	140,269	83,803	44,953	232,485	344,081	273,222	2,801,055
TULARE CO	0.14	17,854	10,642	5,722	29,592	43,797	34,778	331,081
VENTURA CO	0.15	37,025	23,068	11,868	61,365	90,822	72,118	686,580
TOTALS		1,131,437	674,363	362,599	1,875,269	2,775,430	2,203,862	20,960,848
COLORADO								
BOULDER CO	0.13	12,840	7,787	3,968	18,097	31,989	23,965	236,196
CONNECTICUT								
FAIRFIELD CO	0.15	46,518	27,922	12,307	59,548	95,783	115,381	828,713
HARTFORD CO	0.15	47,545	28,538	12,579	60,863	87,697	117,928	847,008
LITCHFIELD CO	0.13	9,907	5,946	2,621	12,682	20,399	24,372	176,489
MIDDLETOWN CO	0.15	8,112	4,869	2,146	10,384	18,702	20,120	144,507
NEW HAVEN CO	0.16	44,967	28,991	11,898	57,562	92,586	111,553	801,078
NEW LONDON CO	0.14	13,935	8,364	3,687	17,638	28,692	34,563	246,246
TOLLAND CO	0.14	7,494	4,378	1,930	9,337	15,818	18,922	179,848
TOTALS		178,277	107,009	47,185	228,214	367,080	442,158	3,175,966
DELAWARE								
NEW CASTLE CO	0.15	25,123	15,074	7,172	34,395	56,838	55,878	455,008
GEORGIA								
DuKALB CO	0.13	30,418	18,289	8,508	44,261	74,294	56,725	563,517
DOUGLAS CO	0.13	4,069	2,447	1,272	5,921	9,939	7,589	73,389
FULTON CO	0.15	35,838	21,807	11,234	52,292	87,774	87,017	665,785
ROCKDALE CO	0.13	3,185	1,915	998	4,834	7,778	5,939	58,998
TOTALS		73,610	44,258	23,011	107,108	179,786	137,270	1,363,669
INDIANA								
CLARK CO	0.13	4,989	2,928	1,473	8,434	11,830	11,378	89,858
LOUISIANA								
ASCENSION PAR	0.13	3,322	1,811	1,117	4,848	8,018	8,851	60,944
EAST BATON ROUGE PAR	0.14	21,345	12,281	7,181	31,154	57,936	44,027	391,832
WEST BATON ROUGE PAR	0.13	1,079	621	263	1,575	2,929	2,228	19,799
TOTALS		25,746	14,813	8,862	37,577	69,881	53,104	472,751
MAINE								
CLIMBERLAND CO	0.13	13,851	8,097	3,829	18,268	31,033	33,193	244,378
KNOX CO	0.13	2,053	1,218	578	2,447	4,866	4,963	36,760
SAGadahoc CO	0.13	1,897	1,125	532	2,281	4,313	4,613	33,963
YORK CO	0.13	9,308	5,520	2,610	11,090	21,156	22,629	166,802
TOTALS		26,907	15,958	7,547	32,086	61,170	65,428	461,703
MARYLAND								
ANNE ARUNDEL CO	0.14	24,069	14,857	8,857	33,898	54,585	48,368	441,464
BALTIMORE CO	0.13	38,493	23,411	11,113	54,302	87,187	77,257	705,159
CECIL CO	0.14	4,064	2,490	1,182	5,775	9,273	8,217	74,984
HARFORD CO	0.15	10,872	8,480	3,081	15,055	24,172	21,419	195,493
KENT CO	0.13	1,003	610	290	1,415	2,272	2,013	18,187
PRINCE GEORGE'S CO	0.13	40,878	24,920	11,629	57,804	92,810	82,239	750,814
TOTALS		119,337	72,578	34,452	166,346	270,299	239,512	2,186,075
MASSACHUSETTS								
BARNSTABLE CO	0.13	10,546	8,405	2,754	13,475	21,415	26,301	189,006
BRIGHTON CO	0.13	28,268	17,188	7,383	36,118	57,399	70,495	508,593
ESSEX CO	0.13	37,365	22,705	9,764	47,764	75,912	83,232	669,964
HAMPDEN CO	0.13	25,229	15,322	8,589	32,234	51,229	62,916	452,140
HAMPSHIRE CO	0.14	8,229	4,998	2,149	10,514	18,708	20,522	147,474
MIDDLESEX CO	0.13	77,807	47,254	20,321	99,410	157,992	194,400	1,394,406
WORCESTER CO	0.14	39,515	23,999	10,320	50,486	86,236	98,545	708,164
TOTALS		228,978	137,851	59,280	289,999	460,898	566,053	4,067,769
MICHIGAN								
ALLEGAN CO	0.13	5,131	3,018	1,563	7,048	12,402	11,350	93,078
BENZIE CO	0.14	895	409	212	955	1,681	1,538	12,818
DELTA CO	0.13	2,108	1,238	642	2,893	5,001	4,859	38,208
MASON CO	0.18	1,456	856	444	2,000	3,290	3,222	26,420
MUSKEGON CO	0.14	8,929	5,249	2,721	12,265	21,583	19,752	181,980
OSHTAWA CO	0.14	1,265	744	368	1,738	3,059	2,799	22,954
OTTAWA CO	0.15	10,878	8,393	3,314	14,939	26,289	24,059	197,297
TOTALS		30,461	17,904	8,281	41,838	73,826	67,380	552,553
MISSOURI								
ST. LOUIS CO	0.13	56,185	32,545	18,498	72,502	132,836	141,444	1,000,860
NEW HAMPSHIRE								
ROCKINGHAM CO	0.13	13,480	8,139	3,913	18,045	31,566	28,947	248,184

NEW JERSEY

BURLINGTON CO	0 18	22,289	13,328	8,018	29,183	46,087	53,750	397,631
CAMDEN CO	0 15	28,436	17,018	7,884	37,264	58,823	68,833	507,735
GLOUCESTER CO	0 14	13,288	7,938	3,585	17,364	27,442	37,018	236,867
HUDSON CO	0 13	31,080	18,588	8,369	40,729	64,293	75,015	554,950
MERCER CO	0 15	18,352	10,962	4,959	24,050	37,984	44,298	327,884
MIDDLESEX CO	0 13	38,333	22,938	10,358	50,234	79,298	92,521	684,458
MONMOUTH CO	0 18	31,895	18,908	8,585	41,535	65,564	78,488	585,928
MORRIS CO	0 13	23,979	14,349	8,480	31,423	48,803	57,878	428,158
OCEAN CO	0 13	24,548	14,859	8,833	32,189	50,780	58,249	438,315
TOTALS		231,957	136,803	62,660	303,970	479,832	558,858	4,141,732

NEW MEXICO

DONA ANA CO	0 13	7,878	4,553	2,755	12,389	22,153	18,020	148,819
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NEW YORK

DUTCHESS CO	0 13	14,841	8,753	4,085	18,782	31,148	34,450	282,858
QUEENS CO	0 13	108,875	64,887	30,174	148,881	231,200	255,702	1,951,034
RICHMOND CO	0 14	21,784	13,023	8,048	29,402	48,344	51,255	391,085
SUFFOLK CO	0 15	74,539	44,580	20,887	100,808	158,579	175,385	1,338,204
WESTCHESTER CO	0 13	48,118	29,384	13,838	68,298	104,487	115,571	881,822
TOTALS		268,157	160,668	74,823	362,750	571,770	632,383	4,825,003

OHIO

CUYAHOGA CO	0 14	78,847	46,182	22,858	102,283	162,332	188,828	1,411,209
HAMILTON CO	0 13	48,588	28,537	14,185	63,181	112,888	115,281	873,028
MEDINA CO	0 13	7,182	4,208	2,080	8,313	18,804	18,888	128,513
WASHINGTON CO	0 14	3,488	2,054	1,021	4,548	8,110	8,298	62,788
TOTALS		137,905	80,960	40,252	179,315	318,175	327,072	2,474,514

PENNSYLVANIA

BUCKS CO	0 14	31,088	18,158	8,064	39,900	68,289	78,877	558,279
DELAWARE CO	0 13	30,711	17,935	8,884	39,018	65,482	75,744	548,508
MONTCOMERY CO	0 13	38,582	22,520	11,280	48,895	82,188	95,109	688,888
PHILADELPHIA CO	0 13	88,788	50,873	25,382	110,243	184,958	214,008	1,552,372
TOTALS		187,131	106,284	54,741	237,756	398,868	481,535	3,348,353

RHODE ISLAND

KENT CO	0 15	9,188	5,477	2,383	11,510	18,882	24,880	182,483
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SOUTH CAROLINA

YORK CO	0 13	7,517	4,487	2,282	10,389	17,785	15,881	137,211
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TEXAS

BRAZORIA CO	0 13	10,871	8,418	3,718	17,312	29,375	20,712	203,857
COLLIN CO	0 14	15,885	9,158	5,303	24,702	41,814	29,552	290,873
DENTON CO	0 14	15,883	9,281	5,375	25,031	42,473	29,848	284,750
EL PASO CO	0 14	33,824	19,788	11,457	53,371	90,581	83,852	628,472
GALVESTON CO	0 18	12,275	7,182	4,158	18,389	32,888	23,173	228,084
HARRIS CO	0 20	58,938	33,575	14,177	252,368	428,221	301,828	2,871,755
JEFFERSON CO	0 13	13,082	7,660	4,435	20,958	35,053	24,715	243,257
TARRANT CO	0 14	85,888	50,418	22,244	103,815	175,815	123,983	1,220,118
TOTALS		327,285	191,485	110,684	518,425	878,278	617,842	6,081,167

VIRGINIA

ARLINGTON CO	0 13	8,348	5,729	2,880	12,537	20,795	18,882	171,582
CHARLES CITY CO	0 13	347	212	99	485	771	693	8,383
FAIRFAX CO	0 14	48,882	28,812	13,285	62,818	103,889	83,383	857,020
FAIRFAX CITY	0 13	1,117	685	318	1,498	2,488	2,234	20,511
SUFFOLK CITY	0 13	2,302	1,779	878	3,883	6,457	5,884	53,278
TOTALS		60,384	37,018	17,187	81,011	134,379	120,788	1,108,752

WISCONSIN

DOOR CO	0 13	1,295	835	438	1,858	3,585	3,481	25,888
KENOSHA CO	0 15	7,452	4,328	2,280	8,822	18,482	17,928	133,978
MANITOWOC CO	0 13	4,520	2,824	1,371	5,838	11,187	10,872	81,254
ME WAUKESHA CO	0 15	52,848	30,738	18,887	68,385	131,172	127,358	951,884
OSHAKEE CO	0 15	4,230	2,458	1,284	5,488	10,483	10,188	78,148
RACINE CO	0 13	8,885	5,798	3,028	12,882	24,737	24,018	179,508
SHEBOYGAN CO	0 14	5,843	3,382	1,772	7,544	14,475	14,054	105,038
TOTALS		88,278	50,188	28,200	111,587	214,100	207,877	1,553,875

SOURCE ESTIMATED PREVALENCE AND INCIDENCE OF LUNG DISEASE BY LUNG ASSOCIATION TERRITORY MAY 1995, AMERICAN LUNG ASSOCIATION; STATE AND COUNTY POPULATION ESTIMATES 1992, U.S. BUREAU OF THE CENSUS; COUNTY DESIGN VALUES FOR OZONE HAAS ALTERNATIVES 1991-1993 ARS DATA BASE, U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTES

1 THE OZONE LEVELS LISTED HERE REPRESENT THE FOURTH HIGHEST DAILY MAXIMUM HOURLY AVERAGE MEASURED OVER THE THREE YEAR PERIOD 1991-93. 125 WAS SELECTED AS OUR CUTOFF POINT FOR INCLUSION BASED ON THE ACTUAL MONITORING LEVEL REQUIRED TO DEMONSTRATE A VIOLATION OF THE NATIONAL AMBIENT AIR QUALITY STANDARD FOR OZONE OF 12 ppm FOR COUNTIES WITH ONLY TWO YEARS OF COMPLETE DATA. THE 3rd HIGHEST OZONE LEVEL WAS USED FOR COUNTIES WITH ONLY ONE YEAR OF COMPLETE DATA. THE 2nd HIGHEST OZONE LEVEL WAS USED.

2 COPD INCLUDES CHRONIC BRONCHITIS AND EMPHYSEMA.

Mr. WAXMAN. The American Lung Association, which is the Nation's foremost expert on respiratory issues, is recommending exactly the opposite action that you're recommending. The Lung Association says that the Federal health standard for ozone should be tightened. According to the Lung Association, there is overwhelming evidence that the current health standard is not protective enough.

Mr. Marquez, what is your response to the idea that the standard is not tight enough? The doctors who are part of the American Lung Association are the Nation's health experts. They say that for medical reasons, the ozone standard should be tightened, but you're advocating the opposite approach. Why is that?

Mr. MARQUEZ. I don't believe I'm advocating the opposite approach. I think the position that Texas is taking is very much in line with the recommendations of the Clean Air Act Science Advisory Committee, who go to an 8 hour standard, average standard, which many people believe is more protective of human health and the environment.

I am not in a position to argue the health effects of a 1 hour versus 8 hours, but they are talking about 70 to 90 parts per billion for the standard based on an 8 hour average.

Mr. WAXMAN. That approach would have the effect, without doing any reduction in air pollution, to redefine a number of areas that are out of attainment now into attainment, and that's what concerns me because I think it's inconsistent with protecting people's health.

Why is Texas doing such a worse job cleaning up air pollution than California, for example? In Los Angeles, where I'm from, air pollution is getting much better. Ten years ago, there were 83 smog alerts in L.A. and this year there are only 13, a dramatic reduction. But in Texas, the trends are the opposite. Whereas air quality is improving in most of the rest of the country, it is getting worse in Texas.

For instance, Houston had 50 days of non-attainment this year, more than any time in the last 5 years. Non-attainment days have increased from 4 days in 1992 to 15 days this year. Why has your performance been so poor in Texas?

Mr. MARQUEZ. I do not agree with that statement, Congressman, but let me clarify a couple of things. First of all, the VOC emissions in Houston have been reduced tremendously over the last few years, over 50 percent reduction in VOC emissions. The number of non-attainment areas over the years is going down.

My colleague from Michigan just talked about the problems that they have had in Michigan. They've had them all over the country, those high ozone exceedances because of very unusual weather conditions, very hot weather. It's happening all over the country. That is not reflective of air deterioration, manmade air deterioration in Houston.

The second thing I want to clarify is that, again, we are not talking about decreasing environmental health or public health protection. We're talking more about a better way perhaps of protecting public health by using an 8 hour standard.

Mr. WAXMAN. Well, what concerns me are the end results of the measurements of pollution. For example, Dallas-Fort Worth ex-

ceeded the standard on 4 days in 1992, 4 days in 1993, 9 days in 1994, 15 days in 1995. Dallas' air quality has actually gotten worse and this trend is one that is disturbing, because that is a trend for more air pollution, which causes more adverse consequences to public health.

Mr. MARQUEZ. And it is happening in spite of very large reductions in VOC, which EPA has proposed to make and we have made, and that perhaps proves my point, Congressman, that we are following the EPA study and perhaps we're not making that much progress in ozone.

Mr. WAXMAN. Well, it's baffling to me that you're not making progress and a place like Los Angeles is making progress. It seems to me the solution is not to redefine what our goal should be. The solution ought to be to find better ways to be sure we reach the goal, because the goal is to protect the public health and we ought to have standards that do that and then do everything we can to get to those standards, given, of course, enough reasonable time to comply and not to be disruptive of the other competing objectives of energy sufficiency and economic development.

But taking that into consideration, we shouldn't redefine the goal and say that we've accomplished what we need to accomplish because the goal has been lowered.

Mr. Chairman, I have no other questions. I don't want to interrupt you if you had anything more to say.

Mr. MARQUEZ. There is one more point I'd like to make. The proposal for changing the definition and the strategy that we have made is based on 80 parts per billion of the ozone standard, which is the middle of the range. In reality, that hardly changes the status of non-attainment areas in Texas.

Mr. WAXMAN. I thank you for your comments. I do want this report to be acknowledged and I want to share it with you, because they consider this approach that you're suggesting a dramatic weakening. I want to yield to my colleague, Mr. Klink.

Mr. KLINK. Thank you very much for yielding. There is one more question I wanted to ask Mr. Drake and I wouldn't have had the opportunity to do it. On page 7 of your testimony, you say any strategy for controlling ozone must recognize the regional and even multi-regional nature of the problem. The current strategy of requiring controls in non-attainment areas assumes that the area monitoring the violation is responsible for the violation.

In my opening statement, I talked about the fact that our air comes from your direction. Yet, we're in this ozone transport region and we're treated differently than other States are treated. I wondered if you would comment on that, from your perspective as an expert.

Mr. DRAKE. I guess I'd characterize there's two different kinds of transport, one I would call overwhelming transport and another long-range transport. The situation in west Michigan is the classic case of overwhelming transport, where the vast majority of the pollution comes from upwind areas.

In addition, the entire northeast has a problem of long-range transport that needs to be addressed and I think you will probably hear from EPA and their panel how they're trying to address that

through a multi-state review of the problems of ozone throughout the entire midwest.

I mentioned the Lake Michigan Ozone Study, which was a four-state study done around the Lake Michigan area, I think the most comprehensive study of its kind, and it involved developing a simulation, a model of what are the emissions in the area and what's the concentration of the ozone that results from it.

That study reveals that even the ozone coming in to the Chicago region is very high. It reveals the long-range transport, as well as the overwhelming transport. In fact, we've measured ozone on the perimeter of Chicago and it's upwards of 100 parts per million, when the standard is 120. So there is clearly a large-scale problem of ozone and the current strategy of sticking some monitors across the country and declaring those areas non-attainment and saying you've now got to reduce your emissions to meet that, I think, is a strategy that's got to be reviewed. It doesn't recognize the long-range transport nature of ozone.

Mr. KLINK. Thank you for making that point. I yield back.

Mr. WAXMAN. And I yield back the balance of my time.

Mr. BARTON. The gentleman from Illinois. Before I recognize the gentlelady from California, we have a report—The Good News About Urban Ozone and the Need for Rethinking the 1990 Clean Air Act, by Dr. Kay Jones, May 1995, and it's approximately the same thickness as the American Lung Association report. So I will ask unanimous consent that if that report can be in the record, then this one could, too. I think the only objection is that both sides have to see the reports. Is there objection?

[The report follows:]

The Good News About Urban Ozone and
The Need for Rethinking the 1990 CAA

Briefing Notes

by

Kay H. Jones, Ph.D.
Zephyr Consulting
Seattle, Washington

May 1995

DISCUSSION POINTS

- **The Ozone Standard, Present and Future**
- **The 1988 Anomaly**
- **Current Non Attainment Status**
- **Trends**
- **Future Emissions Reductions**
- **Current Regulatory Effectiveness?**

CURRENT OZONE STANDARD

- The standard is 0.12 ppm for the maximum hour in a day. This level is not to be exceeded more than one day per year on the average, e.g. 3 days in 3 years, 10 days in 10 years, etc.
- Measurements are reported to 3 digits, hence 0.12 is really 0.124.
- EPA has designated (1979) a 3 year window for administrative purposes with no provision for non average conditions.
- The "design value" is the 4th highest observation in 3 years at each monitor, the highest d.v. in a region becoming the regulatory baseline for classification and SIP purposes. For example, the worst case monitor in Philadelphia showed the following daily maximum observation for 1988/89/90: .20, .19, .19, .17, .16, .15. The d.v. in this case would be .17 ppm.
- The required VOC emissions reduction to achieve attainment is a function of the difference between the d.v. and 0.124 ppm.

FUTURE OZONE STANDARD

- Health effects studies relate to observed exposure periods of 1-2 hours and 6-8 hours.
- Most likely options are .08 to .10 and 8 hour average/ per day as opposed to 1 hour. The number of allowable exceedances may be one or more, i.e., 3 to 5 days.
- A one exceedance per year limit is not a stable statistic under any averaging scheme, i.e., 1 hour or 8 hours. This can cause bump up.
- There would be more marginal non attainment areas if a .08 ppm 8 hour, one exceedance limit were adopted, but the number of areas would converge in the near future because of further emissions reductions due to auto fleet turnover.
- A .08 ppm 8 hour 3 exceedance standard is probably statistically equal to the current standard. If this is demonstrated then a change in the standard would be unnecessary.

THE 1988 ANOMALY

- 1988 was one of the hottest years in the past 25 years in terms of the frequency of days above 90°, 95° and 100° F. See Table 1.
- The length of atmospheric stagnation periods is also an important factor. The persistence data for Philadelphia in Table 1 further confirms the anomalous nature of 1988. The temperature was above 90° F. for most of July and August.
- The 10 year trend in non California total, OTR and state exceedance rates show the same phenomenon. See Figures 1 and 2.
- EPA's argument that there were other years as bad as 1988 is not based on any detailed analysis on EPA's part.
- Even if another 1988 like year were to happen, it would be impossible to develop a stringent enough regulatory program which would prevent more than one exceedance in that year. An analogy would be trying to build the Mississippi levees high enough to prevent all possible floods.

TABLE 1
 TEMPERATURE STATISTICS AND EPISODE PERSISTENCE PROFILES
 FOR PHILADELPHIA - 1966 - 1993

YEAR	ANNUAL DAYS ABOVE			TOTAL DAYS OF EPISODES > 3 DAYS	NUMBER OF EPISODES > 10 DAYS	EPISODE PERSISTENCE (DAYS)
	90°	95°	100°			
1966	33	9	3	32	1	12
1973	28	8	0	25	1	10
1977	26	5	1	22	1	10
1979	17	0	0	14	1	11
1980	36	10	0	31	2	11, 12
1983	45	9	0	41	2	10, 16
1986	33	3	0	28	1	13
1988	52	18	5	49	2	18, 22
1991	53	17	1	51	1	12
1993	39	ND	3	ND	1	11
Expected	22 ⁽¹⁾	2.5 ⁽¹⁾	--	17	--	4.5
Probability	--	--	.23(1) ⁽²⁾	--	0.4(1) ⁽²⁾ 0.12(2) ⁽²⁾	--

⁽¹⁾ Based on 44 years of data.

⁽²⁾ Number in () is frequency of the probability estimate.

Zephyr Consulting

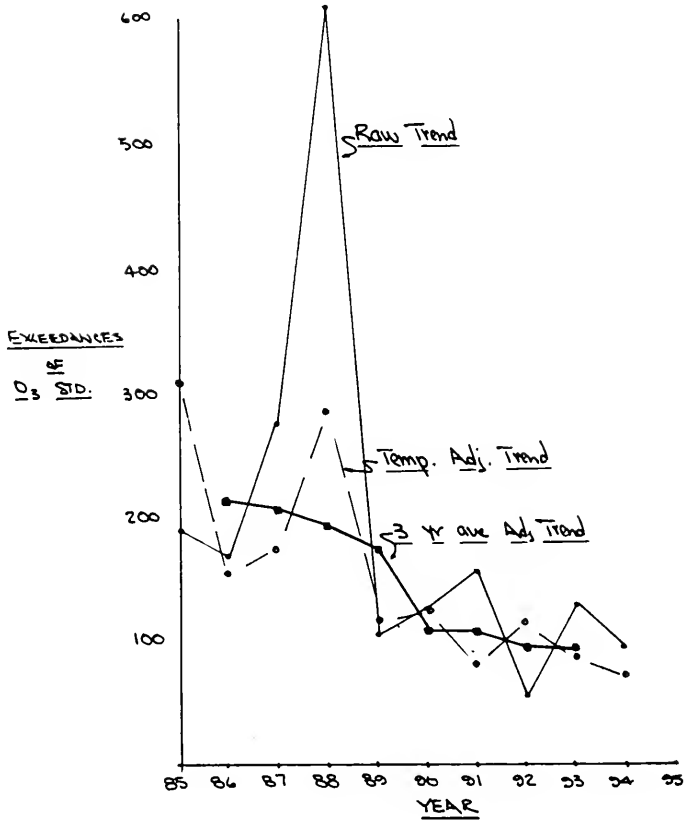


FIGURE 1

Trends in Nationwide (Non Calif.) Ozone Air Quality
Based on Worst Case Monitor Data

Zephyr Consulting

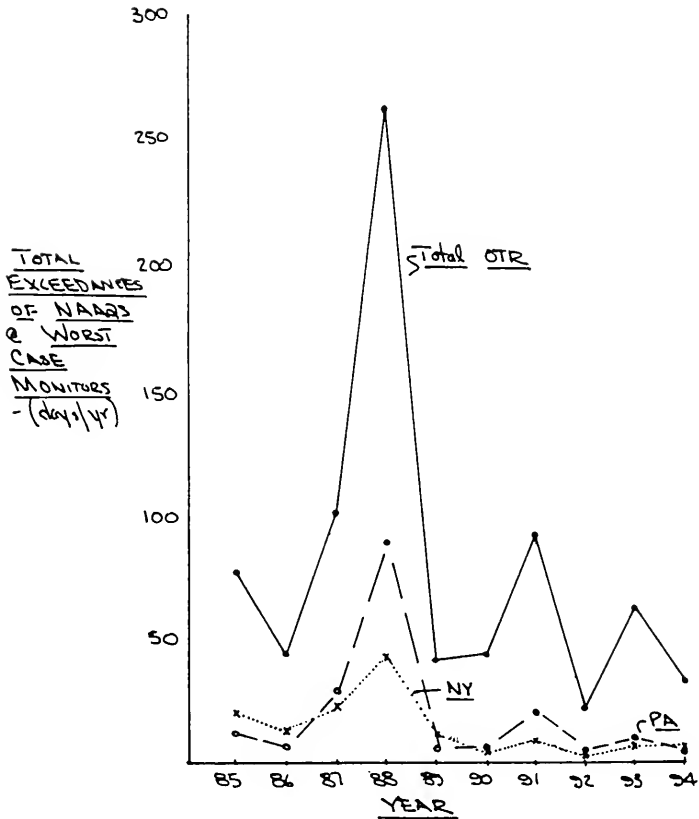


FIGURE 2

Trends in OTR and Subregional State Ozone Air Quality Based on Worst Case Monitor Data

CURRENT NON ATTAINMENT STATUS

- The 1990 CAA only provides for reclassification from non attainment to attainment. It does not allow for reclassification based on new data since 1988/89/90..
- California needs to be treated separately because of L.A. and 0.10ppm state standard.
- Use of non 1988 data and reduced emissions have had dramatic effects. See Tables 2, 3, and 4.
- Except for Houston, no non California area is classified above moderate. See Table 3. There are 5 Moderate areas and 13 Marginal areas.
- EPA may propose the use of the 6 highest values in lieu of the 4 highest values for d.v. determinations, e.e., average of 2nd highest in each year over a 3 year period. This prevents bump up. The number of non attainment areas drop to 13.
- The California situation is reflected in Table 5.
- CO improvement has been equally dramatic with only 10 areas remaining out of 38. See Table 6.

TABLE 2

Comparison of Current Non Attainment
Status of All Non Calif Urban Areas
Versus Required 1990 CAA Classification

Number of Areas in Non Attainment
by 1990 CAA Classification - Non Cal.

<u>3 YEAR PERIOD</u>	<u>Severe</u> > .180	<u>Serious</u> .160 - .180	<u>Moderate</u> .138 - .160	<u>Marginal</u> .121 - .138	<u>TOTAL:</u>
88/89/90	5	11	29	40	85
89/90/91	1	3	15	19	38
91/92/93	1	0	12	15	28
92/93/94 ⁽¹⁾	0	1	5	12 (6)	18 (24)
92/93/94 ⁽¹⁾⁽²⁾	0	1	3	9	13

(1) Based on preliminary 1994 data

(2) Design value based on average of annual 2nd max values

TABLE 3

CLASSIFICATION FOR 18 NONATTAINMENT AREAS
(NON CALIFORNIA)
1992/93/94 DATA

92/93/94 RECLASSIFICATION	DESIGN VALUES - PPM			
	88/89/90	90/91/92	91/92/93	92/93/94
Severe 15				
None				
Serious				
Houston	.220	.210	.200	.172
Moderate				
New York/New Jersey/Connecticut	.187	.148 (.160) ¹	.158	.148
Philadelphia	.187	.153	.156	.139
Atlanta	.159	.146	.149	.140
Hartford	.172	.158 (.174) ¹	.158	.141
Phoenix	.141	.141	.147	.147
Marginal				
Portland, ME	.154	.148	.147	.127
El Paso	.150	.140	.136	.133 (.138) ¹
Washington, DC	.165	.134	.137	.126
Louisville	.148	.125	.130	.125
Richmond/Petersburg	.142	.122	.128	.128
St. Louis	.149	.127	.132	.125
Springfield, MA	.167	.139	.141	.131
Dallas/Ft. Worth	.140	.147	.141	.137
Baltimore	.181	.135 (.156) ²	.150	.133 (.135) ¹
Boston	.165	.132	.137	.136
Baton Rouge	.168	.127 (.152) ³	.135	.135
Chicago	.190	.143	.145	.133

NOTES:

- 1 Different site used by EPA than previous years, or alternative site with higher d v
- 2 Missing data rule applied, (y) is second-highest observation
- 3 These areas should be considered contiguous with the adjacent urban areas already classified
- 4 Classified by EPA as being marginal but below NAAQS.

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TABLE 4
COMPARISON OF 1990 CAA REQUIRED NON ATTAINMENT CLASSIFICATIONS USING
1988/89/90 OZONE DATA VERSUS CURRENT OBSERVED LEVELS

State	CMSA	1990 CAA Classification			1992/93/94 Classification		
		Severe	Serious	Marginal	Serious	Moderate	Attainment
AL	Birmingham			X			X
AZ	Phoenix			X			X
CT	Greater Conn	X					X
DC	Metro Wash		X				X
DE	Sussex Co.			X			X
FL	Miami		X				X
FL	Tampa			X			X
GA	Atlanta		X				X
IL/IN	Chicago/Gary/Lake Co	X					X
IL	Jersey Co.			X			X
IN	Evansville			X			X
IN	Indianapolis			X			X
IN	South Bend			X			X
KY	Edmonson Co			X			X
KY/WV	Huntington/Ashland		X				X
KY	Lexington/Fayette			X			X
KY/IN	Louisville		X				X
KY	Owensboro			X			X
KY	Paducah			X			X
LA	Baton Rouge		X				X
LA	Lake Charles			X			X
MA/NH	Boston/Lawrence/Worcester		X				X
MA	Springfield		X				X
MD	Baltimore	X					X
MD	Kent/Queen Ann Cos			X			X
ME	Hancock/Waldo Cos			X			X
ME	Knox/Lincoln Cos		X				X
ME	Lewiston/Auburn		X				X
ME	Portland		X				X

State	CMSA	1990 CAA Classification			1992/93/94 Classification				
		Severe	Serious	Moderate	Marginal	Serious	Moderate	Marginal	Attainment
MI	Detroit/Ann Arbor		X					X	X
MI	Grand Rapids		X					X	X
MI	Muskegon		X					X	X
MO/KS	Kansas City								X
MO/IL	St. Louis		X				X		
NC	Charlotte-Gastonia		X					X	X
NC	Greensboro/Winston-Salem		X					X	X
NC	Raleigh/Durham		X					X	X
NH	Manchester				X			X	X
NH	Portsmouth/Dover/Rochester		X					X	X
NJ	Atlantic City		X					X	X
NV	Reno				X			X	X
NY	Albany/Schenectady/Troy				X			X	X
NY	Buffalo/Niagara Falls				X			X	X
NY	Essex co.				X			X	X
NY	Jefferson Co.				X			X	X
NY/NJ	New York Metro Area	X					X		X
NY	Poughkeepsie				X			X	X
OH	Canton				X			X	X
OH/KY	Cincinnati		X					X	X
OH	Cleveland/Akron/Lorain		X					X	X
OH	Columbus				X			X	X
OH	Dayton/Springfield		X					X	X
OH	Toledo		X					X	X
OH/PA	Youngstown/Warren/Sharon				X			X	X
OR/WA	Portland/Vancouver				X			X	X
PA/NJ	Allentown/Bethlehem/Eastern		X					X	X
PA	Altoona		X					X	X
PA	Erie		X					X	X
PA	Harrisburg/Lebanon/Carlisle		X					X	X
PA	Johnstown		X					X	X
PA	Lancaster		X					X	X
PA/NJ/DE	Philadelphia	X							X

State	CMSA	1990 CAA Classification			1992/93/94 Classification				
		Severe	Serious	Moderate	Marginal	Serious	Moderate	Marginal	Attainment
PA	Pittsburgh			X					X
PA	Reading			X					X
PA	Scranton/Wilkes Barre					X			X
PA	York					X			X
RI	Providence		X						X
TN	Memphis					X			X
TN	Nashville			X					X
TX	Beaumont/Pt. Arthur		X						X
TX	Dallas/Ft. Worth			X				X	
TX	El Paso		X					X	
TX	Houston	X						X	
UT	Salt Lake City			X					X
VA	Norfolk						X	X(?) ⁽¹⁾	
VA	Richmond/Petersburg			X				X	
VA	Smyth Co.					X			
WA	Seattle/Tacoma					X			X
WI	Door Co.					X			X
WI	Kunaunee Co.			X					X
WI	Manitowoc Co.			X					X
WI	Milwaukee/Racine	X							X
WI	Sheboygan			X					X
WI	Walworth Co.					X			X
WV	Charleston			X					X
WV	Greenbriar					X			X
WV	Parkersburg/Marietta			X					X
TOTALS:		5	11	29	40		1	5	12 ⁽¹⁾

(1) Norfolk's status under review

TABLE 5
Comparison of 1990 CAA Required Non Attainment Classification
Using 1988/1989 CO Data Versus 1992/93 Observed Levels

<u>State</u>	<u>NonAttainment Area Name</u>	<u>1990 CAA Classification</u>				<u>1992/93 Classification</u>			
		<u>Serious</u>	<u>Moderate+</u>	<u>Moderate</u>	<u>Serious</u>	<u>Moderate+</u>	<u>Moderate</u>	<u>Attainment</u>	
AK	Anchorage Area							X	
AK	Fairbanks North Star Borough							X	
AZ	Phoenix NA Area		X						X
CA	Chico NA Area			X					X
CA	Fresno NA Area				X				X
CA	Lake Tahoe S. Shore								X
CA	Los Angeles S. Coast Air Basin	X					X		
CA	Modesto NA Area			X					X
CA	Sacramento NA Area			X					X
CA	San Diego NA Area			X					X
CA	San Francisco-Oakland-San Jose			X					X
CA	Stockton NA Area			X					X
CO	Colorado Springs NA Area			X					X
CO	Denver-Boulder NA Area		X				X		
CO	Fort Collins Area			X					X
CO	Longmont NW Area			X					X
CT	Hartford-New Britain-Middletown			X					X
DC-MD-									
VA	Washington NA Area			X					X
MA	Boston NA Area			X					X
MD	Baltimore NA Area			X					X

**Comparison of 1990 CAA Required Non Attainment Classification
Using 1988/1989 CO Data Versus 1992/93 Observed Levels**

<u>State</u>	<u>Non-Attainment Area Name</u>	<u>1990 CAA Classification</u>			<u>1992/93 Classification</u>			
		Serious	Moderate+	Moderate	Serious	Moderate+	Moderate	Attainment
AK	Anchorage Area		X				X	
AK	Fairbanks North Star Borough			X			X	
AZ	Phoenix NA Area			X			X	
CA	Chico NA Area		X					X
CA	Fresno NA Area			X				X
CA	Lake Tahoe S. Shore			X				X
CA	Los Angeles S. Coast Air Basin	X					X	
CA	Modesto NA Area			X				X
CA	Sacramento NA Area			X				X
CA	San Diego NA Area			X				X
CA	San Francisco-Oakland-San Jose			X				X
CA	Stockton NA Area			X				X
CO	Colorado Springs NA Area			X				X
CO	Denver-Boulder NA Area		X				X	
CO	Fort Collins Area			X				X
CO	Longmont NW Area			X				X
CT	Hartford-New Britain-Middletown			X				X
DC-MD-								
VA	Washington NA Area			X				X
MA	Boston NA Area			X				X
MD	Baltimore NA Area			X				X

State	Non-Attainment Area Name	1990 CAA Classification			1992/93 Classification			
		Serious	Moderate+	Moderate	Serious	Moderate+	Moderate	Attainment
MN	Duluth NA Area							
MT	Missoula			X				X
NC	Raleigh-Durham NA Area			X				X
NC	Winston-Salem NA Area			X				X
NM	Albuquerque NA Area			X				X
NV	Las Vegas NA Area		X				X	
NV	Reno NA Area			X				X
NY-NJ	New York-N. New Jersey Long Island		X				X	
OR	Grants Pass			X				X
OR	Klamath Falls			X				X
OR	Medford			X				X
PA-NJ	Philadelphia-Camden Co. NA Area			X				
TX	El Paso			X			X	
UT	Ogden NA Area			X				X
UT	Provo-Orem NA Area		X				X	
WA-OR	Portland-Vancouver NA Area			X				X
WA	Seattle-Tacoma NA Area		X					X
WA	Spokane NA Area		X				X	
TOTALS:		1	8	29	1	1	8	28

TABLE 6
Comparison of 1990 CAA Non Attainment Classification
Versus 1992/93/94 Classification for California

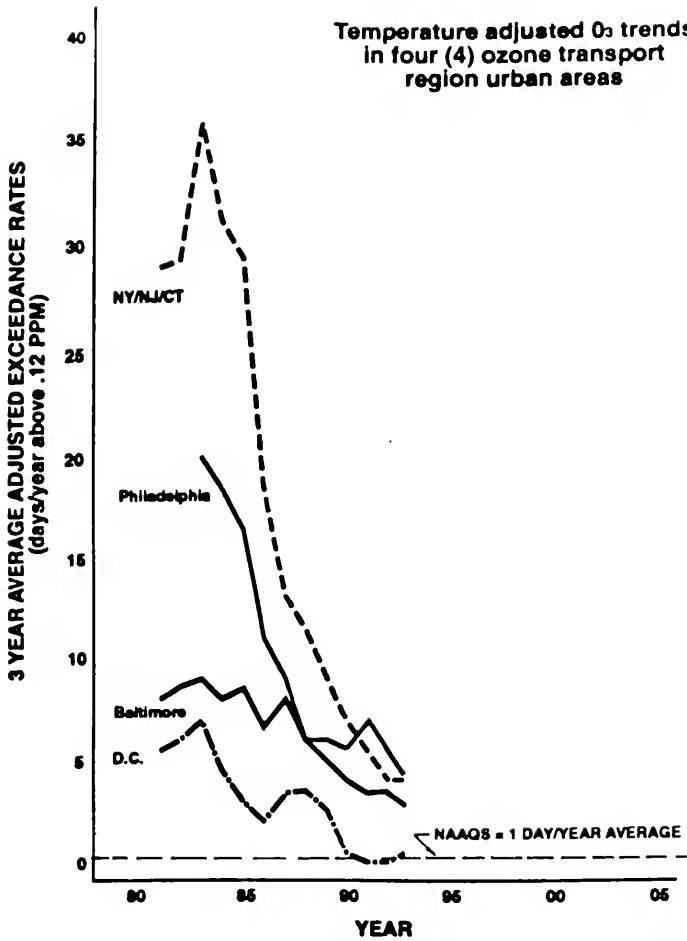
Region/Area	1990 CAA Classification					1992/93/94 Classification					
	Extreme	Severe	Serious	Moderate	Marginal	Extreme	Severe	Serious	Moderate	Marginal	Attainment
Los Angeles/So. Coast	X					X					
Monterey Bay				X					X		X
Sacramento			X						X		
San Diego		X							X		
San Francisco				X							X
San Joaquin Valley			X					X			
Santa Barbara				X							X
SE Desert		X						X			
Ventura		X							X		
TOTALS:	1	3	2	3	3	1	0	2	3	3	3

TRENDS IN OZONE

- Ozone air quality data must be corrected for meteorology which causes observed fluctuations greater than those associated with lower emissions effects.
- Several methods have been developed and tested with success.
- A simple batting average approach works well for most areas, i.e., the more times at bat in a season the more likely the number of hits: the more days above 90°F in a year the more likely the number of ozone standard exceedances.
- If we normalize the exceedance data to the long term temperature data, i.e., annual days above 90°F., we would expect the batting average to drop if ozone levels are improving. Three year running averages also smooth the data.
- The downward trends are clearly evident. See Figures 3 and 4. The downward trend will continue due to the expected emissions reductions associated with auto fleet turnover.

FIGURE 3

Temperature adjusted O₃ trends
in four (4) ozone transport
region urban areas



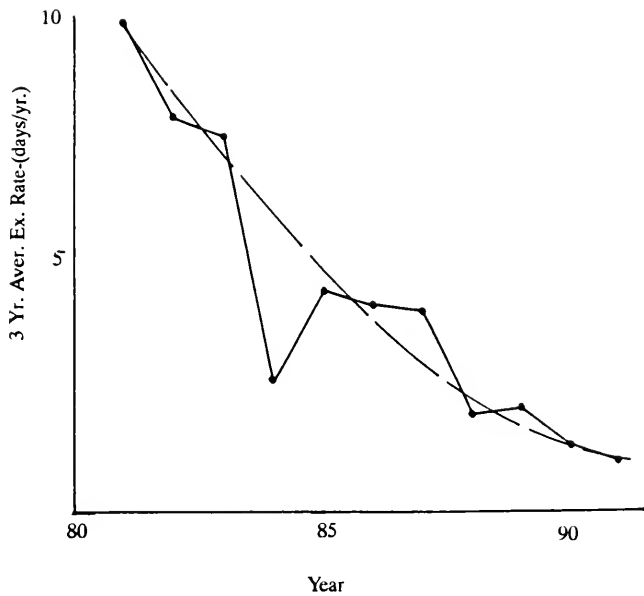


FIGURE 4

Ten Year Temperature Adjusted Ozone Trends
1980--1992, Charlestown Monitor

Louisville

FUTURE EMISSIONS REDUCTIONS

- The downward trends shown in Figures 3 and 4 will continue without further regulatory strategies just due to auto fleet turnover.
- Fleet turnover will produce a 15 to 25% VOC emissions inventory reduction. The ozone reduction will in turn be in this range. See Figures 5 and 6.
- Control of non mobile sources has had only a small benefit in the past and will have even a less benefit in the future. See Figure 7.
- This expected ozone reduction should bring most of the urban areas listed in Table 7 into attainment. The percent ozone improvement needed for attainment is shown in the last column.

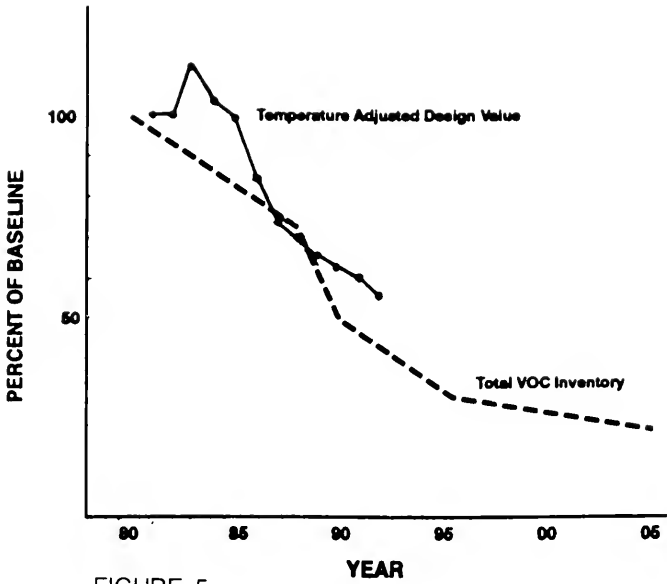


FIGURE 5
**TRENDS IN VOC EMISSIONS & O₃ DESIGN VALUES
NY/NJ/CT REGION
1980-2005**

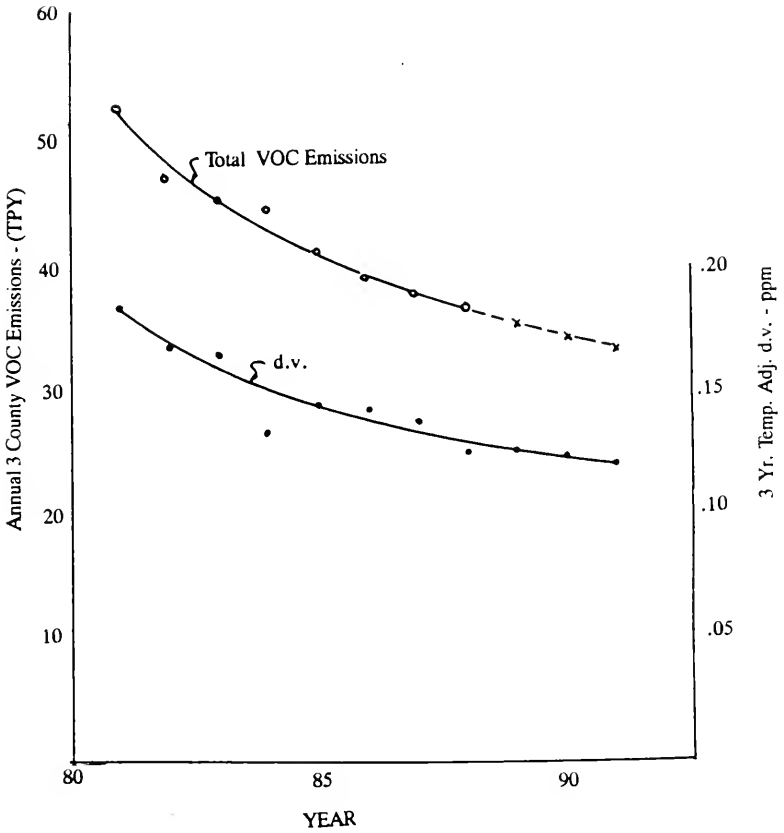


FIGURE 6
Comparative Trends in Ozone Design Value
and Total AQCR VOC Emissions
Louisville

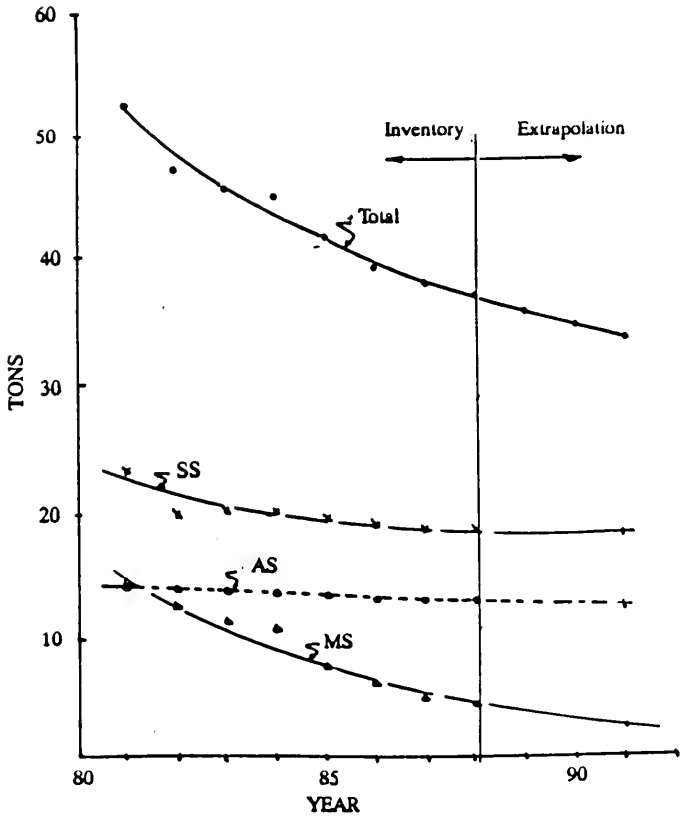


FIGURE 7

Trends in VOC Emissions By Source Category
Jefferson County
Louisville

Zephyr Consulting

TABLE 7

PROJECTED O₃ REDUCTION REQUIREMENTS
VERSUS HISTORICAL TRENDS

	1991-1993 RED - %	REQ'D RED. - %
92/93/94 RECLASSIFICATION		
Severe 15		
None		
Serious		
Houston	18.1	27.9
Moderate		
New York/New Jersey/Connecticut	7.5	16.2
Philadelphia	9.2	10.8
Atlanta	4.1	11.4
Hartford	10.8	12.1
Phoenix	-4.2	15.6
Marginal		
Portland, ME	14.2	2.4
El Paso	5.0	6.8
Washington, DC	6.0	1.6
Louisville	0	1.0
Richmond/Petersburg	-4.9	3.1
St. Louis	1.6	0.8
Springfield, MA	5.8	5.3
Dallas/Ft. Worth	6.8	9.5
Baltimore	1.5	6.8
Boston	-3.0	8.8
Baton Rouge	-6.3	8.1
Chicago	7.0	6.8

NOTES:

1. Different site used by EPA than previous years, or alternative site with higher d.v.
2. Missing data rule applied, (y) is second-highest observation.
3. These areas should be considered contiguous with the adjacent urban areas already classified.
4. Classified by EPA as being marginal but below NAAQS.

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CURRENT REGULATORY EFFECTIVENESS

- Most control strategies outlined under the NA provisions of 1990 CAA do not have meaningful benefits. They reflect a control for control sake mentality.
- NO_x control is counterproductive despite what the OTC claims. See Figure 8.
- I/M 2040 is a major issue.
- Public exposure is not affected by implementation of the required strategies.
- Ozone is now a marginal problem in a few non California areas.
- Further regulation implementation should be postponed for 3-5 years.

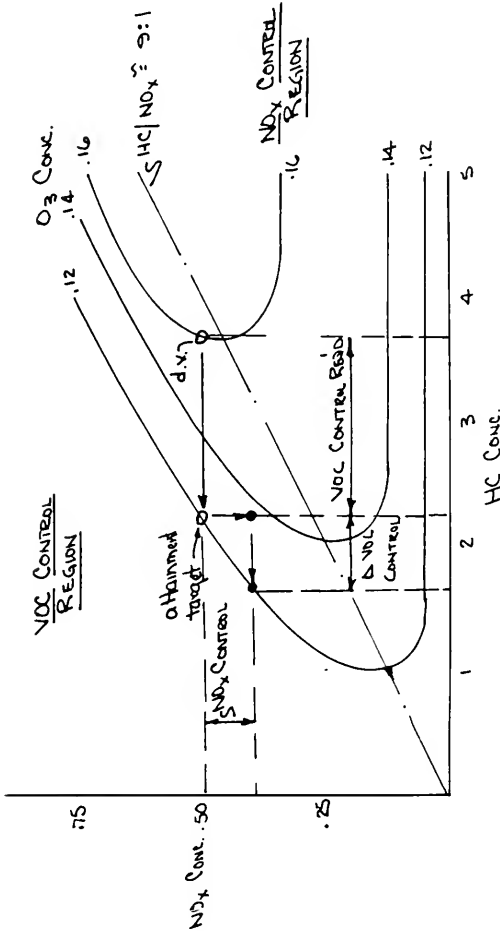


FIGURE 8

THE RELATIONSHIP BETWEEN O₃, HC, & NDx
AND CONTROL STRATEGY EFFECTIVENESS

Mr. BARTON. I'd point out that in this report, on table 3, when it looks at areas outside of California, it shows that both in Houston and in the Dallas-Fort Worth area, from the period 1988, 1989 and 1990, and they go through four base periods, but from 1988, 1989, 1990 to 1992, 1993, 1994, that the ozone levels have actually declined.

Now, admittedly, that's a 3-year moving average of data points that were collected by the EPA. So I think if we can—I will not dispute that this year in Dallas-Fort Worth they had more non-attainment days. But my non-scientific explanation is that the wind didn't blow in Dallas this summer like it has in previous summers and the weather wasn't any hotter, just the air was stiller. But that may not be valid scientifically, but that's my layman's explanation for that.

Would the gentlelady from California like to ask some questions?

Ms. ESHOO. Thank you, Mr. Chairman, and thank you to the witnesses. This question is for either one of you. Obviously, witnesses come in and attempt to articulate what the problem is. What are you, in brief form, suggesting that the Congress do? Do you think that the Clean Air Act needs to be opened up all over again to address the problems that you're underscoring? Do you see something that's in parentheses that can be cured? Do you think that it is particular to your State rather than a national problem or vice versa?

Take a stab at those. I always have an appreciation for all the things that are said, the questions that are asked, the statements that are made. Many times I leave and I think what did everybody say or what were they saying to us.

So if you could summarize and address what I just asked, it would be most helpful to me. Thank you.

Mr. MARQUEZ. My colleague from Michigan spoke to that earlier and I agree with the things he said, that maybe many of the solutions can be done regulatorily, but we need to have assurance that these things are going to happen. We do need to put a stop to some of the punitive actions that are taking place while we rethink which way we're going to do our business.

Above all, we need more flexibility on how to achieve standards. We cannot have one solution for every part of the country. We have to have flexibility in how we achieve those standards in this part of the country. This is some of the flexibility that EPA has begun to find and we must make sure that they continue to find.

Ms. ESHOO. Thank you. Mr. Drake?

Mr. DRAKE. I did earlier, in response to the what would I do if I was king question.

Ms. ESHOO. I missed it.

Mr. DRAKE. Indicate that our preference is administrative solutions, but some lack of confidence that that's going to happen is why we have, in the past, advocated a short-term moratorium on sanctions, to let these administrative solutions work their way out.

I think we, like everyone, have a concern that if the Act gets opened, everyone will jump on with their thing that they want changed and it won't be the narrow fix that we want. It will be the sum total of all the narrow fixes that everyone wants, and we share that concern. We don't want to see the statute gutted. We

are proud of the progress we've made in air pollution control. We're proud of the reductions that we've seen. But we're not ignorant to the problems that exist with the Act the way it's currently constructed.

Ms. ESHOO. Well, I'm reminded daily that whatever we do obviously bears the mark of humanity. Nothing is perfect. Now, I think anything that can be done can be done better. So I think that that's really what the purpose of the hearing is, to learn from you and then build. I hope that this can be done administratively with the EPA. The legislative route, you know, is a long and securitist route and some of the greatest problems that we're facing in the Nation, are in the legislative area, where it's tough for us to try and resolve those problems or develop a consensus. So I appreciate your saying that.

When you characterize your problems from the States that you come from, do you think that the fixes you need are provincial or do you suggest they be handled administratively to remedy problems that exist in all 50 States? Is it more tailored toward your State?—and it's all right if it is. If someone is having a problem, we need to work with them if, in fact, their sincerely stated goals are to have the cleanest air possible. I mean, our lungs and our kids deserve it.

Mr. DRAKE. There are something like 35 States, I think, that have had areas declared non-attainment for ozone and many of those States, probably most of those States, I think, are concerned about the long-range transport situation that I've described.

Certainly, all of those States would be concerned about what the standard is, how you measure it and how you implement it. The No. 1 problem that I describe for us of this overwhelming transport, I think, is probably far fewer States that feel they're in that situation. I can think of a couple of others that probably feel the same way as Michigan.

But west Michigan is—well, I've called it the poster child of overwhelming transport. I mean, that is an area that really does believe they are being punished for problems they didn't cause.

Ms. ESHOO. Thank you very much. Thank you, Mr. Chairman.

Mr. BARTON. Thank you. Mr. Burr.

Mr. BURR. Mr. Chairman, I have no questions.

Mr. BARTON. We want to thank this panel for coming today. We want to thank you for being so patient, as we've had to go vote and come back. There may be additional questions submitted to you in writing for the record and, if so, we would appreciate those responses being timely back to the committee. So thank each of you for attending and we would now like to call our second panel forward.

Mr. MARQUEZ. Thank you.

Mr. DRAKE. Thank you.

Mr. BARTON. We'd like to welcome our second panel. We have Dr. Kay Jones from Zephyr Consulting in Seattle, Washington; Dr. Roger McClellan, President of the Chemical Industry Institute of Toxicology, from North Carolina; and, Dr. Alan Krupnick, Senior Fellow, Resources for the Future, here in Washington, DC. I think Congressman Burr wishes to elaborate on Dr. McClellan's qualifications.

Mr. BURR. Actually, Mr. Chairman, and I thank you for yielding, my purpose is twofold. One, to welcome Dr. Roger McClellan to testify in front of Congress a second time since I have been here and to thank him for his commitment to do that.

Also, to say to all the witnesses who have testified today that with so many things going on, I'm sorry that we're scattered throughout this building with markups and with other hearings, but I hope that they understand that this is very important to us here in Congress, specifically these committees, and that we will and I will do everything I can to make sure that the testimony that's received through this hearing is digested and taken in the proper way, as are the questions and the answers of the members of this committee.

And, Dr. McClellan, again, I thank you for your participation in this. I yield back, Mr. Chairman.

Mr. BARTON. Each of you gentlemen needs to be made aware that it's the tradition of the subcommittee that all testimony taken by the Oversight and Investigations Subcommittee is taken under oath and Chairman Bilirakis of the Health and Environment Subcommittee has indicated that he wishes to continue that in these joint hearings. Do either of you three have an objection to testifying under oath?

[Chorus of nays.]

Mr. BARTON. You also need to be made aware that under the rules of the House and the United States Constitution, you have the right to be advised by counsel during your testimony. Do either of you wish to be so advised?

[Chorus of nays.]

Mr. BARTON. Would you please rise and raise your right hand?

[Witnesses sworn.]

Mr. BARTON. Be seated. We'll accept each of your written statements for the record. We would ask that each of you try to summarize those statements in 5 minutes. We will begin with Dr. Jones and then just proceed to your left, Dr. McClellan and then Dr. Krupnick. Dr. Jones.

TESTIMONY OF KAY H. JONES, ZEPHYR CONSULTING; ROGER McCLELLAN, PRESIDENT, CHEMICAL INDUSTRY INSTITUTE OF TOXICOLOGY; AND, ALAN J. KRUPNICK, SENIOR FELLOW, RESOURCES FOR THE FUTURE

Mr. JONES. Thank you, Mr. Chairman and distinguished committee members. It's indeed a pleasure for me to appear before you. I've sort of dreamt about this opportunity for the last 25 years of my career. You have my full testimony and I would only like to highlight the key points.

Believe it or not, I date back to the Clean Air Act of 1967. When I arrived at Washington just after the new Federal agency was formed, I was handed that Clean Air Act by my boss, told to go home and read it that night at bedtime and have it digested by the next morning. Obviously, the Clean Air Act of 1967 is not as thick as the Clean Air Act of 1990.

One of the things I will say which I think is extremely important here is that the Act of 1967 embodied the air quality management approach; in other words, the systems approach to balancing our

needs versus our goals, as opposed to the control for control sake approach, and that's what the Acts have evolved into as we've look on from 1967 to the Clean Air Act Amendments of 1990.

The difference between these two approaches is not significantly different when you've really got dirty air, but today we are at the margin of the ozone non-attainment problem and no matter how you cut it, it's much more costly to take the control for control sake approach rather than the systems approach.

I think the most important thing here is not to talk about specific provisions and who they affect or what industry is involved, but let's talk about the air quality that we breathe and that we see. I have put quite a few facts in my testimony and there's some attached reports that elaborate on that, but let's talk about the number of days that we're exposed, possibly exposed to outdoor ozone.

In 1988, there were over 600 days, collectively, across the United States at the worst case monitors, adding up the worst case monitors, as opposed to 93 outside of California last year. This year, there was 140 exceedances of those same monitors, but that's just due to the variations in year-to-year meteorology. We have seen a 50 percent reduction in the number of exceedances of the standard outside of California in the last decade. There's been a 27 percent reduction in those exceedances in Los Angeles.

On the average, Houston, at the worst case monitor, has seen about 12 days per year, a large contrast from southern California. We look at the northeast, the most highly impacted cities in the northeast, over the last 3-year period, at the worst case monitor, we've averaged no more than three exceedances per year above the allowable of 1 day per year, again demonstrating how close we are.

When we look at the trend in exceedances in the northeast, the raw data shows that we've reduced exceedances by 60 percent over the last decade. In fact, if we adjust for meteorology, by merely looking at a simple batting average approach to this, we have seen an 80 percent reduction in exceedances in the northeast.

Unfortunately, the 1990 Clean Air Act was based on 1988. I can tell you unequivocally 1988 is a once in a 100 to 200 year phenomena and we cannot afford to design programs to prevent an exceedance in another year like 1988. In fact, prior to 1988, the Clean Air Act was possibly going to be changed to actually remove some of the more onerous provisions in that particular Act, including inspection and maintenance of automobiles.

We had 87 non-attainment areas designated as a result of the Clean Air Act of 1990 and now, if we look at the last 3 years of data, we would have only less than 20 non-attainment areas outside of California. We would only have one serious area, which is Houston, we would have five moderate areas, and the rest would be marginal.

Nineteen ninety-five has really not changed that picture. In fact, we have had a handful of cities which might bump up, but barely above the standard, and this points to one of the major problems with the Clean Air Act is the bump-up provisions.

I also will say, very clearly, based on some studies which I've attached to my testimony, that the change to alternative standards will, in fact, not increase the non-attainment problem. It will not increase regulatory requirements and it will be no more protective

of the exposure to public health, and this is based on EPA's own population exposure assessments and my analysis against the most 3 years of data.

In fact, improvements in the last decade have had nothing to do with the provisions in the Clean Air Act, in Title I of the Clean Air Act of 1990, because they haven't been enacted. I firmly believe that the margin problem must be solved locally, that all of those provisions that were included in Title I were based on the assumption we had to roll back ozone from 1988 levels, and that has shown not to be the fact.

So what we really need to do, since we are at the margin, is to allow local governments, local agencies to tailor whatever additional controls they might need beyond just the regulations that are in place now, and this automobile turnover is going to provide a 15 percent reduction over the next 10 years in almost every city in the United States, and that, based on my calculations, is more than adequate to attain the current standard or alternative standards.

Mr. BARTON. Dr. Jones, you've waited 27 years and you've been dreaming about this, so I'm not going to hold you exactly to 5 minutes, but you have spoken 5 minutes. If you could conclude within the next one or 2 minutes.

Mr. JONES. Thirty seconds. I believe that the thing we should be doing is making the Title II provisions discretionary to be considered by local governments. I don't think we should have specificity of the attainment dates, that the year 2000 is a good target for almost area outside of California, possibly not Houston.

I will be glad to answer any questions, but in a nutshell, I think what we should be doing is watching the trends for the next few years and solve the problems at the local level. I think that the one thing I can say is that the importance of good environmental protection policy is that it must depend upon good science.

Thank you.

[The prepared statement of Kay H. Jones follows:]

PREPARED STATEMENT OF KAY H. JONES

I very much appreciate the opportunity to appear before you to discuss the CAA of 1990 with respect to the Title 1 and 2 provisions relative to urban ozone and those adjustments that are needed based on the unequivocal monitoring data that has become available since 1988.

There have been several iterations of the CAA, but the corner stone for all air pollution control activity at the Federal level was the CAA of 1967. At that time there was a need for Federal leadership because of the recognition that here was a demand for common thinking on health standards, control technology development and resolution of common interstate air pollution problems. I recall my arrival in Washington in the Fall of 1967 to join the National Air Pollution Control Administration as an assistant director for research. I was promptly handed a copy of the 1967 Act by my new boss, Dr. John Ludwig who was one of the most outstanding environmental research managers to ever serve in government. He told me to take it home for bed time reading before starting work the next day. I eventually wrote a paper on how the '67 Act embodied the "systems approach" to air quality management. Briefly, this meant air quality goals were set first, pollutant by pollutant. Then the pollutant source/impact relationship was determined before developing and implementing the administrative and technological tools to achieve the preset ambient standards. Continued R/D programs were established in parallel to support all technical facets of the program. This systematic process was dynamic in nature in that environmental monitoring provided the feedback loop whereby fine tuning of the system could then take place. My paper evolved into the framework for much of the air quality management activity undertaken throughout the NATO commu-

nity as a result of President Nixon's Committee on Challenges to Society Initiative within NATO, led by Senator Pat Moynihan.

Unfortunately, all of the CAA amendments since 1967 have moved away from the systematic air quality management approach to a "control for control sake" philosophy. The 1970 CAA, for example, required the health standard to be set for 5 criteria pollutants (in many cases without adequate health effects data) and that these standards were to be achieved within 5 years, i.e., by 1975. Strict auto emissions limits were set which also had to be met within this same time frame. These auto emissions limitations had no air quality related rationale, but were in fact the long term research goals for alternative engine technology which were being pursued by the agency at that time. When air pollution is at high level as it was in the 1960s, there was no significant regulatory distinction between the needed control strategies under either the air quality management approach or the control for control sake approach. However, as the potential or actual achievement of the air quality standards become a reality we enter into the gray or marginal zone of the problem. This is where we are today with respect to ozone non-attainment, and the overly detailed and unnecessary strategies required under Title 1 and Title 2 of the 1990 CAA amendments vividly illustrate a total lack of balance at the margin. The pervasive belief by the non-scientific environmentalists that overkill regulation is good because of their perceived uncertainty and that we can economically afford over regulation, is in the end bad air quality management policy.

Having served in government for 20 years and about the same time in the private sector, I think I have a middle of the road perspective although some of my colleagues at EPA believe that I have been unduly critical. To provide some truth about how far we've strayed from the systems analysis of the air quality problem, just let me say "1988". Prior to 1988 the CAA was under Congressional review and the mood was to relax some of the unnecessary and convoluted provisions, among them mandatory auto I/M (which by the way was to have been discretionary according to the legislative history.) Then the once in a hundred year flood annology—the excessively hot, humid, stagnant 1988 occurred. In the fall of 1988 I was asked as a consultant to the President's Council on Environmental Quality (CEQ) to analyze the 1988 ozone impacts in light of the abnormal meteorology and to compare them to the historical record. In January of 1989 my results were contained in the Air Quality Status and Trends Chapter, which I authored, of the 1988/89 CEQ Annual Report. The tenuous regulatory implications of using 1988 as a basis for legislation was discussed in the original draft chapter. EPA held off clearance of the full report until July of 1989 which was after the Bush version of the CAA went to the Hill (June 12, 1989.) The section of this chapter discussing the policy implications had also been excised from the chapter before EPA could give its clearance. To this day EPA has never produced a technical analysis justifying the use of the 1988 ozone data as a basis for their stringent legislative position, either prior to or after the passage of the 1990 CAA amendments. The onerous and unneeded provisions of Title 1 and Title 2 were the result of zero scientific analysis of the 1988 phenomenon.

The cure for the problems with Title 1 and Title 2 is not special interest adjustments, it's providing time to really more precisely understand where we are and what the longer range needs are at the local level and *possibly*, and I want to emphasize *possibly*, on a regional scale. The need to regulate precursor emissions of ozone on a regional scale through the Ozone Transport Commission and the unauthorized 31 state Ozone Transport Advisory Group has little if any proven scientific justification. It is mostly a state level agency finger pointing "I can't do it alone" exercise, plus more control for control sake emissions reduction planning.

I would like to briefly discuss the end product of our historical efforts of achieving "clean air." For over a decade I have said that the only way to persuade Congress to improve/relax/tighten clean air legislation is to educate congressional members and their staff about *air quality*, i.e., the air we see and breathe. I think the record is clear that special interest lobbying during the 1990 CAA debate regarding specific source regulation was ineffective, at least from an industrial perspective. If you will only focus on what the *air quality* trends data are telling us you will have all the direction and justification you need to temper the 1990 amendments with respect to Title 1 and Title 2.

A few air quality facts:

1.) There are less than 20 urban areas out of the 87 originally designated non-attainment areas outside of California that would be classified in air quality non-attainment today, based on 1992/93/94 data. Despite the hype, you may have heard or will hear, the inclusion of the 1995 data does not significantly change the good news picture.

2.) Among all U.S. urban areas outside of California there have been no more than 140 total days (among the worst case monitors) above the ozone standard. By contrast, L.A. alone experiences over 100 days/year at its worst case monitor. The next highest cities outside of California were Houston with 14 exceedance days and Philadelphia with 9 exceedance days in one year. In 1988 there were over 600 days above the standard nationwide (again, outside of California.)

3.) Except for Houston, there are no urban areas outside of California that would be classified as "Severe" or "Serious" based on 1992/93/94 data. Most would be classified as "Marginal" with only 5 in the "Moderate" category.

4.) There has been more than a 50% reduction in total violations of the standard over the past 10 years outside of California. California experienced a 27% improvement over the same period.

5.) If we examine the trends in the 4 most highly impacted cities in the NE, i.e., the Wash. D.C., Baltimore, Philadelphia, and New York metropolitan areas, the raw improvement in air quality is almost 60% in the reduction of days above the standard since 1985. If we adjust for the year to year temperature influence, the true improvement is an 80% reduction.

6.) The standard allows for one hypothetical exposure to one day per year with the peak hour concentration above the 120 ppb standard. The worst case hypothetical exposure in the NE has averaged no more than 3 days above this one day limit over the past three years.

All of this progress has been achieved without any of the new regulatory strategies embodied in Title 1 or Title 2. The downward trend in ozone should and will continue for five to ten years just due to auto fleet turnover to new cars. To argue that this won't happen would be counter current to the observed data which has clearly demonstrated that our past VOC control strategies have been effective. Critics would have to refute the very policies they supported in the past and support for the future.

I hope that the these factual air quality indicators and historic trends will amply destroy the myth that because of 1988 we need more emissions control regulation. Another myth which you will hear about is that we need to lower the ambient ozone standard to protect the health of children and other susceptible members of the population. It is also mistakenly perceived that the nonattainment picture would broaden to many other urban areas across the Nation and that we need all the controls we can find even beyond those specified in Title 1 and Title 2. For example, 49 state tail pipe standards beyond Tier I, and utility boiler NO_x controls on utility plants beyond current mandates among others.

Lets examine the facts of the matter using EPA's own staff analysis which has been developed as part of the ozone standard review process.

1.) Except for 3 urban areas, the current exposure to the most sensitive segment of our population, i.e., outdoor exercising children is probably not significantly different (i.e., a residual exposure less than 5% of the total susceptible population) between current exposures and the achievement of the current ozone standard or upon achievement of any of the alternatives under consideration. This finding is based on applying EPA's 9 city exposure study results to current data and various NAAQS alternatives under consideration.

2.) The frequency of actual exposures of outdoor children are less than that measured at the worst case monitor. Allowing multiple exceedances of the current or alternative standards does not make any difference in their actual exposure.

3.) A lot of publicity has been made about increased hospital admissions of asthmatics due to ozone exposure in N.Y. If we accept the research results at face value, the current exposures add only 0.79% to the background admission rate. This is 225 admissions out of the background estimate of 28,470 admissions per year. An 80 ppb, 8 hour, and 5 allowable exceedance standard when achieved would only reduce this to 0.49%. Given the uncertainty of the model, such exposure risks are insignificant.

4.) The expected reduction in urban ozone which should take place over the next few years makes the alternative standards indistinguishable from each other, both from a regulatory perspective and a health risk perspective. If a 90 ppb, 8 hr. standard were adopted, the ozone reductions necessary to achieve it is equal to or less than that needed to meet the existing 120 ppb standard, depending upon whether 3 or 5 exceedances are allowed.

We do not need to change the current ozone standard. A precedent was already set when we didn't change the NO₂ standard, merely because there was new data to suggest we needed a short term standard. The annual standard was equally protective of the short term effects of concern. This is the case here.

I am not suggesting that we don't need a CAA. What I advocate is the return to the principles of systematic air quality management. Several of the provisions of Title 1 and 2 which need rethinking are:

1.) With respect to non-attainment classification, allow for immediate reclassification of all urban areas based minimally on 1992/93/94 data. Allow for further analysis of meteorological influences at the local level to establish a normalized planning baseline. Eliminate implicit attainment deadlines, target the year 2000 with a Congressional review provision at that time. Outside of California, Houston is the only area that might miss in 2000.

2.) With respect to the percent reduction mandates, eliminate the specificity of VOC reduction requirements. The 15% in 6 years, the 3% year, and no credits for projected benefits of existing strategies makes absolutely no sense from an *air quality* planning perspective. It appears that these numerical requirements were the projected needs based on the 1988 baseline, although I have been unable to identify the analyst. The trends data show that we are clearly at the margin. Any implementation of additional control strategies should be up to state and local agencies because of their unique situations involving growth, stationary versus mobile source contributions, etc.

3.) NO_x control substitution makes absolutely no scientific sense in terms of meeting the ozone rollback requirements in urban areas. NO_x controls in the urban setting increases ozone levels. NO_x controls are advocated by the OTC and now OTAG have no scientific validity. The OTR model has yet to be validated. Until such models can be run retrospectively, i.e., back to 1980-, they have no function in current policy analysis.

4.) The prescribed measures such as RACT on 10 ton sources, Stage II, enhanced I/M, TRMs traffic controls, etc., have no ozone benefit analyses associated with their promulgation. These provisions epitomize the control for control sake mentality of the proponents of such measures. My best guess is that if all of these prescribed measures were carefully scrutinized as to the best estimate of VOC reduction effectiveness and then were assumed to be implemented, their net collective ozone reduction benefit would be less than 5%, which is only slightly above the rounding error of the measurement method, i.e., 5 ppb.

5.) Abolish the OTC and let the affected states, if any truly exist, form their own coordinating effort. In my view, such efforts should focus solely on the scientific issues at the present time. I would also prohibit any EPA led regulatory effort, i.e., OTAG, beyond that authorized in the Act.

6.) With respect to tail pipe standards, maintain Tier I, but drop Tier II until an independent study, e.g., by NAS for the Congress proves otherwise.

7.) Make fleet clean fuels provisions discretionary.

8.) Eliminate any inference that other cities should consider opting in.

9.) Reformulated gasoline provision should be re-evaluated from an effectiveness and toxicity perspective.

10.) Non-highway vehicles on particular locomotive emissions have little if any contribution to urban ozone. Their inclusion in present VOC inventories mask the benefits of the current on road vehicle reduction benefits. Such sources should be removed from local inventories unless they are *proven* contributors.

I don't have time to address all of the other specific provisions, but the points I've made so far apply in principle to the entire Act, especially Title 3.

I would like to close my remarks by saying that we have the opportunity to make appropriate mid course corrections to the CAA without in any way jeopardizing public health protection as opponents to revisions suggest. The *ambient* data when properly interpreted clearly support the removal of costly ineffective and unnecessary regulatory burdens. Our lack of precise scientific knowledge at the current margin of the ozone problem is greater than the regulatory burden the Act imposes. Please forget 1988, watch the air quality improve even further over the next 5 years and allow local governments to deal with their future air quality management needs on a case by case basis. In a nutshell, good environmental management policy only comes from good science.

I have appended 4 of my recent analyses which underpin my overview remarks. I will be happy to respond to any questions any again I appreciate the opportunity to appear before you.

Mr. BARTON. Thank you, Dr. Jones. We'd now like to hear from Dr. McClellan.

TESTIMONY OF ROGER McCLELLAN

Mr. McCLELLAN. Mr. Chairman, distinguished members of the subcommittee. I'm pleased to have this opportunity to testify at your request on the implementation and enforcement of the Clean Air Act, with emphasis on the national ambient air quality standard for ozone.

The comments I offer are based on my experience as a scientist, research manager, and experience in advisory roles in numerous public and private organizations. That has included long-term service to EPA, including chairmanship of its Clean Air Scientific Advisory Committee, CASAC. I am currently serving as a member of the CASAC panels on ozone and particulate material.

The legislative basis for the Clean Air Act is well known to all of you. Put in its simplest form, the Clean Air Act requires the Administrator to develop criteria, promulgate standards for certain air pollutants to protect against adverse effects, including those in sensitive populations, with an adequate margin of safety. Clearly, this portion of the Act is based on a threshold concept of relationships between exposure and response.

The approach that I've discussed has been used to set the current national ambient air quality standard for ozone and particulate material. The current standard, as we've been discussing, is 0.12 ppm, with a 1 hour averaging time. Attainment of the standard occurs when the expected number of days per calendar year with maximum hourly averaged concentrations greater than 0.12 ppm is equal to or less than one. Operationally, the standard has exceeded—that value has exceeded a fourth time in a 3-year period.

Both the PM-10 and ozone standards are currently under review. For both pollutants, substantial new information on their health effects have been developed since the previous reviews and have been incorporated in the most recent criteria documents and related staff position papers. It is noteworthy that for both pollutants, there are published papers and the scientific peer reviewed literature reporting health effects at or about the level of current standards, and, in some cases, models have been used to extrapolate the background.

In the case of ozone controlled multi hour exposures of human volunteers, results in pulmonary changes that are related both to exposure concentration and duration of exposure. These data have been a major factor in the EPA staff recommendation for a change in the standard from 1 to 8 hours averaging time and consideration of setting the standard at levels from 0.07 to 0.09 ppm. Consideration is also being given to changing the statistical form of the standard, the number of allowable exceedances.

I personally support setting the primary standard at 0.09 ppm, with an 8 hour averaging time. I also favor going to a more robust statistical form, such as a concentration-based metric and, in my opinion, a standard set with five allowable exceedances per year would be acceptable.

In considering the health effects of exposure to ozone, a key finding of EPA staff was that this approach recognizes that for most of the health effects associated with ozone, no population threshold can be identified. It follows that the use of an adequate margin of safety approach, as outlined in the Clean Air Act, for setting the standard is untenable. It is unworkable. Setting of the standard is a judgment call of how much estimated ozone risk, down to and including background, the Administrator wishes to allow relative to the background of similar risks from other factors.

This was recognized by the EPA staff in the ozone staff paper with a statement "In recommending a range of options for the Administrator to consider, the staff notes that the decision is largely a public health judgment call." I strongly concur with both of these statements.

The basic problem can be illustrated by considering table A that is attached to my testimony. It shows estimated hospital admissions for asthmatics in the New York City area. The model used to develop that table assumed ozone effects down to a background level of 0.04 ppm. The first row in the table, excess admissions, was prepared by the EPA staff and included in their draft ozone staff paper.

It may be noted, reviewing that row, that the excess admissions for various ozone control scenarios included 210 cases for the present standard to a range of 60 to 240 cases for alternative standards. For comparison, the present situation is estimated to result in 400 cases.

If we look at the fifth lower row in the table, prepared by CASAC members, we see quite a different picture. In this row, all asthma admissions with a baseline of approximately 30,000 cases is shown.

Mr. BARTON. Dr. McClellan, you've also just hit the magic 5 minute mark.

Mr. MCCLELLAN. I'll wrap up quickly.

Mr. BARTON. So another minute or two.

Mr. MCCLELLAN. When this value is compared with that for various options, ozone aggravated asthma admissions clearly represent only a small fraction of total cases and the difference in impact of the various options for the ozone standard is small.

Let me just conclude by making one other point, and that is that I'm not an advocate of rolling back the standard for criteria air pollutants. The gains we've made must be sustained. However, I believe we're now at a juncture where we need a substantially improved information base, new approaches, including potential legislative changes, if we're going to address the tough question how low is low enough. That is going to require an improved information base and a better record of support of the research required for that that EPA has had with its previous on-again-off-again approach to the support of funding of research on criteria air pollutants.

And with that, I'll close and indicate that I'll be pleased to address questions later when we have the opportunity.

[The prepared statement of Roger O. McClellan follows:]

PREPARED STATEMENT OF ROGER O. MCCLELLAN, PRESIDENT, CHEMICAL INDUSTRY
INSTITUTE OF TOXICOLOGY

Chairmen and distinguished members of the Subcommittees: I am pleased to have this opportunity to testify at your request on the Implementation and Enforcement of the Clean Air Act with emphasis on the National Ambient Air Quality Standard for Ozone. I request that this written testimony be included in the record as though read in its entirety.

By way of background, I serve as President of the Chemical Industry Institute of Toxicology located in Research Triangle Park, North Carolina. The Institute is supported principally by some 40 leading industrial firms and has a mission of developing an improved scientific basis for understanding and assessing the human health risks of exposure to chemicals, pharmaceuticals, and consumer products. This mission is being achieved through the conduct of an in-house research program carried out by 160 scientists, postdoctoral fellows, and supporting personnel.

The comments I offer are based on my experience as a scientist and research manager and on my extensive service in advisory roles to numerous public and private organizations. (An abbreviated biographical sketch is appended.) My advisory experience has included long-term service on the EPA Science Advisory Board. I have served under each of the Agency's Administrators on a number of Committees, previously as Chair of its Clean Air Scientific Advisory Committee, Environmental Health Committee, Environmental Radiation Exposure Advisory Committee, and the Research Strategies Advisory Committee and as a member of the Relative Risk Reduction Strategies Committee. Most recently, I have served as a member of the Clean Air Scientific Advisory Committee Panels considering the National Ambient Air Quality Standards for Ozone and Particulate Material.

Legislative Basis for National Ambient Air Quality Standards

The legislative basis for the Clean Air Act is well known to all of you. However, I would like to highlight several key points to provide a basis for my remarks. The Clean Air Act directs the Administrator of the Environmental Protection Agency to identify pollutants which "may be reasonably anticipated to endanger public health and welfare" and to issue air quality criteria for them. These air quality criteria are intended to "accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of [a] pollutant in the ambient air..."

For these "criteria pollutants" the administrator is directed to propose and promulgate "primary" and "secondary" National Ambient Air Quality Standards. In the interest of brevity, I will consider only the primary standard setting process in this testimony. The primary standard is defined in the Act as one "the attainment and maintenance of which, in the judgment of the Administrator, based on the criteria and allowing an *adequate margin of safety*, [is] requisite to protect the public health." The legislative history of the Clean Air Act indicates that the primary standard is to be set at "the maximum permissible ambient air level... which will protect the health of any [*sensitive*] group of the population" and that for this purpose "reference should be made to a representative sample of persons comprising the sensitive group rather than to a single person in such a group." The standard is viewed as sufficient whenever there is "an absence of *adverse effects* on the health of a statistically related sample of persons in sensitive groups from exposure to ambient air."

The courts have held that the "*margin of safety*" requirement for primary standards was intended to address uncertainties associated with inconclusive scientific and technical information available at the time of standard setting. And further, it was intended to provide protection against hazards that research has not yet identified or whose medical significance is a matter of disagreement. In setting a margin of safety, the EPA considers such factors as the nature and severity of the health effects involved, the size of the sensitive population(s) at risk, and the kind and degrees of uncertainties that must be addressed. The margin of safety comes into play at the boundary between conclusive evidence of adverse effects related to pollutant exposure and levels of exposure where there is no conclusive evidence of adverse effects with unknown or only partially quantified risks. The selection of a particular approach to providing an adequate margin of safety has been viewed by the courts as a policy choice left specifically to the Administrator's judgment.

A section of the Clean Air Act enacted in 1977 requires that "not later than December 31, 1980, and at 5-year intervals thereafter, the Administrator shall complete a thorough review of the criteria published under section 108 and the national ambient air quality standards... and shall make such revisions in such criteria and standards and promulgate such new standards as may be appropriate..." The Act requires that an independent scientific review committee be appointed to "complete a review of the criteria... and the national primary and secondary ambient air quality standards... and shall recommend to the Administrator any new... standards and revisions of existing criteria and standards as may be appropriate..." This function is carried out by the Clean Air Scientific Advisory Committee of EPA's Science Advisory Board.

The primary standard is to be set without regard to the cost of its implementation.

Put in its simplest form, the Clean Air Act requires the Administrator to develop criteria and promulgate standards for certain air pollutants to protect against *adverse effects* in the public, including *sensitive populations*, with an *adequate margin of safety*. As clearly implied by the statutory language, levels of pollutant exposures can be identified that cause effects, while lower levels of exposure will be without effect (i.e., a threshold for response). A "margin of safety" is then used to select a lower level for the standard, a level that, if attained, should not result in unacceptable risk.

Standards for Ozone and Particulate Matter

The approach outlined above has been used to set the current NAAQSs for ozone and particulate material. The current ozone standard is 0.120 ppm with a one-hour averaging time. Attainment of the standard occurs when the expected number of days per calendar year with maximum hourly average concentrations greater than 0.120 ppm is equal to or less than one. Operationally, the standard is exceeded if the 0.120 ppm is exceeded a fourth time in a three-year period.

The current particulate matter standard was promulgated in 1987 when the indicator for particles was changed from Total Suspended Particles (TSP) to PM₁₀, the latter referring to particles with a mean aerodynamic diameter less than 10 μm . The 24-hour PM₁₀ standard was set at 150 $\mu\text{g}/\text{m}^3$, with no more than one expected exceedance per year, and the annual PM₁₀ standard set at 50 $\mu\text{g}/\text{m}^3$, expected arithmetic mean. The PM₁₀ standard is thought to provide a more health-protection-relevant metric for controlling exposure than the old TSP metric.

Both the ozone and PM₁₀ standards are currently under review. The EPA has prepared criteria documents on both pollutants and these documents have been reviewed by CASAC. The Agency has also completed Staff Papers on both pollutants. The CASAC has reviewed the Staff Paper on ozone and is in the final stages of preparing a closure letter to the Administrator. The Staff Paper for Particulate Matter has just been completed and is scheduled for review by CASAC at a meeting on December 14-15, 1995.

For both pollutants, substantial new information on their health effects has been developed since the previous reviews and has been incorporated into the most recent criteria documents and related staff papers. It is noteworthy that for both pollutants there are published papers in the scientific peer-reviewed literature reporting health effects at or about the levels of the current standards.

In the case of ozone, controlled multihour exposure of human volunteers results in pulmonary changes that are related to both the exposure concentration and duration of exposure. These data have been a major factor in the EPA staff recommendation for a change in the standard from 1 to 8 hours averaging time and consideration of levels from 0.070 to 0.090 ppm. Consideration is also being given to changing the statistical form of the standard, i.e., the number of allowable exceedances. I personally supported setting the primary standard at 0.090 ppm with an 8-hour averaging time. I also favored going to a more robust statistical form such as a concentration-based metric, defined as the three-year mean of the annual n th highest value with n set between 3 and 7. In my opinion, a standard set with 5 allowable exceedances per year would be acceptable.

In considering the health effects of exposure to ozone, a key finding of the EPA staff was that "This approach recognizes that for most of the health effects associated with ozone, no population threshold can be clearly identified." I personally shared in this conclusion, as did other members of the CASAC Ozone Panel. It follows that the use of an adequate-margin-of-safety approach to setting the standard is untenable. The Clean Air Act language that calls for setting a standard with an adequate margin of safety is not workable. Setting of the standard is a judgment call of how much estimated ozone risk, down to and including background, the Administrator wishes to allow relative to the background of similar risks from other factors. This was recognized by the EPA staff in the Ozone Staff Paper—"In recommending a range of options for the Administrator to consider, the staff notes that the final decision is largely a public health policy judgment."

It is unfortunate that the Clean Air Act prohibits the consideration of cost in setting the standard. In my opinion, the best interests of society would be served if attention could be focused on the "best buy" for actions at levels of ozone control being considered that will reduce health risks, including those of ozone. Further reductions in ozone may not be cost-effective relative to other options.

The issue of the potential for alternative forms and levels of the ozone standard influencing health effects is illustrated in attached Table A considered by the CASAC Ozone Panel at its last meeting. This table is based on a study by Thurston et al. (1992) who examined the relationship between ozone levels and hospital admissions. The model assumed ozone effects down to a background level of 0.040 ppm. The first row on the table (Excess Admissions) was prepared by the EPA staff and included in the draft Ozone Staff Paper. It may be noted that the excess admissions for various scenarios included 210 cases for the present standard to a range of 60 to 240 cases for alternative standards. For comparison the present situation is estimated to result in 400 cases. The five lower rows in the table were prepared by CASAC Panel members. The second row reporting the excess admissions as a percentage change from the present standard at first glance appears to suggest considerable difference between the several options. However, the other rows are worthy of detailed consideration before a final conclusion is drawn.

The third row includes both the excess admissions due to ozone-aggravated asthma above the level of the standard *and* those cases related to ozone below the level of the standard down to background. The relative effect of the different options now appears to be much less, as seen from examining row 4. Let us now turn our attention to row 5, all asthma admissions, with a baseline of approximately 30,000 cases. When this value is compared with that for the various options, ozone-aggravated asthma admissions clearly represent only a small fraction of the total number of cases and the difference in impact of the various options for the ozone standard is small.

I am personally a strong advocate of comparative risk analyses such as detailed above to help guide societal decisions on the allocation of scarce resources. It is my understanding that the EPA Administrator can use analyses such as this in making decisions on the ozone standard although the Administrator is prohibited from explicitly considering costs of implementing the standard. In my personal opinion, the explicit consideration of the cost of achieving the various options would be of substantial value in making a decision that is likely to have a multibillion-dollar impact on society.

Let me hasten to add that the health impacts of ozone are not restricted to effects in asthmatics. However, the table clearly illustrates the importance of considering the estimated impacts of pollutant exposures within the broader context of other risk factors for specific health outcomes. In my opinion, the ultimate concern of society is for the aggregate risks from all causes and how best to achieve an overall reduction.

As I have noted, the EPA has just released the Staff Paper on particulate material, and I will serve as a member of the CASAC Panel reviewing it on December 14-15, 1995. Thus it would be inappropriate for me to comment in detail on it.

However, I can make several observations based on my review of the criteria document on particulate matter. First, a substantial amount of new information on the health effects of low-level exposure of humans to particulate material has become available in the last years. A considerable amount of this was developed using a 10- μ m particulate size metric stimulated by the regulatory shift to this metric in the 1980s. A much lesser amount of information is available for the 2.5- μ m particle size metric, a metric now being considered for a new particle standard. Second, some of the analyses performed suggest relationships between particle exposure and health outcome that extend down to background levels encountered in many areas of the United States. Thus, many of the issues encountered with ozone are apparently also present for particulate material. They can perhaps best be summed up in a one-liner: "How low is low enough?"

Before I am labeled as anti-regulatory, let me quickly note that I am pleased with the substantial progress made in controlling the levels of criteria air pollutants in the United States. A lot has been accomplished through the collective efforts of many individuals and organizations. I am not an advocate of rolling back the standards for the criteria air pollutants—the gains we have made must be sustained. However, I believe we are now at a juncture where we need a substantially improved information base and new approaches, including potential legislative changes if we are to address the tough question, "How low is low enough?"

Improved science needed for risk-based decision making

I call your attention to the need for a substantially improved information base if we are to carry out the kind of risk-based decision making I have advocated. Some might ask, "Has not enough research already been done?" The answer is no. We need additional quantitative data on the effects of long-term, low-level exposures to ozone and particulate matter if we are going to make scientifically sound decisions as to "How low is low enough?"

A major problem encountered in the past with research in this area has been EPA's on-and-off again level of interest and provision of funding for research on criteria pollutants. All too often, the approach has been to initiate new research as plans are developed for preparation of a new criteria document. Unfortunately, the research initiated has usually been of short-term duration, i.e., that which can be completed before the criteria document is finalized. With completion of the criteria document, the research funding is markedly reduced. This pattern must be broken. What is needed now is a sustained long-term effort. I have previously advanced such a proposal for particulate matter, suggesting a targeted research program of \$30 million per year for a five-year period. A similar effort is needed on ozone. These are admittedly large sums. However, when viewed in the context of an estimated \$150 billion expended annually on environmental compliance, I view these as a wise investment. The alternative is to turn aside risk-based decision making, which must have a scientific foundation, and accept a better-safe-than-sorry, lower-is-better approach and the associated high likelihood of misallocation of scarce societal resources.

TABLE A: ESTIMATED HOSPITAL ADMISSIONS FOR ASTHMATICS IN THE NEW YORK CITY AREA

Row		1H1EX	1H1EX	8H1EX	8H1EX	8H1EX	8H1EX	8H5EX	8H5EX	AS IS
1	Excess Admissions	0.12	0.10	0.10	0.09	0.08	0.07	0.09	0.08	≅400
2	% Δ from present standard	210	130	240	180	110	60	180	120	+90%
3	Excess + background	0%	-38%	+14%	-14%	-48%	-71%	-14%	-42%	+90%
4	% Δ from present standard	875	795	905	845	775	725	845	785	1065
5	All Asthma Admissions	0%	-9%	+3%	-3%	-11%	-17%	-3%	-10%	+22%
6	% Δ from present standard	29,810	29,730	29,840	29,780	29,710	29,660	29,780	29,720	30,000
		0%	-0.3%	+0.1%	-0.1%	-0.3%	-0.5%	-0.1%	-0.6%	+0.6%

Adapted by CASAC Ozone Panel from EPA Ozone Staff Paper

Mr. BARTON. Thank you, Dr. McClellan. We'd now like to hear from Dr. Krupnick. Again, your full statement is submitted for the record. So if you could try to summarize in 5 or 6 minutes.

TESTIMONY OF ALAN J. KRUPNICK

Mr. KRUPNICK. I'll try to meet the target. Mr. Chairman and distinguished committee members, thanks for inviting me to testify on this important issue. I've been a professional economist for 15 years, 14 spent at Resources for the Future and the last year ago spent at the President's Council of Economic Advisors as a senior economist there.

Currently, I am co-chairing the Subcommittee on Ozone Particulate Matter and Regional Haze Implementation Programs with John Seitz, the Director of the Office of Air Quality Planning and Standards at EPA. That covers a lot of territory that the committee here is interested in, but we've just formed this committee and don't have anything to report as yet.

I wanted to confine my remarks to issues associated with setting and implementing the ambient ozone and particulate standards because these pollutants are at the center of the debate over the future of air pollution policy. Although the program has been successful in getting air pollution down, it still has problems. It's too costly, it's less effective than it might, and it's inflexible. And many areas are going to face, in the future, very high costs of compliance, particularly if the standards for ozone and perhaps PM are tightened in 1997.

Hence, to guide reforms, I offer only a six-step recovery plan rather than the 12-step plan we hear about for applying to those in dire straits. Now, this program involves all the responsible parties—well, three or four of the responsible parties—Congress, EPA and the public. The first step is adapting to new knowledge. First, we're finding that thresholds in the effects of air pollution on health do not exist or exist at very, very low levels, meaning there's no simple way to choose an appropriate standard. I suggest setting standards for a given level of health protection in the first stage and then comparing all benefits and costs, qualitative as well as quantitative, as well as other factors, to help to decide if more stringent standards are warranted.

Second, and speaking to implementation now, we have a program that assumed that pollutants can be regulated separately locally and that reducing emissions always reduces harm. But these are false assumptions. This situation, to me, the fact that these are false, suggest that we consider designing our compliance strategies to reduce health and other risks directly, rather than simply reducing emissions or local concentrations on a pollutant-by-pollutant basis.

This approach would account for pollutant interactions and the regional nature of this problem. We could think about regional implementation plans, RIPs rather than SIPs, with the necessary institutions encouraged to develop following the OTC, Ozone Transport Commission model. Now, failing that, urban areas performance should be judged with imports of pollution excluded.

The second step is to rehabilitate EPA's Title I program. They've got some new initiatives that I think have a lot of promise and I

think the agency is committed to reforms, significant reforms. But there are still issues to work on. These include, first, the rule on allowable exceedances. This is a judgment call, not a scientific call, and it really matters. If we had three exceedances a year instead of one, 44 of 79 areas would come into compliance. Probably there would be minimal health effects from all of this and huge cost savings.

Second, the compliance demonstrations and the use of modeling are really over-precise and too stringent and they're causing States to play a numbers game, and there's been a lot of proposals around to improve that.

Third, we should pay more attention to PM and less to ozone, and I've got some benefit estimates attached to my testimony that give evidence in that area. The third step is to build on the best ideas we have around now. EPA has set up a number of sub-committees and working groups to generate good ideas. Some of them include regional NO_x trading, economic incentive approaches for mobile sources, like emissions fees or VMTs, vehicle miles travel based fees, that could be revenue neutral, and episodic ozone controls. A number of States are starting down this path. Measures that kick in only a few days a year that ozone is expected to be high.

The fourth step is to clarify and change the Clean Air Act Amendments. Now, I don't think it's necessary to reopen the Act for significant reforms to occur and I recognize the dangers of doing this. I think one thing Congress could do is to clarify the changes in standards, if that comes, invalidate subpart 2 of the Act—of Title I and cause a reversion to the less prescriptive subpart 1, and I think this would give EPA the needed discretion to fix a lot of the program. Of course, if we wanted to change standard-setting criteria, we'd have to open up the Act.

The fifth step is to educate the public. The public has an attitude of no responsibility for air pollution problems and it's caused Congress and the EPA to avoid confronting the driving public directly with the environmental and congestion effects their driving causes. Instead, our policy hides the excessive costs of technology mandates in new car prices. So this needs to be turned around with education and with leadership.

Finally, we need to fund research. There are major uncertainties here that could alter the program that we have now and the one that I am suggesting, and that research needs to be kept up even in this era of budget restrictions.

So thanks for the opportunity to testify.

[The prepared statement of Alan J. Krupnick follows:]

PREPARED STATEMENT OF ALAN J. KRUPNICK, SENIOR FELLOW, RESOURCES FOR THE FUTURE

Mr. Chairman and distinguished committee members. Thank you for inviting me to testify on implementation and enforcement provisions of Title I of the Clean Air Act Amendments of 1990. I am pleased to provide you with my ideas and judgments on the issues, from my perspective as a professional environmental economist, based on fourteen years of experience at Resources for the Future (RFF), many of them spent on issues associated with the Clean Air Act and with cost-benefit analysis. RFF is an independent, non-partisan research and educational organization concerning itself with environmental and natural resource issues. In addition, I have recently served as a senior economist on the Council of Economic Advisers, with pri-

mary responsibility for the environmental and natural resource portfolio. While at CEA I worked on a number of Clean Air Act issues, including EPA's preliminary planning for analyses required to re-promulgate the National Ambient Air Quality Standards (NAAQS) for ozone. Also, I currently co-chair (with EPA's Office of Air Quality Planning and Standards' (OAQPS') Director John Seitz) the Clean Air Act Advisory Committee's (CAAC's) newly formed subcommittee on Ozone, Particulate Matter, and Regional Haze Implementation Programs. I want to emphasize that the views I present today are entirely my own.

I will confine my remarks to issues associated with setting and implementing the ambient ozone and particulates (PM10) NAAQS. Both standards are up for court-ordered re-promulgation and are at the center of the debate over the costs and benefits of cleaner air.

MODERATE PROGRESS ON OZONE AND PM10

Progress toward achieving national compliance with the ozone and PM10 standards has been moderate and, with ozone, unsteady. Nationally, ozone and PM10 concentrations have fallen 12% and 20%, respectively, since 1985.¹ The ozone improvements have been interrupted by four (possibly five) years which showed concentrations and exceedences elevated over the previous year, primarily because of hot summers. The most favorable set of numbers show a drop from 112 million people to 50 million people living in counties with ozone monitors from 1988 to 1994,² but the total number living in the 79 MSA's violating the ozone standard in 1994 is 126 million.³ The corresponding, most favorable estimates for PM10 are 26 million people in 1988 and 13 million in 1994. PM10 nonattainment areas increased from 70 in 1990 to 82 in 1994. (Personal communication, Warren Freas, OAQPS.)

THE RISING COSTS OF CONTROL

According to one recent, albeit preliminary, estimate (Portney and Harrington, 1995),⁴ the U.S. spent about \$13 billion in 1994 for controls of ozone precursors. Because the 1990 CAAA ratchets up the requirements for non-complying states toward the end of the century, by the year 2000, annual spending on ozone control may approach \$25 billion. Even this level of spending will leave many areas of the country in violation of the current standard.

These gross estimates of spending mask a series of mini-dramas involving the cost and effectiveness of controls mandated under the CAAA for meeting ozone standards. First, enhanced inspection and maintenance programs were to be introduced into areas that the CAAA defined as "serious" or worse, with these programs featuring use of complex technologies with high costs, questionable benefits, and waiver limits for vehicle repair costs raised to \$450 (from about \$50 in most state programs). Amidst a howl of protests about the program, EPA withdrew the rule and permitted states to take their own approach, so long as they could meet certain performance criteria. Second, employer trip reduction programs were to be introduced into the areas classified as "extreme," while areas with less significant problems were discussing opting in to the program. Such programs were greeted with much resistance because of their costs and questionable effectiveness. Here again EPA withdrew the relevant rules. Finally, areas classified as serious or worse were required to introduce a clean fuels program. The EPA promulgated a rule that favored gasoline with an ethanol additive, but the rule was thrown out of court on due process grounds (not because of costs). All in all, not an enviable record to date.

THE RISING ADMINISTRATIVE BURDEN

As amended in 1977 and 1990, the Clean Air Act of 1970 requires the EPA to set national ambient air quality standards and sets up a state planning process (called a state implementation plan (SIP)), to ensure attainment. Up until the 1990 Amendments, states were required to demonstrate that their plan would lead to attainment of the standards by the deadline and show "reasonable further progress" in reducing emissions of ozone precursors. The 1990 Amendments made this process both more complex (as laid out in Subpart 2 of the Act) and burdensome by requiring that nonattainment areas be subcategorized into five types of areas (marginal,

¹ USEPA, National Air Quality and Emissions Trends Report, 1988, 1994.

² USEPA, National Air Quality and Emissions Trends Report, 1988, 1994.

³ Ozone Areas Designated in Nonattainment, OAQPS, July 21, 1995; 1990 population data.

⁴ "Economics and Health-Based Environmental Standards," *Policy Studies Journal*, vol. 23, no.

moderate, in addition to serious, severe, extreme noted above) and placing specific and unique requirements on such areas to help bring them into attainment.

THE LOOMING CRISIS

Based on previous interpretations of standard setting criteria, the clinical and epidemiological record, and recent reports from EPA, it is possible that the ambient ozone standard will be tightened and its averaging time lengthened—from a one-hour daily maximum reading of 0.12 ppm (with one exceedence per year allowed over three years) to an 8-hour daily maximum of 0.08 ppm with perhaps multiple annual allowable exceedences. This outcome could double the number of counties classified as being in nonattainment and all but end the hopes of many noncomplying areas to attain.

At the same time, the evidence for health effects below the PM10 standards is pervasive, although significant questions remain to be resolved. Moreover, it is possible that a new, fine particle standard will be set at stringent levels, again throwing many areas into nonattainment and causing significant alterations in state implementation plans for PM10.

A SIX-STEP RECOVERY PLAN

Twelve-step recovery plans are currently the vogue for getting one's own life in order when one's situation is dire. Fortunately, our problems with air pollution control policy are not nearly as bad as that. Thus, I offer a more modest, six-step recovery plan—for EPA, Congress, and the public—to help get air pollution policy as addressed in Title I on track.

1. Acknowledge mistakes and adapt to new knowledge.

The first step toward recovery is to acknowledge mistakes as well as the changing circumstances that can make old habits inappropriate. In writing the 1990 CAAA and in carrying them out, Congress and the EPA based their actions on several assumptions that now appear to be false. In fairness to both, scientific understanding in some of these areas has recently improved and been clarified; in some cases EPA is taking steps to adjust its program in light of some of the new understandings. Among the questionable assumptions are the following:

- *The NAAQS can be set to protect health with a margin of safety and can be set without regard to costs.*

The notion of protecting public health with a margin of safety requires logically that there be "bright lines" below which no effects from pollution exposure are observed. Epidemiological and clinical studies find health effects below current standards for ozone and PM10, with no indication that such "bright lines" exists. EPA acknowledges that such lines may not exist (as did Edmund Muskie when he helped write the 1970 CAA). Yet, without such lines, and excluding any notion of balancing the gains with the pains, there is no other logic for stopping short of complete health protection. As EPA's rationale admits to incomplete protection, costs must implicitly be playing a role. This role should be made explicit.

- *Health benefits are huge relative to the costs of controlling both ozone and PM10 and ozone is the bigger problem.*

In fact, based on the *quantitative* epidemiological and clinical evidence, as well as studies that gauge the preferences of individuals (expressed in dollar terms) for avoiding various types of health effects, the benefits of small additional improvements in ozone reductions may be pretty small while those for PM10 control may be far larger (table 1). Yet, ozone has been EPA's primary focus. Of course, there are many uncertainties in both the health and economics literatures that could swing these findings around. On the one hand, cumulative, low-level exposures to ozone may result in significant irreversible lung damage; on the other, the strong associations between PM10 exposures and mortality may be artifacts of still hidden factors, or the lives of seriously ill people may, for the most part, only be cut short for a few days by high PM10 episodes.

- *The "secondary" effects of ozone and PM10 can be addressed by secondary standards.*

In fact, effects of PM10 constituents and ozone precursors on visibility, crops, forests, lakes, etc. are regional problems related as much to urban emissions addressed under the primary NAAQS as to rural emissions. Studies of the preferences people hold for avoiding such effects question whether they deserve second class status to some types of health effects.

- *Ozone and PM10 problems are local.*

A vast amount of energy is expended on developing localized, urban pollution control strategies through the SIP process. Yet, there is now widespread consensus that ozone and PM10 are generally regional problems (not limited to the OTC region), and that localities on their own cannot, in some cases *ever*, come into attainment with the current (much less a tighter) standard for ozone. The idea of attainment and nonattainment areas simply doesn't fit.

- *Pollutant problems are separable.*

We set standards and develop implementation plans that regulate PM10, ozone, nitrogen oxides (NOx), and sulfur dioxide (SO2) separately. But, NOx and, to a lesser extent, volatile organic compounds (VOCs) are constituents of PM10 and precursors to ozone. SO2 (as sulfates) is a constituent of PM10.

- *Reducing emissions reduces harm.*

What could be more commonsensical than this assumption? Yet, in certain circumstances, increasing NOx emissions can reduce ozone concentrations over significant areas; reducing SO2 emissions can increase nitrate concentrations (which are counted as PM10); and reducing NOx emissions can increase sulfate concentrations (which are counted as PM10). Increasing sulfates can reduce global temperatures. Reducing ozone may increase UV-B exposures, which may result in increased risk of cancer and cataracts.⁵ Thus, the appropriate mix of emissions changes to reduce overall health risks is not clear.

- *Emissions-reducing technologies are preferred.*

The cornerstone of our approach to mobile source pollution problems is technology to abate emissions: tighter tailpipe and new evaporative emissions standards, diesel emissions controls, alternative fuel and vehicle mandates in California, the 49-state car in the Ozone Transport Region, and enhanced inspection and maintenance programs (I&M). At the same time, increasing vehicle miles traveled (VMTs) and congestion threaten to erode much of the potential gains. And the costs of new technologies, as well as mounting public resistance, are already leading to pullbacks in these initiatives. Thus, we need to think about alternative approaches—coupling new emissions monitoring technologies to I&M or economic incentive approaches, for instance (see below).

- *Command and control policies are preferred.*

EPA has been making real strides to develop and encourage implementation of economic incentive approaches to emissions control. Nevertheless, the old culture dies hard, as seen in employer mandates under the employer commute option.

- *We (the general public) are not responsible for air pollution problems.*

The general public wants cleaner air but doesn't believe that mundane actions like driving one's reasonably well-tuned car contribute to the problem and, even in Los Angeles, the public appears unwilling to make the additional lifestyle sacrifices required to bring mobile source emissions down.

2. Rehabilitate EPA's Title I Program

Short of modifying the Clean Air Act, there is much that EPA can do to improve the way the ozone and PM10 NAAQS are implemented. Some examples include:

- *Alter the approach to determine allowable exceedences.*

The current policy to permit one day each year on which the ozone standard is exceeded is a judgment call to balance the effect of changeable weather and economic conditions with the need for health protection. However, given the highly skewed nature of air pollution readings, even a minor change in the number of allowable exceedences could result in huge cost savings. Figure 1 shows that with as few as three exceedences allowed per year, based on 1995 data, 44 of the 79 MSA's currently violating the ozone standard would be in compliance. If the health significance of these relaxations would be minor (and we suspect it would be), the cost savings would be great.

Several options to put the determination of allowable exceedences on a more analytical footing include: (i) defining an allowable exceedence in terms of a multi-day episode rather than a single day; (ii) excluding certain types of unusual weather conditions from the count, an approach that permits allowable exceedences to differ

⁵R. Lutter and C. Wolz. 1995. UV-B Screening by Tropospheric Ozone: Implications for the NAAQS. (unpublished working paper).

across the areas; (iii) balance benefits and costs—allow additional exceedences if the cost savings are disproportionately large compared to the expected health damages.⁶

- *Average monitor readings.*

Currently, if one monitor records an exceedence, it counts as an exceedence for the entire area, even if few people live near the monitor and even if other monitors show readings far below the standard. Averaging concentrations over monitors is one option for dealing with this peculiarity in the present approach. However, weighting the monitored readings by population would provide a truer picture of the health consequences of exceedences.

- *De-emphasize air quality modeling in the planning process.*

Designing SIPs has become a numbers game involving counting up EPA credits for emissions reductions and their running air quality models to demonstrate that a particular set of strategies brings every area of a region into attainment over the set of most of the expected weather conditions. None of the steps in this game are exact enough to warrant rejecting plans and ultimately levying sanctions. By "working to the numbers," good ideas may be rejected because they don't perform so well with the models being used. Minor procedural reforms could make a big difference, such as allowing use of average or typical weather patterns in the air modeling exercise rather than extreme events, and also judging plans acceptable if they bring most parts of an area into attainment.

- *Move towards a performance basis for evaluating state programs*

One major change would be to gauge attainment strategies on the performance of the local area alone, netting out the effect of imports of pollutants from other regions while, symmetrically, counting the effects the local area has on downwind areas.

Another change would be to base plan compliance on "weather-adjusted" conditions. Chock and Nance (1993)⁷ point out that weather variability makes the effective ozone standard far tighter than it seems. For San Francisco to be reasonably certain of staying in attainment with the ozone standard, it needs to design its program to bring the second highest daily peak over the year down to 0.06 ppm.

Another, even more radical change would be to base performance assessment more on risk reductions than on concentration reductions. The interactions among pollutants and the fact that increases in emissions can *reduce* concentrations of some pollutants opens up many interesting and potentially cost-effective strategies for reducing health risks while trading off decreases in emissions of one pollutant with increases in another.

3. *Build on the best ideas.*

Congress, EPA, and the states have initiatives worth saving. In fact, there are more ideas for reform in circulation than ever before. Some of the best include:

- *Revive the "too close to call" category for nonattainment areas.*

Before the 1990 CAAA, EPA used a "too close to call" nonattainment category with minimal requirements for areas just violating the NAAQS. Areas in this category (with "design values" up to 0.14 ppm) were not subject to full SIP requirements, but watched closely to see if their air quality was getting worse. Given the spatial and temporal variability in concentrations as a result of weather and the strict requirements for demonstrating compliance, this category should be revived. It may take a change in the Clean Air Act or new standards to do this.

- *Pursue current institutional/partnership initiatives with vigor.*

Several recent initiatives—the formation of the Ozone Transportation Commission (under the 1990 CAAA), the Ozone Transport Assessment Group, and the Clean Air Act Advisory Committee's (CAAAC's) Subcommittee for Ozone, Particulate Matter and Regional Haze Implementation Programs—are on the right track.

The realization that long-range transport of ozone and its precursors was hindering the ability of cities along the east coast to comply with the ozone NAAQS led to the creation of the Ozone Transport Commission for the northeast corridor, consisting of the states of New England, plus Pennsylvania and New Jersey. The OTC represents a partial, first attempt at "internalizing the regional externalities," as economists would awkwardly say, associated with pollution in airsheds covering hundreds or even thousands of miles. However, major stationary sources of NO_x in the northeastern U.S. are in West Virginia and the Midwest. In addition, multi-ju-

⁶ For a cost-benefit analysis of ozone reductions, see A. Krupnick and P. Portney, "Controlling Urban Air Pollution: A Benefit Cost Assessment," *Science*, vol. 252, April 26, 1991, pp. 522-28.

⁷ "A Monte Carlo Simulation of the Ozone Attainment Process," *Journal of the Air and Waste Management Association*, vol. 43, pp.995-1003.

risisdictional problems are not confined to the northeast. Approaches that encompass an entire airshed are likely to be both more effective and less costly, although implementation will be challenging.

The CAAAC subcommittee addresses the complications of pollutant interactions and spatially overlapping effects, its purpose being to develop integrated approaches to the ozone and PM₁₀ nonattainment problems, as well as regional haze. OTAG takes a piece of this problem to treat in depth: to identify eastern U.S. ozone control strategies.

- *Expand trading.*

A culture shift away from command and control to emissions trading has taken place at EPA, as evidenced by EPA's embrace of SO₂ allowance trading the Agency's Open Market Trading Rule,⁸ and its support for NO_x trading in the northeast. Still, if the benefits of trading programs for Title I pollutants are to be realized, the Agency must become less environmentally risk-averse and consider allowing credits for shut-downs and unlimited banking, and making other changes that will facilitate trading market operation.

- *Develop and expand demonstration programs for economic incentives.*

Projects such as EPA's XL are demonstrating how the agency is preparing to consider significant innovations to traditional pollutant by pollutant, command and control regulations of stationary sources. The Agency needs to expand these efforts and put much more effort into developing economic incentive programs for mobile sources. An idea that obtained broad stakeholder support in the recently completed White House initiative (the Policy Dialogue Advisory Committee to Develop Options for Reducing Greenhouse Gas Emissions from Personal Motor Vehicles, better known as "car-talk") include VMT-based registration fees, which would involve converting existing registration fees to a mileage-based charge, a strategy that can be revenue neutral on average while increasing the marginal cost of driving. For addressing NO_x, VOC, and particulate emissions directly, emissions fees hold promise as a cost-effective tool for mobile source emissions reductions and can also be designed for revenue neutrality.⁹

- *Shift emphasis to monitoring technologies.*

With 10 percent of the vehicles responsible for 50% of vehicle emissions, finding such vehicles and getting them fixed or scrapped should be a major priority. Enhanced I&M is a clumsy and expensive way to do this. New technologies for real-time monitoring of vehicle emissions, including remote and on-board sensing, hold significant promise for cheaply developing in-use emissions information to identify gross polluters for I&M programs and can serve as the foundation for better economic incentive programs, such as emissions fees, that target actual emissions.

- *Vigorously pursue episodic control programs for ozone.*

With the possible exception of Los Angeles, areas classified as violating the ozone standard are actually in compliance the vast majority of the time. The average number of exceedence-days annually (excluding LA) is 5.2 and the median number is 2.3. Only 3 areas out of 43 are out of compliance more than 10 days. As most ozone violations are part of multi-day episodes, this represents from 3-4 episodes a year, on average.¹⁰

The skewed temporal distribution of monitored readings is rendered even more dramatic in hourly terms. A very useful study by the American Petroleum Institute examined the number and percentage of monitor-hours (the sum of hours monitored by all monitors in an area) exceeding the ozone standard in 25 representative cities over the 1981-85 period (a period without the unusually poor weather conditions of 1987-88). The standard was violated less than one-half of one percent of the monitor-hours in each city. Further, in the 1984-85 period, there were no cities showing more than 64 hours in violations at the worst monitor. More recently, Baltimore showed 31 exceedence-hours in 1994 representing 2.8 percent of total summer hours.

⁸Open Market Trading Rule for Ozone Smog Precursors FR Aug 3 1995 (Volume 60, Number 149).

⁹For a summary of cost-effectiveness of various mobile source control options see A. Krupnick. "Vehicle Emissions, Urban Smog, and Clean Air Policy," in Richard Gilbert, ed., *The Economics of Oil*, Kluwer-Nijhoff, The Netherlands, 1992; W. Harrington, V. McConnell, and M. Walls. "Using Economic Incentives to Reduce Auto Pollution," *Issues in Science and Technology*, Volume 11 no. 2, Winter 1995.

¹⁰Based on 1991-1993 nonattainment areas. Areas which had experienced an average of 0 exceedences are omitted from the calculation, as is Los Angeles, leaving 43 out of 91 nonattainment areas in the tabulation. The mean *including* areas which had experienced 0 exceedences was 2.52 and the median was 0.

This skewed temporal distribution of violations presents obvious opportunities for episodic controls—strategies and measures to reduce ozone precursors on the few days where conditions warrant. Such controls would involve issuing a public warning in advance of meteorological conditions usually associated with high ozone, which would trigger a set of prearranged modifications to the behavior of ozone emitters. For instance, large stationary sources might cut back or shift output to different hours, produce products with lower emissions (VOCs from spray painting activities vary by the color of the paint), employers might shift to a flexible work schedule to reduce early morning traffic congestion, public transportation costs might be reduced, etc. Episodic controls could reduce the number of days requiring precursor emissions reductions substantially. With an ideal forecasting system, this number could be reduced from the entire three-month summer season, to about the number of days per year with weather conducive to ozone formation.

Efforts to develop episodic control programs are on-going in a number of localities. Some regions, such as Baltimore and Chicago, have worked to develop public-private partnerships to bring about voluntary episodic reductions in emissions of ozone precursors across a broad array of economic sectors. These programs also extend to government agencies and individuals, particularly with respect to transportation choices.

One obstacle to the acceptance of substituting episodic controls for continuous controls on air pollutants is the concern that the former would redistribute rather than reduce the production of the pollutant. However ozone's unique tendency to form in significant concentrations only on days with certain meteorological characteristics makes it the perfect candidate for episodic control. A mix of NOx and VOCs on a warm, humid, sunny day will likely produce ozone, whereas on a cold, cloudy day it will not. Moving the emission of large quantities of VOCs and NOx away from the few days per year likely to produce ozone will typically not defer the production of ozone to another time, but rather may prevent its formation altogether.

4. Clarify and Change The Act

Congress is responsible for much of the current problems in air quality policy. Congress could take a number of steps to modify Title I of the CAA (or use other vehicles) that would go a long way to support improvements. These steps include some minor changes and some major ones:

- *Clarify that a change in the current standards invalidate subpart 2 of Title I. If new standards for ozone or PM are issued, this interpretation would permit EPA to base its regulations on the much less prescriptive subpart 1, giving the agency and states significant discretion in program design.*
- *Encourage the idea that airsheds, rather than MSA's, should be the organizing spatial principle of the Act, as in "Regional Implementation Plans (RIPs)".*

Go farther than the 1990 CAAA to foster the creation of airshed-wide institutions with enforcement powers to make airshed management a reality.

- *Consider a two-stage standard-setting process, setting minimum health protection standards in the first stage and requiring that costs and non-health benefits be taken explicitly into account in setting tighter standards in the second stage. Permit costs and benefits (both quantifiable and nonquantifiable) to be used to set the number of allowable exceedences.*

5. Educate the Public

The general public also bears responsibility for some of the problems with our air quality policy. For instance, the emphasis on technology fixes rather than behavioral change—such as that for alternate-fueled vehicles and against VMT or emissions fees or other approaches that would make driving more expensive—can be laid squarely on the shoulders of public sentiment. Education is the only answer to this problem.

6. Fund Research

Underlying my testimony is a set of assumptions based on my understanding of the current state of the air quality modeling, clinical and epidemiological science, and economics. Yet, major uncertainties in these areas remain and their resolution may mean major new directions for the air programs. Therefore a strong directed research effort needs to be devoted to: (i) the effect of cumulative exposures to ozone on the human lung and the implications for chronic respiratory disease; (ii) the determination of the types and sizes of particles most affecting health, particularly the effects of road dust; (iii) the extent to which life is shortened by particulate exposure; (iv) the preferences for avoiding various types of health and non-health effects related to ozone and PM10 exposures; and (v) the design of publicly acceptable incentive policies.

CONCLUSION

Congress, EPA, the states and the general public can all take credit for the successes of Title I of the Clean Air Act. They each must take responsibility for the serious disconnect between the Act and the implementing regulations on the one hand and scientific and economic realities on the other. EPA can go a long way to make its programs more efficient and effective without changes in the Clean Air Act; indeed, a number of its current initiatives show promise. But it must do more. Congress can help, too, by giving EPA the statutory guidance it needs to improve the program. The states need to be willing to push the system and be laboratories of change. And, the general public, particularly the driving public, needs to take responsibility for bringing mobile source pollution down.

Table 1. Unit Value Health Damage Estimates for Ozone and Particulate Matter

Ozone Human Health Damage Estimates - Unit Values (\$1989)				
Pollutant/Endpoint	Annual \$ per Person per .01 ppm change Ozone			
	Low	Central	High	Target Group
Clinical Studies				
Cough Incidents	<1	<1	<1	All
Chest Discomfort	5	12	23	All
Lower Respiratory Symptoms	6	15	30	All
Upper Respiratory Symptoms	1	4	7	All
Shortness of Breath	2	10	28	All
Nose or Throat Irritation	1	6	14	All
Respiratory Symptom Days	7	14	23	All
Epidemiological Studies				
Respiratory Symptom Days	1	3	7	Adults (>17) 74.4%
Eye Irritation Days	<1	<1	<1	All
Asthma Attacks	<1	1	2	Asthmatics 5%
Minor Respiratory Related Restricted Activity Days (MRRADs)	<1	4	9	Adults (>17) 74.4%
Total Morbidity Damages*	3	7	12	All
Total Annual Mortality Damages	0	0	70	All
Total Health Damages**	3	7	82	All

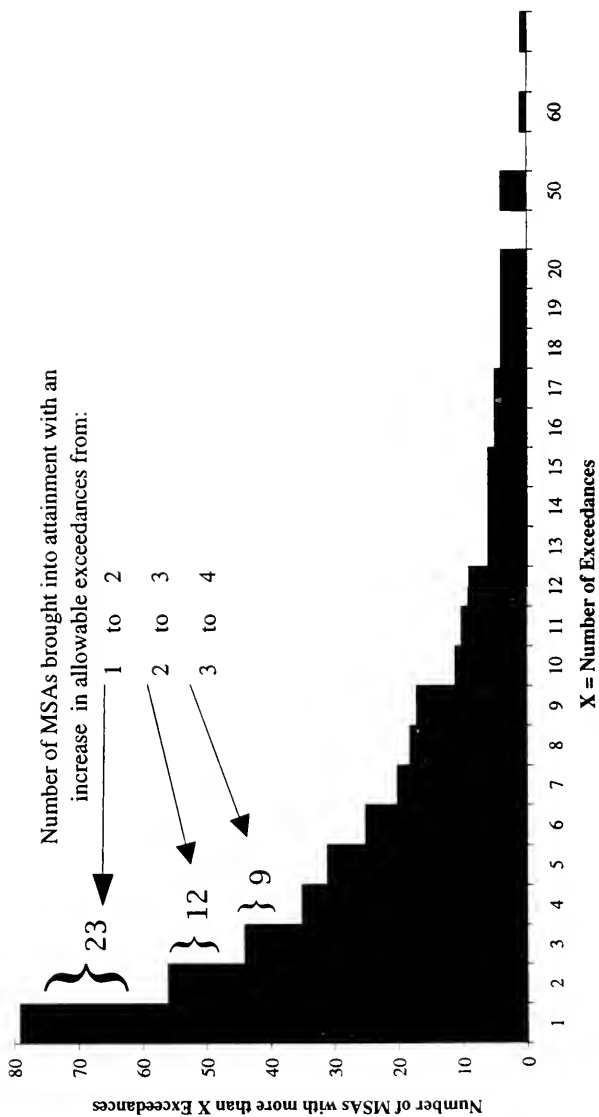
*This total only represents the sum of damages derived from epidemiological studies. Adjustments have been made to avoid double counting, e.g. of symptom-days and MRRADs.
 ** Columns may not sum to total because they represent high, mid and low percentiles of the sample of sums, rather than sums of the sample percentiles. Rounding errors also affect totals.

Particulate Matter Human Health Damage Estimates - Unit Values (\$1989)				
Pollutant/Endpoint	Annual \$ per Person per 1 $\mu\text{g}/\text{m}^3$ change PM_{10}			
	Low	Central	High	Target Group
Childhood Chronic Coughing	<1	<1	<1	Children (<17) 25.4%
Adult Chronic Bronchitis	<1	2	3	Adults (>25) 63.7%
Respiratory Hospital Admissions	<1	1	1	All
Emergency Room Visits	<1	<1	<1	All
Child Chronic Bronchitis	<1	<1	<1	Children (<17) 25.4%
Restricted Activity Days	<1	2	4	Non-asthmatics (>17) 70.97%
Asthma Attack Days	<1	1	1	Asthmatics 5%
Respiratory Symptom Days	4	10	17	Adults (>17) 74.4%
Total Morbidity Damages*	9	14	22	All
Total Mortality Damages	9	25	51	All
Total Annual Health Damages**	21	39	67	All

* Values in this column do not sum to total because adjustments have been made to avoid double counting of endpoints.
 ** Columns may not sum to total because they represent high, mid and low percentiles of the sample of sums, rather than sums of the sample percentiles. Rounding errors also affect totals.

- A. Krupnick, RFF, with contributions from B. Ostro, California Department of the Environment, and assistance from R. Lee, and C. Easterly, Oak Ridge National Laboratory, and K. Harrison and D. Farrell, RFF, "Resources for the Future's Health Benefits Model (Version 1.0)," Resources for the Future, Washington, DC (unpublished 1994)

Figure 1.
NUMBER OF MSAs WITH MORE THAN X EXCEEDANCES



Ozone, Carbon Monoxide, Particulate Matter, Sulfur Dioxide, Lead: Areas Designated Nonattainment
 EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC, July 21, 1995

Mr. BARTON. Thank you, Doctor, and you concluded before being encouraged to conclude.

Mr. KRUPNICK. I'm an efficient kind of guy.

Mr. BARTON. Thank you. And I want the record to show that that's one of our witnesses, with his credentials.

Dr. Jones, this is a general question that I'm going to ask to all. I've just discussed this with Congressman Waxman, who I consider to be if not the most knowledgeable, one of the most knowledgeable members on all the issues that are before us in terms of the Clean Air Act.

My question is wouldn't it be better to have a standard that is an average standard over a longer period of time at a lower level as opposed to the current standard that is a spike standard that's basically an exception? You monitor by exception rather than by what is really going on almost all of the time. Why was the Clean Air Act standard set at 120 parts per billion on a spike basis as opposed to some sort of a longer-term rolling average standard? Is there a health consequence reason to do that or was it just easier to collect data on a spike basis?

Mr. JONES. I'm sure that Dr. McClellan can get into the more detailed toxicological thing, but the rationale behind the short-term standard is because the lowest threshold of observed effect was for 1 to 3 hour exposure to exercising individuals. And since that time, we have identified health effects to children who are exposed outdoors for 6 to 8 hours.

The point I want to make here is it really doesn't make any difference what form of the standard you choose. All of the data is statistically interrelated. And when I made the statement that if we chose to go to, say, a .09 8 hour and 3 or 5 exceedance standard, that is statistically no different than our current standard.

The important thing of allowing for the multiple exceedances is to deal with this bump-up effect, this fluctuation in and out of the standard. So, for example, the current standard for nitrogen dioxide is 100 parts per billion annual average. Yet, during the review of that particular standard, there were some short-term health effects that were identified, but EPA determined that the annual average standard was equally protective as the short-term health effect. So the standard was not changed.

In my opinion, we don't need to change the standard to increase the protection of the health of children or asthmatics in this country. It would only be done to make it more scientifically correct. But in my view, that's a lot of administrative cost to go through and it's not going to alter our regulatory strategies.

Mr. BARTON. Dr. McClellan.

Mr. MCCLELLAN. I think Dr. Jones has pointed out the key points. When the standard was set at 120 part per billion, 1 hour, it was based on the data that we had at that time, which predominantly related to experience in terms of looking at epidemiological data, but most significantly, clinical studies which had been conducted with volunteers. They had been exposed for those short periods of time and there appeared to be this threshold that's below the 120 part per billion, and thus setting it.

Now, since that was set, we've had an emerging data base on exposures for longer and longer periods of time to volunteers and

those indicate that there are effects, measurable, reversible effects, in my opinion, in those individuals, and those are driving us toward a longer averaging time.

But I would emphasize, again, the point by Dr. Jones that when you look in terms of the real world out there, there's actually a rather tight correlation between what measures in terms of that 1 hour time versus the 8 hour averaging time. But I personally concur with the view to move to a longer-term standard, recognizing that we do have health data indicating effects over those longer time periods.

I think the key question, in my opinion, is one of whether there are serious health consequences associated with long-term exposures at about those levels, in terms of the levels between 60, 70 and 90 part per billion over a period of a year. We don't know that today and that becomes a critical issue on which we need the research data. So there's the answer, in a nutshell.

Mr. BARTON. Dr. Krupnick.

Mr. KRUPNICK. I agree with all of this and I'd add one thing. The ultimate issue is compliance. How many areas are kicked out of compliance that were in compliance by longer averaging time at a lower—at a tighter standard? If we go to .09, five exceedances, the way Dr. McClellan is suggesting, we'll be probably about as well off as we are now, maybe there will be fewer areas in non-compliance and non-attainment.

If we go to a .08 standard with two or three exceedances or one exceedance, this is going to be a significant tightening of the standards from the point of view, at a minimum, of all these areas that are currently complying being thrown into non-compliance, and that, to me, is where the rubber meets the road. But all they said on health is true. Probably if you take the Clean Air Act, protect health with a margin of safety, literally, the standard should be set below .08 because that's where we're seeing effects at already.

Mr. BARTON. Thank you. We just had a vote. I'm going to allow Mr. Bilbray to ask exactly 5 minutes of questions. Then we're going to recess and we'll come back and when we come back, Mr. Waxman will be the first questioner. So Mr. Bilbray, if you want to ask.

Mr. BILBRAY. Thank you. And let me just tell you, as somebody who grew up in southern California and suffered from those chronic effects, where on bad air days mom said you stay in the house, it is one of those things where you've got to look at the short-term and use that as a baseline. I think we've seen that reflected on new California standards, where we actually got an athletic standard for kids and extended activities.

My question really gets down to some of this new information and, Doctor, the issue of PM. We've sort of broken into a new threshold, in that we talked about PM(10) for so long, and now we're starting to see that maybe we need to look a little smaller. I think the PM(2) issue is something that's legitimate and we need to talk about it frankly and openly.

Do you have any information about the latest studies on the PM(2) issue?

Mr. KRUPNICK. Well, again, among this panel, I would defer a bit to Roger McClellan. But my understanding of this literature, and I've been following it fairly closely and do some epidemiology my-

self, is that the bottom line on this issue is we don't yet know whether the size of the particles and the types of particles that appear to be a cause—appear to be associated with elevated mortality rates, that information is not well known.

And more interestingly, I think, and it's a more cautionary tale, is that my understanding is that the link between monitored readings of particulates and exposures, when you try to see how much particulates people are really being exposed to on their person, that that linkage is not all that tight.

Another issue is fugitive dust, the road dust that's kicked up by cars.

Mr. BILBRAY. Or by farming.

Mr. KRUPNICK. Or by farming, off-road. These could—if that kind of dust is causing problems, we're barking up the wrong tree and really we don't know the extent of this issue. So I think it's a little too early to be changing the way we regulate PM(10), but we ought to be focusing on this pollutant because the epidemiological studies show something is going on and something significant.

Mr. BILBRAY. Have any of the doctors been able to review the NOAA's latest study about the VOC background problem in the southeast? And when we're talking about our standards, there is some indication by NOAA that the ambient air background problem there is naturally higher than what our standards are, and maybe we need to reflect the fact that there are ambient problems there that need to be looked at in modifying our standards.

Mr. JONES. This is the tree contribution of infamy.

Mr. BILBRAY. Yes.

Mr. JONES. I've done ambient air quality analysis at the border of Virginia—

Mr. BILBRAY. Gentlemen, I must apologize. I've got to go down and vote or I'm going to miss the vote.

Mr. BARTON. We'll listen to your answer.

Mr. BILBRAY. I apologize. I want to make sure that you understand that we do have a standard problem here. Go ahead.

Mr. JONES. Well, I've analyzed the trends in ozone data at the Virginia-North Carolina border and also at the Pennsylvania-Ohio border and I tend to agree that in the southeast, there appears to be a background, but it does not exceed the standard. But it does create a problem, possibly a transport problem that has to be recognized. But I personally do not believe that the transport issue is as large as people are making out and I think that my trends analyses bear that out. The trends in the upwind ozone in Ohio have been going down just as rapidly as the trends in ozone downwind of Pittsburgh.

Mr. BARTON. Do either of you other gentlemen want to answer that question?

Mr. MCCLELLAN. I don't have anything to add on that. I would simply go back to the question asked by the Congressman from California on the PM(10). That is under review by EPA now. I received a copy of the staff paper yesterday as a member of the CASAC panel. And there is an emerging data base there, but the data base is not as strong as is needed to really make the kind of tough decisions that we have here.

And we don't have the data on exposure characterization across the country at those smaller particle sizes we need and it's a tough problem because we aren't exposed to little packets of particles of a given size. We're all exposed to a gommish, closely interrelated, and, also, correlations not only between different particle sizes, but between other air pollutants, such as ozone. And so it's a tough problem and we need additional data if we're going to make these multi-billion-dollar decision impacts.

Mr. BARTON. We're going to recess the hearing. It's five after 12. I'm going to say until 12:35. We will reconvene between 12:35 and, say, 12:45. So if you wish to try to grab a quick bite of lunch, but we've got a number of questions we want to ask this panel.

[Brief recess.]

Mr. BARTON. We want to reconvene the hearing. We're in the process of contacting Congressman Waxman's office so he can come up and ask his questions. Until he gets here, I will continue to ask some questions.

Dr. Jones, EPA has just recently released some information that indicates that ozone levels have declined about 12 percent over the last 10 years. You've got some data that you presented to the committee that shows a more dramatic decline. What's the difference in the reduction between your numbers and the EPA's official numbers?

Mr. JONES. Well, EPA, as part of their annual report, has developed a statistic that relates to averaging the concentration that are measured annually at each of the monitors. It will take the second high concentration at all the monitors and average those and then plot those over time. And that is a good statistical way to do it, but it really doesn't indicate to the public or to us what that means in terms of public exposure.

And without trying to be too mathematical, the data that—when we look at the concentrations that are measured day after day during the smog season, if we were to take and plot that data, it would look like a skewed distribution, the old bell-shaped distribution. It's actually skewed distribution with a long tail, with a very few days at high concentrations, where the average is right down at the middle or the hump of the skewed distribution.

So what happens if you add all these monitors together, some that are very, very low and ones that are very, very high, it dampens the true picture of what is happening to the high values that we're concerned about. So what I am reporting is the frequency or the number of days at the worst case monitor and the trend in that, and that's what the standard is all about. The standard says will not exceed the 120 ppb standard more than once per year on the long-term average.

So although EPA's data is statistically correct, it really doesn't reflect on what our policy is doing for us. In fact, I can take their very data and translate it into exceedances and it's right out of the same data base, there's no difference, and the numbers would be the same. So if they did frequency like I do it, they'd have the same answers.

Mr. BARTON. So you're using the same data base. You're using a different methodology than they're using and you get a different

conclusion because you use more of, apparently, a long-term average as opposed to a single point exception. Is that—

Mr. JONES. No. What I'm looking at is the trend in the number of days above the standard at the worst monitor in each of 96 cities which were designated as non-attainment in 1990. So what I'm reporting to you is if you were standing outdoors next to that monitor, that's how many days a year you would be exposed to ozone. And over the last decade, over the last decade, that has gone down 60 percent in all the cities outside of California.

Mr. BARTON. Dr. McClellan, do you want to comment on his methodology, since you're on this advisory committee or chair it, I think?

Mr. MCCLELLAN. I think it's a case where neither is right or wrong. They probably both are informative to us. I think the approach that Dr. Jones has used is very informative in terms of telling us that we've pushed down that high end and that's very important.

This sort of goes back to sort of the heart of one of the points that I'd make that the nature of the standards has focused all of our attention on what happens during a few days during the year and the question is really unanswered as to whether exposure at levels just below the standard essentially throughout the year, does that carry with it any "health penalty." Congressman Waxman made repeated reference to Houston in terms of its air. I think he overstated the situation there in terms of making comparisons to California, but the fact is that we haven't had the research support to tell us whether living in those areas, with a relatively high level of pollution over long periods of time during the year, actually carries with it a health penalty.

That is what is of concern to me and I think that will be an area that we'll be addressing in the future and I've urged EPA to put additional research resources in so that we have that when those days arrive. In terms of making decisions on that, we can make them in an informed way rather than an uninformed way, which is likely to mis-allocate resources.

So, again, in all of these cases, what's important to keep in mind is that people don't get exposed to just a single packet of ozone that arrives over a 1 hour period or over 8 hours or the total year. We all get exposed to some level of that. We have substantial debate actually over that 40 part per billion background level. Some people would say that that's much too low to use as background. The background level may, in many areas of the country, be up closer to 60 or approaching 70, the lower end of the range being considered for the 8 hour standard.

So that's going to be there irrespective of the community's activities or industry's activities in the area. But we're now starting to make our debates as to how close do we go there. How low is low enough on this?

Mr. BARTON. Dr. Krupnick, I want to ask you a little different question. Your written testimony talks about we need to de-emphasize air quality modeling in the planning process and move more toward actual real world performance. Do you want to elaborate on that a little bit? Because that's music to my ears. I've been advocating that type of a position all year long in these hearings.

Mr. KRUPNICK. I think, actually, we heard the same refrain from the State testimony this morning, where you—the requirements for using, let's say, the urban air shed model, which is the key model for areas that have significant ozone problems. Those requirements are quite rigid about how the urban area demonstrates attainment with some plan that they have for the future. You need to show that all areas within the modeling—the region being modeled come into compliance at this future year.

You need to use the worst weather conditions, the most uncondusive weather conditions. The models aren't very—you know, they're not that accurate. To base one's—

Mr. BARTON. Have there been any improvements? I mean, we've had this Act around long enough now that if you're going to base a lot of this on computer modeling, the models should have shown some at least linear improvement in their predictability of the future. Is that true or not true?

Mr. KRUPNICK. I'm not an expert on air quality modeling. I'm not saying that they shouldn't be using modeling either. I'm a user of models myself. They should be using models, but use it in a more heuristic way, a way to—

Mr. BARTON. A what?

Mr. KRUPNICK. Heuristic.

Mr. BARTON. Define heuristic. I don't understand that.

Mr. KRUPNICK. A loose way, a way to guide the development of strategies, of the development of strategies rather than having to go to EPA and say see what our model shows, it shows compliance in the year 2007. And how we move from where we are not to there, I'm not so sure, but we should be doing it. We should be pulling back a little in the use of models to demonstrate compliance in the future.

Mr. BARTON. Dr. Jones, and then I'm going to let Mr. Waxman speak.

Mr. JONES. I think the very important point here is that the models have been used to try to identify what sources are contributing, but, in my opinion, the models are not worth using simply because unless you can take the model and run it backwards to 1980 or start in 1980 and run it forward and match up with the actual air quality observations, then the model has not been validated. And this is the precise problem with this whole ozone transport region, is that the model has never been validated. So we keep hearing about the need for all these NO_x controls and everything else.

In studies in three cities that I've personally done, we've found out that we've got a 1-percent reduction in ozone for every 1 percent reduction of VOCs, according to their emission inventories. So I think that mother nature's model is the best one that we should be adhering to and make the model fit what we've observed historically.

Mr. BARTON. Dr. McClellan, do you want to comment on that?

Mr. MCCLELLAN. I would agree basically with the comments of Dr. Krupnick on this. Models have a role, a definite role, but they should be used to inform and guide decisions. Our problem in so many of these is the emphasis on regulatory compliance and how a model gets used. We also heard that earlier in terms of the ques-

tion of siting additional sampling stations, as, for example, in Texas.

I think you heard the answer in terms of it's costs a consideration, but also the potential of a penalty. Because you add another station, you're now at risk in terms of another potential for exceedance. It's this excessive emphasis on compliance, regulatory compliance that really, in some ways, is holding us back, holding us down. We see that right now as we look at the PM(10) data. There was a short period of time when the agency, in the 1980's, was considering both a PM(10) standard and a PM(2.5) standard, and data were collected on both those size fractions.

Unfortunately, then the decision was made, PM(10) would be the new standard and you saw many of those PM(2.5) stations disappear. Today, we come to a situation in which we're reevaluating the standard. We've got a growing body of data at PM(10), but we have very little at (2.5). So we're not in a position to make an informed decision. Why? Because we've got lots of data out there, largely collected for regulatory compliance, inadequate data collected to inform us as to what is actually going on that could be used as a science base for future iterative changes in the standard.

Mr. BARTON. The Chair would now recognize Congressman Waxman for such time as he may consume.

Mr. WAXMAN. Thank you very much, Mr. Chairman. Mr. Barton asked some questions about where you set the standard and I wanted to explore that sort of conceptually and understand it.

When we set a standard for ozone, we're not talking about a standard like an exposure to a carcinogen and we want the carcinogen exposure to be as low as possible because there's a cumulative effect. We set a standard based on the idea that we don't want an exceedance of that standard for even a short period of time, which could trigger an asthma attack among children or an adverse impact among elderly, the most vulnerable people, and, of course, even the average person on society.

Isn't that the conceptual framework?

Mr. MCCLELLAN. I think almost correct, but I would add to that that part of our concern in terms of the control of the short-term exposures is that it serves as a surrogate control of effects that may occur in a cumulative manner. So that in some sense, the difference between pollutants that may cause acute reversible effect versus an irreversible effect, like cancer, may not be so different after all and it really does become a judgment call in terms of how low we decide to go to protect against those effects and, in some cases—

Mr. WAXMAN. Well, even a reversible effect can be pretty traumatic for the individual.

Mr. MCCLELLAN. Absolutely.

Mr. WAXMAN. Now, we have, as I understand it, a .12 standard within an hour timeframe and the discussion seems to be moving toward an 8 hour standard. But if you're going to go from a .12 for 1 hour and you go for an 8 hour standard, averaging within that 8 hour period, you can have some spikes within the 8 hour. Probably in the morning it's low, by the afternoon the ozone could be much higher.

So if we just had an average for 8 hours, we would need to have an average at a level that would give is commensurate health benefits as a .12 standard is for 1 hour. And then the question is what is an adequate standard for that. I just wanted to just point out for everyone involved that the Lung Association said that if we coupled a .09 parts per million, 8 hour, ozone standard as the upper level of the range, that would constitute a major relaxation of current health protections, even though it might seem to be a tightening of the standard because we're talking about a longer period of time.

I just wanted to sort of get back to——

Mr. BARTON. I think its parts per billion.

Mr. WAXMAN. No.

Mr. BARTON. Isn't it billion?

Mr. MCCLELLAN. It's kind of an interesting question. I'm not certain why way back when we didn't just call it 120 part per billion rather than .12 ppm. Maybe because we thought that one or the other might have a different impact on people. But it does get awkward. But I think I certainly understand what Congressman Waxman is talking about and, in general, the statement is correct.

I think I would come to a different conclusion, though, in L.A.

Mr. WAXMAN. Excuse me. Right. Dr. McClellan, I do have a limited period of time to ask questions.

Mr. BARTON. No. I said as much time as you shall consume.

Mr. WAXMAN. Well, you really wouldn't want that. I don't have the time or the interest to discuss the question of whether it would be part per billion—expressed in part per billion or part per million, because you can have the same number and express it in a different way.

Mr. BARTON. That's true.

Mr. WAXMAN. And the whole debate over that is one that I happily missed years ago and don't want to reopen.

Mr. BARTON. I'm getting heuristic here.

Mr. WAXMAN. Everyone knows that it's heuristic on demand. But if we're going to go to an 8 hour standard, the question is at what level it should be set so that we're getting the health benefits. After all, this whole concept is really to protect the health of people.

Mr. BARTON. And I support that.

Mr. WAXMAN. Dr. Jones, I wanted to comment about your testimony because you seemed to make a statement that there's no ozone problem outside of California and perhaps Houston and that other areas are generally going to get into compliance you said, by the year 2000.

But as I understand it, in the 1980's, you were forecasting for the CEQ predictions that major cities in all regions of the country outside of California would attain the standard by 1990.

The reason I point that out is that your testimony appears to be at variance with the prevailing scientific community, as reflected in the National Academy of Sciences report on ozone, which represents the findings of a blue ribbon independent panel of scientists. In their 1991 study, they concluded that "high ozone concentrations in urban, suburban and rural areas of the United States continue to be a major environmental and health concern." They didn't see the magical march to attainment that you do. In

your written testimony, you also stated that NO_x control substitution makes absolutely no scientific sense in terms of meeting the ozone roll-back requirements in urban areas. Yet, this conclusion is again rejected by this blue ribbon panel, which instead found that NO_x reductions would be needed to substantially reduce ozone in many urban areas. And, by the way, their report does cite, as a reference, your 1989 paper on ozone trends. They just reached quite different conclusions.

Do you have any comment?

Mr. JONES. Yes. In fact, I was an invited peer reviewer of that report and the reason that their conclusion was different than mine, because at that point in time, they only had 1988 and 1989 data, and, at that time, and if you read the report more carefully, they were not making any adjustments for the fluctuations in temperature.

And what's happened is through this decade, we've had these spikes in temperature in 1980, 1983, 1987, 1988 and so forth. So, therefore, that's why they thought that maybe the trend was flat, but the point is that both EPA and I totally agreed that when you look at the decade from—the 15 years from 1980 to 1995, it's clear that the trend has occurred and that has been due to VOC control.

Now, to comment on the issue of NO_x control.

Mr. WAXMAN. Before you get to that. So on that issue, what we have, you claim EPA agrees with your conclusion and then opposite that is a statement by the National Academy of Sciences in the 1991 study where they reach a different conclusion. So we have a difference of opinion here.

Mr. JONES. No. What I was trying to say is that based on the limited data they had, which only got through 1989, it made the data look fairly flat. But there was no compensation for temperature for the hot years and once you do that, then the underlying trend shows up. Then they said, well, maybe since it appears that we've had the flat trend, maybe we should look at NO_x control.

On the other hand, if you look at the chemistry, including Los Angeles and everywhere else, it's clearly recognized that NO_x control is counter-productive to reduction in ozone in urban areas, and this is true all over the United States, in every city, that I'm aware of. And EPA's own policy documents support that. The issue of NO_x control in rural environments, I think, is something that's still for further scientific scrutiny.

Mr. WAXMAN. Well, I just want to tell you that I read their conclusion about NO_x very differently. As I understand it, they seem to say that reduction of NO_x is tremendously important and put a high priority on that. So I think there's a difference.

Dr. Krupnick, I'm concerned about your devotion to a cost-benefit analysis in this respect. And the reality is that costs are frequently over-estimated, especially by industry, and benefits are frequently under-estimated. For instance, a study released in 1990 by the Clean Air Working Group, an industry group that has championed some of these ideas about changing the standard, they put the costs of the Clean Air Act Amendments at between \$51 billion and \$91 billion per year. The Business Roundtable released a study with a high estimate of \$104 billion per year. Yet, EPA's latest

data finds implementation costs over the last 5 years are, in fact, only \$22 billion, far lower than the industry estimate.

Just as costs are inflated, benefits are often understated. To calculate the benefits for air pollution controls, as I understand it, an article in *Science* that I think you co-authored in 1991, you assigned monetary values to various health effects that the population would be spared if ozone were reduced. For instance, the article values a day of coughing at \$5. In other words, a person who coughed all day due to high ozone levels would be adequately compensated if they were handed \$5 at the end of the day. That seems very low to me if you're going to give a number for it.

Do you remember the value assigned for an asthma attack? In your article, you assigned a benefit value of \$25, value to an asthma attack. In other words, a parent would be indifferent between receiving \$25 while watching their child suffer through an asthma attack and I think that defies common sense. Many of my friends have children in Los Angeles with asthma and I think it's hard to hold a small child that can't breathe and is so scared and panicking that it's nearly impossible to give the medicine he or she must have to breathe. A little boy last year compared an asthma attack to breathing through a straw while being suffocated by a pillow.

So analyzing costs and benefits are useful and they must inform decisions, but we must never think that these crude tools for estimate policy impacts mean that a calculator can replace a human being as a decisionmaker. I think the process to set and implement national ambient air quality standards set in the Clean Air Act strikes the right balance between costs and public health and nothing that I've heard today changes my views, but I wanted you to be able to respond to these things.

Mr. KRUPNICK. Thank you. I have a daughter that has asthma and I know exactly what asthmatics go through. And my mother also has asthma. The studies that we use for valuation are studies that have been taken from surveys of a wide variety of people, people who have asthma, people who are just normal everyday folks, and we've asked them what they're willingness to pay is to avoid various sorts of health effects. Not every—the questions that they are asked are questions that do not say you've been coughing hysterically for an entire day. There's no evidence that that's what ozone does or PM(10).

There are effects. The questions try to ask people realistically—present people with realistic descriptions of the effects of air pollution and then they respond accordingly. We didn't make up the numbers. These are numbers that come from studies. The studies are imperfect and I'll be the first to admit that. And we should be doing more. We should be able to present the general public with studies that are of a high quality, because this is an important policy debate.

Mr. WAXMAN. Did you—I don't want to interrupt.

Mr. KRUPNICK. Let me just respond to one other thing. The fact about using benefits and costs—

Mr. WAXMAN. Before you get into that, back on this question of benefits. Was I accurate in saying that you has given a figure of \$25 per asthma attack?

Mr. KRUPNICK. I think it might have been 50 instead of 25, but it's in the ballpark, and that was an average attack that people reported in their willingness to pay to avoid that attack in a study.

Now, you have to remember these are attacks. This isn't the attack when you're sitting there and your child is suffocating. This is when your child—you've got an intervention. For most people, on average, you have an intervention technique. You have an inhaler that the person can take. So this includes the avoidance behavior or the medical interventions or whatever it is that you need to take.

Now, I'm not qualified to judge whether that's an appropriate number, whether, when that person responded, they responded appropriately. All I know is there are studies out there that show these values and we use them. We evaluate them. If they seem to be done reasonably methodologically, then we use them. I'm not saying it's the last word, but it's something to go on.

Mr. WAXMAN. Sounds heuristic, is that the word?

Mr. BARTON. But we put in the record what your estimate would be.

Mr. WAXMAN. I don't know what an estimate would be if a child didn't have an inhaler and started having an asthma attack.

Mr. KRUPNICK. Those values would obviously be very high, but for a lot of other people, they're not.

Mr. WAXMAN. Do you accept—

Mr. BARTON. We'll make you a part of the sample survey and we'll put it in the record, \$50, \$100, \$1,000.

Mr. WAXMAN. I don't recall yielding.

Mr. BARTON. That's true. You didn't yield.

Mr. WAXMAN. I find it a little hard to think that we have the ability to put numbers. Now, of course, my premise was the numbers for the benefits seemed to be awfully low, but the numbers for the costs seemed to be exaggerated when we find out the reality of costs and compare them to what the estimates were by self-interested parties, usually. Do you think that's an accurate assessment?

Mr. KRUPNICK. Yes. I do think that there is a lot of over-estimation of cost that gets done by interested parties and a lot of probably over-estimation of benefits by other interested parties. So you do the best analysis you can. You get folks who don't have an axe to grind one way or the other and ask them to do their best job.

Mr. WAXMAN. I guess my point is in doing a cost-benefit analysis, we ought not to think we have any kind of mathematical precision and that we ought to use this tool as far as it will take us, but I feel uncomfortable when people want us to rely on it for major decisions, where it can have a lot of impacts.

Mr. KRUPNICK. Actually, Congressman, I agree with that wholeheartedly. All I would like to see is that the balancing of benefits and costs is one element of a decision framework that now is excluded by law from setting standards. It shouldn't be the only thing. There's too much imprecision. It doesn't deal with equity. Fine. It's one of a set of criteria.

But to say that we don't take into account costs, we can't take into account costs, is not only a bad idea, but, in fact, it doesn't happen. When EPA—why do these standards that EPA sets, by

their own rationale, that rationale says we can't protect everybody. There's going to be some effects. And I ask myself if costs don't matter, why isn't everybody protected. And obviously they do matter.

Mr. WAXMAN. As I listen to you—

Mr. KRUPNICK. So let's be explicit.

Mr. WAXMAN. I think there is common ground in thinking this through. Costs do matter. And even under the structure of the Clean Air Act, no one denies that costs matter. The question is do you take into consideration costs in terms of the time to achieve the standards. But the goals are the goals and if you set the goals based on some kind of cost-benefit analysis and then set the parameters of how to achieve those goals on a cost-benefit analysis, you see a constant, in my view, degradation of what you're trying to accomplish, which is ultimately to protect as many people as we can possibly protect from what can be important adverse health effects.

But I thank you for what you said and I think it's very constructive. Mr. Chairman, I've taken an extraordinary amount of time and I thank you for your generosity. I want to yield to you as much time as you wish to consume.

Mr. BARTON. I thank the former chairman of the Health and Environment Subcommittee and the ranking—

Mr. WAXMAN. Stop celebrating.

Mr. BARTON. I want to conclude this. I'm very sorry that the rest of the subcommittee couldn't be here for this panel because the expertise here and the questions that Congressman Waxman has asked and that I've asked really get to the heart of not just this title, but the whole intent of the Clean Air Act. I don't think anybody wants us to change a standard that degrades health prospects in this country.

But when Congressman Waxman is talking about this \$25 or \$30 cost to avoid an asthma attack, it really encapsulates what we're trying to do, because his estimate of avoidance is as valid as any estimate that was asked of a respondent to the survey, in my opinion. And if he says it's \$1,000 to him, it's \$1,000 or whatever it is.

My father-in-law was a severe asthmatic. My son is a moderate asthmatic. And I can tell you when they're in a serious asthma attack, you're willing to spend some money to stop it. And I've taken my son to the emergency room when he had a severe asthma attack and I would have paid a lot more than \$25. But we don't want to say cost doesn't matter and Congressman Waxman admitted that cost does matter.

So my final question before we release this panel, because this goes to one of the main purposes of this hearing. We've had quite a bit of discussion about changing from a spike standard to some sort of an average standard and if we were to change to an average standard, the number that's being bandied about is 90 parts per billion or 80 parts per billion and there's been some discussion of even going down to a 70.

If we're going to make some changes, we ought to make changes that are actually applicable to the real world. So I want each of you, in your expert opinion, to say what would the practical effect

be if we changed from the spiked standard to some sort of an average standard.

Is there enough data out there that if you go from a 120 to 80 or 90 or 70 on a longer-term basis, that you have the same practical effect, or is that so inconclusive that we're safer to stay where we are?

Mr. JONES. May I go first? EPA has put together what I consider to be a state-of-the-art model to predict what the residual exposures are under the various standard scenarios, and that's contained in their reports. And I've taken their report and the current air quality data and the projected air quality to just make those comparisons, and let me just give you one example.

They studied nine cities, which is a good cross-section of cities across the United States, and, again, if we accept Los Angeles and Houston, but look at Philadelphia—and I've always said that as goes Philadelphia, so goes the Nation air quality-wise, and that's again been true for 25 years. If we were to meet the current standard in Philadelphia, we would have to roll back the ozone level about 11 percent. Now, whatever that translates into VOCs, that's another scientific question. We'd have to roll back the ozone by at least 11 percent and that would leave us with a residual exposure to outdoor exercising children, which is the lowest common denominator of all of the health effects that EPA has looked at, we would have a residual exposure of only 1.2 percent of those children exposed to 3 days a year.

If we went to a .08 8 hour and a five exceedance standard, and really a three exceedance standard doesn't make that much difference, we would have to roll back the ozone level in Philadelphia by 18 percent. In other words, an increased control requirement of 7 percent, and that would reduce the residual risk down to one-tenth of 1 percent, from 1.2 to one-tenth of 1 percent.

If we went to a .09 standard, 8 hour, five exceedances—by the way, these are all residual exposures above .08, not above .09, but above .08, which EPA now is saying is their lower—at least the medical people are saying is the lower level that they think should be in the range of the standard.

The residual—the roll-back requirement to achieve that would be 8 percent, almost the same as the current standard, and the residual exposure risk would be 2.7 percent. And if you look at all the cities across the country, when you look at that, there's practically no difference among these standards, yet there is an increase of probably another 8 percent in regulatory requirements with respect to ozone to produce those kind of differences.

So what I'm really trying to say here is that we can change the standard to relate to the 8 hourly thing, but from a practical point of view, it doesn't make any difference in terms of what we're going to leave out there as the residual exposure risk to the sensitive segment of the population, which is extremely small.

Mr. BARTON. Dr. McClellan.

Mr. McCLELLAN. I am on record, both as a member of the CASAC panel on ozone and in my testimony here, as indicating that I favor a move to an 8 hour averaging time, 90 part per billion, and a five exceedance standard. I think that that standard is as protective as the 120 part per billion, 1 hour averaging time, one

exceedance standard that is in place at the present time. I think the value or the benefit of going to the changed standard is that we fully recognize that people are not exposed to that artificial packet of ozone. They are exposed over a day, in fact, many days, and that there is a more realistic linkage between the standard and the observations we make out there in the real world.

I do think that it's important to recognize that, as Congressman Waxman was commenting earlier about mathematical precision, that we do not have precision in our relationships between ozone exposure and health outcome. These are not highly precise kinds of relationships because of the variability in people, the variability in how an individual may respond day to day. So it becomes a judgment call in terms of a decision as to setting that standard.

I think there are practical benefits of changing from the standard which has the single exceedance allowance to the five exceedance one in that it minimizes, as I have been told by those who are more knowledgeable in this area than I, the likelihood of a community swinging in or out of compliance as a result of a summer such as we saw in 1988 or this last summer, 1995.

I think beyond that, it's important to recognize that early on, I think our selection of the 120 part per billion and 1 hour averaging time was heavily driven by the California experience. In California, in the early days when we had those terrible situations where you had 200, 300, 400 part per billion measurements, there were big spikes, spikes associated with commuting, with local sources, but that over time, as they brought control in, I think we've seen a dampening in California.

But that pattern is not necessarily a pattern that we see across the U.S., and particularly in the eastern areas of the U.S., where we have regional impacts, California is fortunate most days, having that good Pacific Ocean out there and that clean packet of air there that's coming in. In the rest of the country, we've got a lot of these packets of air that are moving around and regional impacts, as you've heard, emphasizing here, and thus for New Jersey, New York, Connecticut, et cetera, I think that the 8 hour situation may be better and more protective there than what we would see with the single 1 hour peak.

Mr. BARTON. Dr. Krupnick.

Mr. KRUPNICK. I guess I'd like to offer a slightly different perspective and I think we should try to resist the temptation of getting—of putting too much emphasis on changing the standards, on what the new standards would mean, and keep our eye on the prize. The prize is how can we reduce the costs of air pollution control without compromising health protections.

There are so many ways of doing this, having to do with the rules we have for demonstrating compliance, with the number of exceedances that one is allowed, whether it's a .08 or .12 or 1 hour or 8 hour, I think there's a lot—although this is what gets people fired up and I get fired up about it myself. I think the key issues have to do with sort of the bowels of the State governments trying to respond to rules made in the bowels of EPA. Fixing those problems, those disconnects, would do more than having a huge national debate on what the appropriate standards should be.

Mr. BARTON. Well, I want to thank this panel.

Mr. WAXMAN. Could I just ask one question?

Mr. BARTON. Sure. As long as it's not too long.

Mr. WAXMAN. No, no, I won't. Dr. McClellan, you gave your views on the subject. You were part of the EPA advisory committee. On that advisory committee, was there unanimity on that position that you've expressed as your recommendation or were there variances of different views by the scientists as to at what level you would set the ambient air standard?

Mr. McCLELLAN. There were a range of opinions on that. I think the panel was in general consensus on the utility of moving from a one to an 8 hour averaging time and there were a range of views in terms of the precise level of the standard. That all will be a matter of record in the closure record.

Mr. WAXMAN. Was there anybody on that panel that thought there ought to be an even weaker standard than what you're recommending?

Mr. McCLELLAN. There was some individual——

Mr. WAXMAN. Or were they all others—were most of them on your left arguing for a tighter standard?

Mr. McCLELLAN. There were some individuals who argued for an 80 part per billion. There were others who argued for a 90 part per billion.

Mr. WAXMAN. I guess my point is, Mr. Chairman, that if we had scientists here, we would hear different views, and Dr. McClellan is giving us his and I appreciate that.

Mr. McCLELLAN. That's, I think, a very important point and I think I'd emphasize that my value, where I put it is a professional judgment, just as I would respect a professional judgment of others, and that it's not any precise mathematical set of formulas that led me to that conclusion, just as there is no set of precise mathematical formulas that say it's healthy on this side, unhealthy on the other side, that will inform the judgment of the Administrator in making a decision.

Mr. WAXMAN. Mr. Chairman, one last thing before this panel leaves. I think this panel was helpful and I think the questions we both asked did go to the heart of some of these important issues in the Clean Air Act, and I appreciate your openness and willingness to listen to these discussions.

I want to express to you—you and I may have differences on a lot of things, and, obviously, we do, but I am open to talking to you and exploring in a serious way places where we can have common ground, because I think you have sincere, genuine feelings about protecting the public and recognizing costs and getting the right balance for this country, and I feel the same way.

Mr. BARTON. Thank you. Well, the truth isn't always pretty, but the truth is always the truth and that's what we're trying to get here. And I want to commend you, Congressman, for your long-term dedication to this. I mean, the fact that we have cleaner air today, you can take some—in fact, quite a bit of personal achievement for because you've been a tiger on this and I have fought against you many times in the past and lost, but I respect the fact that when you say something, you know what you're talking about.

We appreciate this panel. Again, apologize for having to break in the middle of your testimony. There may be written questions that

we want to submit to you and, if so, we would hope that you would reply expeditiously for the record. You are dismissed at this time.

We would now like to hear from the Honorable Mary D. Nichols, the Assistant Administrator for Air and Radiation at the United States Environmental Protection Agency. We'd like for her to come forward and bring with her any staff that she wishes.

It wouldn't be a clean air hearing if you weren't here at some point.

Ms. NICHOLS. Thank you.

Mr. BARTON. I think, Ms. Nichols, you know that it's the tradition of the subcommittee to take testimony under oath. You've never shown an unwillingness to testify under oath before. I would assume that you're still willing to testify under oath.

Ms. NICHOLS. Yes, sir.

Mr. BARTON. And I think you also know that you do have the right to be advised by counsel. You either can be or they're available if you wish them to be.

Ms. NICHOLS. Thank you, but I don't think I'll need them today.

Mr. BARTON. Okay. Would you please stand and raise your right hand?

[Witness sworn.]

Mr. BARTON. Your full statement is submitted for the record. We would ask that you summarize in 5 to 7 minutes.

TESTIMONY OF HON. MARY D. NICHOLS, ASSISTANT ADMINISTRATOR FOR AIR AND RADIATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. NICHOLS. Thank you, Mr. Chairman. I'll try to summarize my remarks. It is a pleasure to be back here to talk about the public health protections that are provided by Title I of the Clean Air Act. The provisions in Title I are the heart of the effort to protect public health by cleaning the air, and I think that's why they've been supported and successfully implemented on a bipartisan basis over the years.

Although the focus of this hearing has been on ozone, I would just point out that we have ambient air quality standards for six air pollutants, including lead, which causes infant mortality and reduced birth weights, as well as loss of childhood IQ; particulate matter, which is linked to premature death and can cause an increase in lung disease, as well as visibility problems; ground-level ozone, of course, which we'll talk about more; sulfur dioxide, which causes increases in respiratory illness, especially in asthmatics and is also a major contributor to acid rain and visibility problems; nitrogen dioxide, which causes lung tissue damage and also increases respiratory illness, as well as contributing to the formation of ground-level ozone and acid rain; and, carbon monoxide, which causes reduced circulation and heart damage and, at high enough levels, of courses, causes death.

Over the 25-year period during which emissions of these pollutants have been reduced under the Clean Air Act, the U.S. population grew by 27 percent. The domestic economy grew by 90 percent and the number of vehicle miles traveled grew by 111 percent. And we've done this chart just because I think it dramatizes the fact that the overall reduction in air pollution, contrasted with the

increase in the sources of air pollution, make it clear that a clean, healthy environment and healthy economic growth can both be achieved at the same time.

However, during 1994, approximately 62 million people—more than 1 in 5—still were living in counties where air quality levels exceeded at least one of the national ambient air quality standards. Moreover, despite the progress made in reducing ground level ozone in non-attainment areas across the country, there are areas, notably in California and the Houston area, but also most of the 13 northeastern States and the Lake Michigan area, that continue to experience unacceptably high levels of ground-level ozone.

A growing body of knowledge about the effects of even low levels of this pollutant and/or the potential combined effects of air pollutants make clear that we have not yet finished the job, and that's what Title I is designed to help us do.

Basically, Title I required EPA to establish health-based ambient air quality standards with an adequate margin of safety. EPA can and has, where warranted, established secondary standards to protect against these effects of these pollutants on crops, forests, materials, et cetera. EPA, in doing the standards, is required to review the current peer reviewed literature and, if necessary, to revise each standard every 5 years.

The standards are based on the best peer-reviewed science available and are subject to extensive review by the Clean Air Scientific Advisory Committee, a group of independent scientific experts from academia, industry and various institutions around the country.

Since 1980, we have completed eight reviews of the various standards and all of these reviews except one resulted in a reaffirmation of the existing standard. The core of the efforts to meet the standards once they're set is a strong and dynamic partnership between the EPA and State and local governments. The statute places the primary responsibility for meeting national health goals with the States. States and local governments develop and implement plans to address the air pollution problems unique to their areas.

At the same time, the Act supplements these State and local levels with national standards and policies to ensure that all citizens breathe air that meets minimum health levels, to assure that multi-state businesses can work within a single consistent system instead of facing 50 entirely different regulatory schemes, and to assure that programs are developed to deal with the common phenomena of pollution traveling from one State to another.

National standards also remove the incentive for States and localities to use weak environmental standards as a weapon in the economic competition among the States.

It became clear by the mid-1980's, however, that while the structure and the programs of the Clean Air Act, combined with the efforts of State and local governments, had made progress, the non-attainment provisions needed to be improved. At that time, most areas had not met the health-based standard. When President Bush signed the 1990 amendments into law, 6 out of every 10 Americans were living in areas that did not meet one or more of the national ambient air quality standards. At that time, 98 areas of the country did not meet the health standards for ozone, 42 did

not meet the carbon monoxide standard, and 73 did not meet the standards for particulate matter.

In order to deal effectively with these problems, the 1990 amendments gave new specific mandates to EPA to issue a series of national rules to help reduce pollution from specific sources. In addition, for the first time, the Act recognized that air quality problems vary from area to area, that Los Angeles' air quality problems differ from those of Dallas-Fort Worth, for example.

For ground-level ozone, the Act established five different classifications, with different deadlines and different sets of specific control requirements, each dependent upon the severity of the problem in each individual area. An area with a serious problem, like Beaumont, Texas, for example, was given a longer deadline for attainment than an area with a moderate problem, like Richmond, Virginia. The serious areas were required, however, to implement more specific emissions reduction strategies.

What all areas continue to have in common is that each must continue to make progress toward its own attainment goal. The 1990 amendments also included a new emphasis on the problem of interstate air pollution. It had been clear for some time that air pollution does not respect political boundaries. The 1990 amendments provided tools, such as establishing the Northeast Ozone Transport Commission, so that regions could begin to effectively deal with that issue.

With this new framework in place, EPA's ability to incorporate cost-effectiveness and flexibility has improved dramatically. While the Clean Air Act does not permit EPA to take costs into consideration when defining air quality standards to protect public health, it does provide that costs be taken into consideration when developing programs to meet these standards.

The Clinton Administration has worked hard with our State and local partners in order to develop common sense, cost-effective solutions. For example, one key component of President Clinton's reinventing environmental regulation initiative is an open market trading program which allows industries and States to trade air pollution reduction credits to achieve the required emissions reductions in the most cost-effective ways possible.

As the overall cost of compliance comes down, communities may be able to achieve the standard faster than otherwise planned. We intend to issue this rule in final form in April of next year, after considering public comment.

Another area where we are working with our State partners to provide flexibility is in addressing emissions of pollutants that are transported from upwind areas and contribute to unhealthy pollution downwind. In conjunction with States, industry and environmental groups, we have developed a program that provides States more time to submit their ozone attainment plans if they participate in a multi-state consultative process. The purpose of this process is to develop recommendations on finding the most cost-effective ways to reduce ground-level ozone.

Known as the Ozone Transport Assessment Group, the process is chaired by the Environment Commissioner from Illinois, with key subcommittees chaired by the Commissioners from the States

of New Jersey and Ohio and over 25 States are participating in this effort.

There is one pollutant for which we have not seen reduction in recent years, and that is nitrogen oxides. Since 1970, emissions of nitrogen oxides have risen by 14 percent, predominantly as the result of increases in emissions from power plants and non-road vehicles, such as construction and farm equipment, locomotives, et cetera. Because nitrogen oxides contribute significantly to the formation of ground-level ozone, as well as particulates, these increases are continuing cause for concern. Clearly, we have more to do.

I think I'll conclude at this point, Mr. Chairman, and I'll be happy to answer any questions that you might have.

[The prepared testimony of Hon. Mary D. Nichols follows:]

PREPARED STATEMENT OF HON. MARY NICHOLS, ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, ENVIRONMENTAL PROTECTION AGENCY

Good Morning. It is a pleasure to be here today to discuss the U.S. Environmental Protection Agency's (EPA's) efforts to achieve the public health protections in the Title I nonattainment provisions of the Clean Air Act. This is an area in which this Nation has experienced improvements that may rival any domestic policy program over the past quarter of a century. These provisions are the heart of our Nation's efforts to protect public health by cleaning the air. Perhaps that is why they have been supported and successfully implemented on a bi-partisan basis by six Presidents—four Republicans and two Democrats—since 1970. And, as you know, key additions and revisions to Title I were proposed and signed into law by President Bush in 1990.

Nonattainment provisions have been part of the Act since 1970 and are designed to ensure that state and local governments, supported by EPA technical expertise and national rules, implement programs to achieve the health-based national ambient air quality standards for each of six major pollutants. The health and environmental impacts of elevated levels of these pollutants include: *Lead*: which causes infant mortality, reduced birth weights and childhood I.Q. loss; *Particulate matter*: which is linked to premature death, can cause increased lung disease, and contribute to visibility problems; *Ground-level ozone (smog)*: which causes or contributes to respiratory illness and lung damage, crop and forest damage, building and material damage, and visibility problems; *Sulfur dioxide*: which causes increased respiratory illness, especially in asthmatics, contributes to visibility problems, and is a major contributor to acid rain; *Nitrogen Dioxide*: which causes lung tissue damage and increases respiratory illness, and contributes to the formation of ground-level ozone and acid rain, as well as visibility problems; and *Carbon Monoxide*: which causes reduced circulation and heart damage.

Since 1970, the Clean Air Act has tried to ensure that all Americans breathe clean, healthy air at all times—a goal that has not yet been achieved. To control emissions of these common air pollutants, the Clean Air Act provides for a strong, successful, partnership between the EPA and state and local governments. In fact, this statute places the primary responsibility for meeting national health goals on the states. State and local governments develop and implement plans to address the air pollution problems unique to their local areas. At the same time, the Act supports those state and local efforts with national standards and policies to ensure, among other things, that (1) all citizens breathe air that meets minimum health levels; (2) multi-state businesses do not face 50 different regulatory schemes; and (3) programs are developed to deal with the common phenomenon of pollution traveling from one state to another. National standards also prevent the "race to the bottom" phenomenon where environmental standards are used as a weapon in the economic competition among states. Serving as a national framework, the Clean Air Act helps provide a level playing field that is essential to the achievement of the overall national health-based standards.

How the Nonattainment Provisions Work

Since the Clean Air Act was enacted in 1970, under Title I, EPA is required to establish national ambient air quality standards for air pollutants that adversely affect public health and welfare. EPA has done so for the six pollutants I just described. These standards are set through a comprehensive scientific review that es-

establishes a level that protects the public with an "adequate margin of safety." EPA can, and in some cases has, also established "secondary" standards to protect against the effects of these pollutants on crops, forests, materials, etc.

All of these standards are based on the best peer-reviewed science available, and are subjected to extensive review by the Clean Air Scientific Advisory Committee, a group of independent scientific experts from academia, industry and various institutions around the country. To ensure that the standards are up-to-date and adequately protect public health, EPA is to review the current peer-reviewed literature and, if necessary, revise each standard every five years. Any decision to revise or not revise a standard goes through extensive scientific and public review and comment, as well.

An extensive air quality monitoring system is in place across the Nation to determine actual concentrations of these pollutants in the air. Any area that has monitored air quality levels that exceed the national standards and endanger the public health is designated as a "nonattainment" area. State and local governments are responsible for characterizing the nature of the local air pollution problem through emissions inventories, monitoring networks, and air quality modeling, and through the development of programs to reach "attainment" of the standard by deadlines that are provided for in the law. These analyses and control programs are included in state implementation plans, which are submitted to EPA for approval. EPA supports the states in achieving and maintaining the health standards by developing and issuing national rules that reduce emissions from various sources of pollution, such as automobiles, gasoline, or chemical plants.

1990 Clean Air Act Amendments

It became clear by the mid-1980's that despite the efforts of state and local governments and the very real success of several emission reduction programs, the non-attainment provisions needed to be revamped to better control pollution since many areas had not met the health standards. For example, when President Bush sponsored and signed into law the Clean Air Act Amendments of 1990, six out of every ten Americans were living in areas that did not meet one or more of the national ambient air quality standards. At that time, 98 areas of the country did not meet the health standards for ground-level ozone; 42 areas did not meet the carbon monoxide standards; and 73 areas did not meet the standards for particulate matter.

The 1990 Amendments to the Act gave new specific authorities to EPA to issue a series of national rules to help reduce pollution. For the first time it recognized that the severity of the air quality problem for certain pollutants varied from area to area—Los Angeles' air quality problems differed from Dallas-Fort Worth's air quality problems. For example, for ground-level ozone, the Act established different classifications with different deadlines and specific control requirements depending on the severity of the problem in each city. An area with a "serious" air pollution problem was given a longer deadline for attainment than an area with "moderate" problems, though the serious area was also required to implement more specific control programs. This was a fundamental change in the Act, in that it allows for attainment plans and timetables to be specifically tailored to local conditions.

Also, it was thought that the threat of penalties could motivate progress in cleaning the air and at the urging of the states, among other parties, the Congress included provisions for emission offset and highway sanctions. The Congress was clear that these provisions were to apply only in cases where an area failed to adopt or implement a plan by the Act's newly extended deadlines—not to an area that did not achieve clean air by a given deadline. For certain pollutants, those areas that do not meet the standard by the deadline in the Act are "bumped up" to the next classification—that is, they are given more time to attain the standard, but are also required to adopt additional control programs.

The 1990 Amendments also included a greater focus on the problem of interstate air pollution (emissions from one state traveling long distances to contribute to air quality problems in downwind areas).

Progress in Cleaning up the Nation's Air

Since the Clean Air Act was first passed in 1970, combined emissions of the six common pollutants have been cut by 24%. Of the six, only emissions of nitrogen oxides have increased over that period. During that same 25-year period, the U.S. population grew by 27 percent, the domestic economy grew by 90 percent and the number of vehicle miles traveled grew by 111 percent. These reductions in air pollution, occurring simultaneously with continuous growth in the sources of air pollution, demonstrate that a clean, healthy environment and economic growth are mutually achievable goals.

Moreover, since 1970, there have been a series of public health successes across the country. Perhaps the greatest success story has been the phaseout of lead in gasoline and controls on industrial sources of lead. This has resulted in a 98 percent reduction in lead emissions since 1970. The result has been that on average the concentration of lead in our children's blood has dropped by nearly 75 percent during that same time period.

Dramatic improvements have been achieved for other pollutants, as well. When the 1990 Amendments were signed into law, there were 98 areas of the country that were designated as nonattainment for ground-level ozone. Through 1994, 55 of those areas have met the ozone standard. EPA has formally "reclassified" 22 of those areas as attainment. Among these areas are Indianapolis, Toledo, Detroit, Winston-Salem, Memphis, and San Francisco.

In 1990, there were 42 areas of the country that did not meet the national ambient air quality standard for carbon monoxide. Today all but 9 of these areas meet the carbon monoxide standard. EPA has since redesignated eight of the clean areas as attainment, including Philadelphia, Baltimore, Washington, Cleveland, Memphis, Syracuse and Winston-Salem.

Tremendous progress has also been made in controlling emissions of particulate matter. Of the 73 areas that were designated as nonattainment when the 1990 Clean Air Act Amendments were signed into law, 37 now meet the standard for particulate matter (PM-10), including Chicago, Illinois; Boise, Idaho; Seattle, Washington; and Klamath Falls, Oregon.

Klamath Falls is a particularly interesting case. In January 1988, measurements of PM-10 five times the federal health standard were recorded in Klamath Falls. The major problem was smoke from residential woodstoves and fireplaces in conjunction with wintertime inversions that trapped the air, causing woodsmoke concentrations to build to very unhealthy levels. The city introduced an initiative that combined a public awareness program, a voluntary woodburning curtailment program, and a woodstove replacement program (with stoves that met the new EPA woodstove standard) to dramatically reduce emissions and meet the national standard.

Progress has been great in other areas as well. As of 1990, 46 areas did not meet the sulfur dioxide standard. In 1990, three additional areas were designated as nonattainment areas for sulfur dioxide. Since that time, eleven have been redesignated as attainment areas and only a few areas are currently monitoring violations of the standard. The environment is also reaping the reward of a 10 million ton reduction of sulfur dioxide as part of the acid rain provisions of the 1990 Clean Air Act Amendments. Based on an innovative market-based emissions trading program, the acid rain provisions will protect lakes, streams and significantly improve visibility (especially in the eastern U.S.) through a 35 percent cut in power plant emissions from 1980 levels by the year 2000. The first phase of the program is already being achieved this year.

Despite this accomplishment, nitrogen oxides is one pollutant for which we have not seen continued reductions. Since 1970, emissions of nitrogen oxides have risen by 14 percent, predominately as the result of increases in emissions from power plants and non-road vehicles (construction and farm equipment, locomotives, etc.). It is clear that this rate of growth is much smaller than would have been the case without the Clean Air Act; currently, only one area remains in nonattainment for NO₂. However, because nitrogen oxides contribute to the formation of ground-level ozone, their continuing increase is cause for concern. Also, nitrogen oxides are a potentially significant contributor to visibility problems, especially in the western United States, and to a number of environmental effects, such as acid rain and eutrophication. Eutrophication occurs when a body of water suffers an increase in nutrients that reduces the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

Another way to measure progress under the Clean Air Act is to look at the excellent job the states have done in submitting state plans to address their air quality problems. Under the Act, states that fail to submit required plan revisions can be given up to 18 additional months before EPA is required to implement sanctions if they still have not submitted the plan at the end of that time. Of the over 2,000 state plan revisions, well over sixty percent have come in on time and more than 99 percent have been submitted before the 18-month period has ended. Sanctions are being implemented in only a handful of instances and are currently in place in only three areas. This is a testament to the states and local agencies that take the need to clean up our Nation's air very seriously, and to the cooperative nature of the state/federal relationship.

Despite all the progress that has been made, there is clearly a need to keep making progress in cleaning up our Nation's air. During 1994, approximately 62 million

people lived in counties where air quality levels exceeded at least one of the national ambient air quality standards. Moreover, despite the progress made in reducing ground-level ozone in nonattainment areas across the country, there are areas— notably California, the Houston area, the Northeastern states, and the Lake Michigan area, among others—that continue to experience unacceptably high levels of ground-level ozone.

Title I Implementation: Common Sense Solutions

While the Clean Air Act has always required the EPA not to take costs into consideration when setting the national ambient air quality standards to protect the health of the American public, it does provide that cost be taken into consideration when developing programs to meet the national standards. This is an area where the Clinton Administration has taken particular care to work with our state and local partners in the development of common sense, cost-effective solutions.

For example, last July we proposed a model rule that states can use for emissions trading of smog-creating pollutants. A key component of President Clinton's Reinventing Environmental Regulation Initiative, this open market trading program provides industry and states with the flexibility to achieve the required emission reductions in the most cost-effective way possible. By lowering the overall cost of compliance with the national ambient air quality standards, communities may be able to achieve the standard faster than otherwise planned. We intend to issue this rule in final form in April of next year, after considering public comment on the rule.

Another area where we are working with our state partners to provide flexibility is in addressing emissions of pollutants that are "transported" from "upwind" areas and contribute to unhealthy air in "downwind" cities. In conjunction with states, industry and environmental groups, we developed a program that provides states more time to submit their ozone plans if they participate in a multi-state consultative process. The purpose of this process is to develop recommendations for finding the most cost-effective ways to reduce ground-level ozone. The result was the formation of the Ozone Transport Assessment Group. It is chaired by the environment commissioner from Illinois, with key subcommittees chaired by commissioners from the States of New Jersey and Ohio. Over 25 states are participating in the effort. To reduce ozone to healthful levels in many cities east of the Mississippi River, there are two choices: (1) ignore the quality of the air blowing in from upwind areas and require cities to develop stricter, more costly programs to maintain healthy air or (2) work to find cost-effective ways of reducing emissions "blowing in" from power plants and other sources in upwind areas so that downwind cities do not have to take extreme or unnecessarily costly steps to clean up pollution they did not create to try to maintain healthy air quality. Clearly the latter is the common-sense approach. Residents and businesses in metropolitan areas like Chicago, Milwaukee, New York, Philadelphia, Boston, Baltimore, Washington, and Atlanta, as well as many other Eastern areas will reap the benefits of this effort.

We have taken several other significant steps over the past two years to help states find flexible solutions to meet the Clean Air Act requirements. We have been and are continuing to work with states to provide flexibility in the process they go through to use air quality modeling to demonstrate attainment with the national air quality standard. For example, we worked with states, industry and other stakeholders to foster the development of several analytical and modeling efforts (e.g., Modeling Ozone Cooperative Project) aimed at a better assessment of the regional ozone problem and its solutions.

Status of EPA Reviews of National Ambient Air Quality Standards

We are continually updating our understanding of the science and health and environmental effects associated with the six principal pollutants. Since 1980, we have completed eight reviews of the various standards. All of those reviews except one resulted in a reaffirmation of the current standard. In 1987, we revised the particulate matter standard to address smaller particles (less than 10 microns in size). We are currently involving some of the Nation's leading outside scientists to provide us advice as we review the existing standards for ozone and particulate matter. We have not yet reached a decision on whether or not to revise either of these current standards.

We have recently established a formal advisory committee with over 100 stakeholders from states and local governments, industry, environmental groups, and other organizations to discuss a more integrated approach to the ozone and particulate matter problems, as well as to visibility impairment. This committee will also discuss ways to improve the implementation of the national ambient air quality standards. We believe that such a process will ensure that the stakeholders are full

partners in helping to better integrate the air pollution programs and in improving the implementation process.

In summary, Mr. Chairman, the Title I provisions of the Clean Air Act have been very successful in dramatically reducing emissions of several serious air pollutants and in improving air quality in large and small cities throughout the Nation. Just since President Bush initiated and signed into law the Clean Air Act Amendments of 1990, we have seen great progress in reducing levels of ground-level ozone, carbon monoxide, particulate matter, and other pollutants. The Clinton Administration is continuing to work with our state and local partners to develop common-sense, flexible approaches, such as the open market trading rule, to help clean up the Nation's air in the most cost-effective manner possible.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions that you might have.

Mr. BARTON. Well, thank you. Unfortunately, we're going to have to go vote and it's a vote on the rule for the debt ceiling extension. So it's not a vote that either one of us can skip. We are going to go vote, but we will be back immediately because you are our star witness and we need to ask some questions.

So the committee is going to recess for approximately 10 minutes and hopefully we'll be back, in 15 minutes, a little before 2, and then we'll ask you some questions.

[Brief recess.]

Mr. BARTON. If we could reconvene. Congressman Waxman is in the anteroom and he'll be in shortly. I'll go ahead and start the questioning.

Ms. Nichols, in your opinion, in Title I of the Act, are there any—I guess the way to phrase the question—what is the most constraining thing about Title I in terms of meeting the goals of Title I? Is there anything, if you could change, you would change?

Ms. NICHOLS. Well, from listening to the earlier discussion, I think you've focused on a number of issues, all of which are of concern to us. There are: how you set the standards, are they the right standards, are we using the best information, do the deadlines that apply make sense, do we have the right mix of tools to use in achieving those standards, and then are we applying them in a common sense way.

I think we feel that we have the ability, working within the existing Title I, to implement a cost-effective program in partnership with the States and local governments and to reach attainment of health-based standards in a timely fashion. And the chart—I apologize for how small it is and we could probably move it closer—shows you how we're doing in terms of coming into compliance with those standards. We feel that the fact that about half of the areas that were violating the standards in 1990 when the Act was passed are now in attainment over a 3-year period and are being reclassified to attainment is proof that the Act has worked and is working and there is nothing that we see on the horizon that will prevent us from achieving those results.

Now, as you know, we are looking at the possibility of changing both the ozone standard and the fine particle standard. There is staff work underway. A lot of scientific and technical review, a lot of advice coming in about how those standards should be set, that focuses on the level, the duration—1 hour versus 8 hours—as well as on how you measure the standard and whether you will allow more exceedance.

Mr. BARTON. Let me ask you a question about your chart there. It is a fact that several areas—many areas have made, if not dramatic, substantial improvement. One of the questions that was in my question sheet to ask is do you attribute that to specific remedies within Title I or is that something that is because of other factors.

Ms. NICHOLS. Well, I think that when you look at a trend over a period of years, you can erase the facts of weather or aberrations of that kind. Clearly, the phase-in of tighter Title II standards, the tailpipe standards for automobiles, is a major factor, one of the most important factors in our success.

However, if you look at the bad year we had this past year in terms of weather, we don't believe that we would have done anywhere nearly as well in continuing the progress based on fleet turnover alone, because you had these really terrible weather conditions, and we attribute a great deal of that to the reformulated gasoline provisions that are in the Act, as well as to the controls that have been put into place in the last year or so on stationary sources, both for VOCs and for NO_x.

And while it's very difficult, and we've talked about this in prior hearings, to assign a specific amount of the real world benefits to each measure, we think that collectively they point to the fact that the Act itself is what has made that difference. It's the combination of measures.

Mr. BARTON. We've had a good hearing today and I don't want to end it by being argumentative, but it can be argued and we've had testimony that made the point that the real heart, so to speak, the teeth in Title I have not been implemented yet. And if, in fact, we're making progress without some of those control strategies that have to yet be implemented, it might be better to defer some of those.

Would you agree with that assessment or disagree with it?

Ms. NICHOLS. I would disagree with that assessment.

Mr. BARTON. I'm not surprised.

Ms. NICHOLS. For a couple of reasons. First of all, the flipside is the 90 million people who are living in the downwind areas that aren't yet in attainment and the people who are the victims—living in the areas that are the victims of transport, where clearly additional measures are going to be needed. And contrary to Dr. Jones, who I think was the exponent of that view, we don't hear a great deal of dissent coming from the National Academy, from outside reviewers, that there are going to be measures that are going to be needed to bring the rest of the country into attainment.

You can argue about precisely how much NO_x versus how much VOC in each region and that's why we're doing this ozone transport assessment process that I testified about. But on the basic theme of further emissions reductions, beyond what we're already seeing going to be needed, there's not much disagreement and I think one of the main reasons for that is the growth factor. We're continuing to have a population growth, our VMT growth is practically exponential, and we don't want to turn those things back. We want to get more efficient.

Mr. BARTON. Well, let me ask the question that I asked the last panel to get to the heart of it, before I let Congressman Waxman

ask his questions. This concept of going to a longer duration standard instead of a spike standard. As for an 8 hour standard, does EPA have an official position on changing the standard or is that something that you're still thinking about?

Ms. NICHOLS. There is a staff paper which clearly indicates that an 8 hour standard in the range of .07 to .09 parts per million is the best reflection of what we know about the health evidence at this time, and that has been presented to me. I've asked for further data and information. I'll be making a recommendation to the Administrator.

Mr. BARTON. Once you have evaluated it and prepare your recommendation, do you have the authority under the existing Clean Air Act Amendments to change the standard or do we need to give you that authority explicitly?

Ms. NICHOLS. We have the authority to change the standard, and that would include the definition of the number of exceedances, as well as the duration and the level.

Mr. BARTON. So that you could do that—

Ms. NICHOLS. Under current law.

Mr. BARTON. [continuing] by an executive decision.

Ms. NICHOLS. Yes, sir.

Mr. BARTON. And my final question. It's my understanding that in setting these standards for national ambient air quality, that cost cannot be a consideration. Would it be helpful to you for us to give you explicitly, in a reform package, the authority to consider cost in setting these standards?

Ms. NICHOLS. I think, Mr. Chairman, that we believe that the approach that has been taken in the past and continues to be taken is the correct one, in this sense: asking the Administrator or any human being to make a decision of this magnitude is obviously an enormous task and Congress clearly has recognized that and has given the Administrator a lot of latitude, as well as science advice and resources to do it with.

It is essentially a public health decision and I found some notes going back to 1979 in the Federal Register promulgation notice when the last time the ozone standard was reviewed, where the Administrator, at that time, said that public health had to be the compelling factor in the decision, but recognized clearly that a standard that protects public health with an adequate margin of safety—which is what the statute calls for—is based on uncertainty because at the lower levels, at any range, you don't know what level is low enough to prevent any health effects.

And there is increasing evidence over the years that there is no such thing as a safe level, a zero effect level, much less a way to scientifically set an adequate margin of safety.

So what the Administrator does at that point is to weigh the relative acceptability of various degrees of uncertainty given the seriousness of the effects. And, clearly, what that says to me is that the Administrator's task is to look at the risks and the knowledge and then to explicitly take cost into account when it comes to designing the implementation strategy.

Mr. BARTON. So you personally are not opposed to cost being a consideration.

Ms. NICHOLS. I am opposed to cost explicitly being—

Mr. BARTON. You're opposed.

Ms. NICHOLS. In the setting of the standard. And the reason why I am is that I believe that we don't know enough, the tools are not there to do it adequately. The colloquy that I heard earlier between yourself and Mr. Waxman and the earlier panel about this issue only reconfirmed my judgment about that.

There are some things that we don't know how to monetize at all. There are other things where despite the best research of people like Dr. Krupnick, we come up with a number for the value of an asthma attack avoided. This based on the best tools they have, which is they go out and ask a bunch of people what they'd be willing to pay, and then we can quibble about whether they had the right number or not.

I don't think, frankly, that a decision that was based on that kind of data would have a lot of credibility with the American public. I don't think it has a lot of strength behind it. I think that the public basically has a pretty common sense view about these things, which is they want to hear their public health officials making a decision on protection of health.

Now, realistically, any public health officer, any physician is a human being. Who knows what is going on in the dark recesses of their mind when they're making a decision about what they think is adequately protective. Dr. McClellan may feel that .09 is the right number because he weighs the uncertainty on the side of not disrupting the economy. The American Lung Association representative may feel that it should be .07 or less because he doesn't weigh the cost that much.

We don't have tools that give you a hard line number on what cost is acceptable for public health protection. But I think we can and we are increasingly able to consider the cost when it comes to designing the control strategies and that's what we're trying to do.

Mr. BARTON. I guess I'm confused. I'm trying not to be inattentive to what you just said.

Ms. NICHOLS. I'm sorry if I've been unclear.

Mr. BARTON. If I understand you, cost should not be a factor in setting the standard, but the cost should be a factor in determining the control methodology to achieve the standard.

Ms. NICHOLS. Correct. And I think Congress gave us that in the 1990 amendments, by setting differential attainment deadlines, as you did for the existing ozone standard. You recognized explicitly that it was going to be more expensive and more difficult for some areas to come into attainment than others, and so you gave those more time. I'm from Los Angeles and we've had 25 years and won't reach the standard until 2010, with really Herculean efforts.

But people are willing to keep moving toward that goal, even in the face of all of the expense and the difficulty, because they know that someday the prize is going to be healthy air.

Mr. BARTON. I'm going to yield because I've taken twice as long as I wanted to take. But if you literally accept what you just said as gospel, that cost is not a consideration in setting the standard, then an adequate margin of safety is zero tolerance. You try to set a standard that everyone is perfectly safe all the time, which is an incalculable cost. In fact, you can't meet it. And we're not—I don't even think the most health-conscious member of the American

Lung Association is going to set a standard that can never be reached in the real world.

So why not set a standard that is based on some consideration of cost and be explicit in the statute that cost is one of several factors, not the dominant one, I'm with you on that, but at least explicitly state that it should be considered. If you don't do that, you set the situation up where you get potential standards that are extremely costly to meet in the very best case.

Ms. NICHOLS. Well, clearly, over the years, we've seen that we've over-estimated the cost of attainment time and time again because of the ingenuity of people about coming up with more cost-effective ways to meet the regulations.

I wouldn't disagree with you, though, that we've still spent a lot of money on attainment of the standards, but I think that what gave people the willingness to do that and to make some of the tough political choices that they've had to make to put some of these control programs into place was the sense that they were working toward a goal which was a public health goal.

I realize that the impurity is hard to come by and you're right that zero is the only ultimately protective standard. But I think that with the best advice of the Clean Air Science Advisory Committee, in a mandate to the Administrator to look at health, recognizing that there is uncertainty both about the exact number at which the effects occur and about how serious those effects are, that you build in enough of a judgment call so that you can ask her to exercise her best judgment as a public health official rather than asking her to weigh all of the costs at that time.

And, again, I would base that primarily on the issue of maintaining the credibility of the goal. But I would also say that we've found when we do try to evaluate the benefits of attainment of the standard, which we do in developing the implementation strategies, that there are a lot of the benefits that we have no way of putting a dollar value on. And while we support further economic research and we believe it's useful, a lot of the tools just aren't there.

Mr. BARTON. Okay. Well, we've beat that horse sufficiently. I'm going to now recognize the gentleman from California for such time as he may consume.

Mr. WAXMAN. Thank you very much, Mr. Chairman. Let me just sort of see if I can put this in perspective. The Clean Air Act was adopted as a public health measure to deal with the problem of adverse health effects from air pollution. And you take a community—and you could approach a number of different ways. You could say we want to set a standard that will be adequate to protect the health of most people. You could say that. But then you wonder who is being left out.

Since air pollution affects kids and elderly people more than others, do we want a community in which we'd say you can't have the elderly and the kids living among us. Well, no one wants to take that position. You have some people who are more sensitive to air pollution than others, asthmatics particularly. Do you want to set the standard for the one with the biggest problem? Well, in some ways you do because that becomes a proxy for those that are going to be most adversely affected and you want to have a society in which they can—since we're talking about breathing air, which is

essential for life, we want to have that as a consideration, if your goal is public health protection.

So it can't be zero tolerance. We're not talking about, because there is a lot of tolerance that people have for air pollution. So you try to set what would be a goal, a public health goal, with the tools that you have to do that, but the tools that you have for protecting public health, with a margin of safety, taking into consideration the most vulnerable populations, give you an objective to reach.

But costs have to be a consideration. Rather than having someone told, well, we're going to protect you elderly people who have problems with air pollution or we're going to protect you, but then we're not going to really protect you in the standard because we're going to say that it's going to be too costly to protect you. We don't do that. We don't take the goal as something where we make some variable. We set the goal, but costs are considered in terms of what will be required to implement the plans to achieve that goal.

In Los Angeles, we could make tremendous strides to cleaning up the air if we banned automobiles flat out. No cars would be allowed to drive on the streets of L.A. We could achieve clean air in a much shorter period of time. But that doesn't make sense. You can't have that kind of an aggressive mindless strategy. So you have to develop reasonable ways to accomplish your goals.

One of the clearest strategies over the years has been cleaner cars replacing older dirtier cars, having tighter and tighter standards, so that there would be a glide path toward clean air.

Mr. BARTON. Seven years.

Mr. WAXMAN. Well, in some areas, they could do it in 7 years. In some areas, you can't do it for 20 or 25 years. But we have a law that's been on the books and we hear so much about how government fails. Some people argue that achieving clean air in this country is too expensive or is not even doable and I'd like to ask Ms. Nichols to look at the record.

When President Bush signed the Clean Air Act into law, there were 98 areas of the country that did not meet that ozone standard, the goal. Today, 55 of those areas do meet the standard. That seems like, to me, real progress. And under the Act, over 40 areas classified as marginal non-attainment were supposed to come into attainment by the end of 1993. Did they make it? Can you tell us a report on that?

Ms. NICHOLS. All but six of them made it by 1993 and as of the following year, all but two of them had made it. There was one area which slipped into non-attainment, into margin non-attainment because they are adjacent to a non-attainment area. But overall, that's a phenomenal rate of improvement, by any standard.

Mr. WAXMAN. Under the Act, 33 areas were classified as moderate. Are they going to meet the standard by the end of 1996 and how are those areas doing?

Ms. NICHOLS. Yes. They are pretty much on track as of this point.

Mr. WAXMAN. And under the Act, the areas classified as serious, severe and extreme are supposed to be making progress toward attainment. Is that, in fact, happening?

Ms. NICHOLS. Yes, we think so. And, again, despite occasional bad years, such as we had this past summer, overall, the 3-year trend is down everywhere.

Mr. WAXMAN. And what has been the experience with respect to carbon monoxide and particulate matter? Are we making progress there?

Ms. NICHOLS. Yes, clearly so with carbon monoxide as a result of improvements in cars and the winter oxygenated fuel program. We've done in extremely well in terms of areas coming into attainment with the standards. Particulate has been slower and that's partly because of the increase in NO_x emissions that I mentioned earlier, which is directly traced to the growth and vehicle miles traveled.

Mr. WAXMAN. So we have a structure, the Clean Air Act, standards are set, we're trying to achieve those goals, we take costs into consideration in terms of the timeframe and the strategies that would have to be employed, how expensive they're going to be, how practical they are. We have a law that's working. I think we ought to acknowledge that fact.

That doesn't mean it's perfect. It doesn't mean we shouldn't look at changing that standard for an 8 hour period as opposed to a 1 hour period, that we shouldn't look for other things that make sense. But to throw out the structure and say we're going to have the goal posts so variable based on something that makes it even more difficult to actually set an honest number because you're taking costs into consideration, seems to me unnecessary. Nobody needs it.

When you have something that's working so well, if it ain't broke, don't fix everything.

Let me ask you about the costs compared to what was estimated.

Ms. NICHOLS. We're still working on the costs for the 1990 amendments. In response to Congress' request, we've done the first part of the section 812 report on the costs and benefits of the 1970 and 1977 amendments. The analysis has gone to the Science Advisory Board for review. They are still reviewing it. But it's indicated that the benefits of the 1970 and 1977 amendments exceeded \$300 billion per year, with costs of less than \$25 billion per year.

Now, a good deal of that is attributable to lead, which was very costly in terms of the effects on health. But we expect that looking at the 1990 amendments and the scoping studies that we've done, that we think that the benefits are going to exceed the costs by several factors. We can't give a number at this time, but we're quite confident that given the direction that we're on, that we're still leveraging very large proportionate benefits for the costs.

Mr. WAXMAN. Mr. Chairman, I'd like us, if we could, maybe the staff could do this—we had hearings throughout the 1980's. Groups came in and said if you require these different things under the Clean Air Act Amendments, it's going to cost so much money and can't be done, impossible and so on and so forth. I heard that so many different times.

I'd like us to look back and see if we have a historical record so we can put some perspective when people come in and give us their certainty about what the impact will be if we do things one way or the other. We're going to do it in a balanced way.



I recall the auto industry coming in and saying there's certain things that just could not be done, period. We required it and it was done.

Mr. BARTON. Shows how powerful you were then.

Mr. WAXMAN. Shows how if you really push, because it's a worthwhile objective, that American ingenuity can get us there. We have to be realistic about it, but I don't think we ought to be timid. That would be the point I would want to make. And when we were timid, under the leadership of President Bush in 1990 and we passed a good clean air bill on a bipartisan basis I think 400 votes in the House, put it into law, working out compromises and differences and moderations over different ideas that were suggested, that law is working and we can be proud of it.

Let's refine it, but recognize and put in perspective some of those people who doubted the ability of Americans to meet the challenge to try to protect the health of our citizens.

Mr. BARTON. I'd want to do a cost-benefit analysis of the cost of gathering the data, but I'm certainly willing to work with the staff. I think it's valid to see what people said then and what's happened since. It's always good to verify. I think that makes sense. So I'd be happy to work with you and the other staff people and the other members of the committee on that.

Mr. WAXMAN. Thank you very much, Ms. Nichols, for your presentation.

Ms. NICHOLS. Thank you. I have an example to share with you on that; it is fresh in our minds because we've just taken another look at this. You may recall that in the acid rain provision, which was new in the 1990 amendments, at the time that those were passed, the estimate was that an allowance for a ton of sulfur was going to be \$1,000, would go for \$1,000. This was under a tradeable market program. And as a result of the flexibility that the Act included under Title IV to allow these kinds of trades, the cost of a ton of sulfur is now \$140.

Mr. BARTON. What was the EPA estimate?

Ms. NICHOLS. EPA was high, we were way off. We were—\$1,000 was our number. There were some in the industry who were saying higher.

Mr. BARTON. Definitely the number is lower, but my recollection is that most knowledgeable people thought they were going to be \$200 to \$300 a ton.

Ms. NICHOLS. My staff has told me that it was \$500.

Mr. BARTON. I think it was around \$400 to \$600.

Ms. NICHOLS. \$400 to \$600, or roughly \$500, and industry was as high as \$1,000.

Mr. BARTON. We're all in agreement that, happily, it's much lower.

Mr. WAXMAN. But the consequence of that—is that market working the way we expected it to?

Ms. NICHOLS. Not enough sales.

Mr. WAXMAN. Because that's a problem when we miscalculate. That's why we have to be a little cautious. I like the idea of a free market system to make these decisions, but if you set the market at the wrong levels, you don't get the results that you want to achieve. So that when we set these trading policies and all of that,

we ought to be as realistic as we can and not be on the high side so that the market doesn't function.

Mr. BARTON. Do you have other questions?

Mr. WAXMAN. No, I'm finished.

Mr. BARTON. Just a few housekeeping questions before we release you. We sent two letters to you on October 10 from the subcommittee, with acknowledgement to the minority, one dealing with the methyl bromide issue that you testified on August 1 before the subcommittee and another one dealing with an eco employee commute option, flexibility working group, and we asked that you respond within 30 days. So that's 2 days or tomorrow.

Ms. NICHOLS. Yes. We believe those are both due. I think Saturday is technically the deadline, so we'll get them to you by Monday morning.

Mr. BARTON. There is a meeting, an international meeting in Europe on methyl bromide at the end of this month and we are beginning to prepare some draft legislation, in which the employee commute options is one of the things we were looking at making voluntary or repealing in its entirety. So it would be helpful to have your response to them.

Ms. NICHOLS. We'll be happy to get to you.

Mr. BARTON. We thank you for being here. It's interesting, by letting you be the last witness, we've worn everybody else out. So there are not too many of us to ask you questions. So it may turn out that going last is—it gives us, the people that care to stay around, more time to ask questions and it certainly gives you the chance to use your day more fully before the fact. It's a pretty good system, I think.

Mr. WAXMAN. Can we get a unanimous consent request that members may submit questions in writing to Ms. Nichols?

Mr. BARTON. Without objection.

Mr. WAXMAN. And the other witnesses, and get a response in writing.

Mr. BARTON. I've informed all the other panelists that that would be the routine. So this hearing is adjourned and we thank you again, Ms. Nichols, for being here.

[Whereupon, at 2:27 p.m., the subcommittee was recessed, to reconvene at the call of the Chair.]



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