

S. HRG. 108-502

**IMPLEMENTATION OF THE NEW AIR QUALITY
STANDARDS FOR PARTICULATE MATTER AND
OZONE**

HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR, CLIMATE CHANGE,
AND NUCLEAR SAFETY

OF THE

COMMITTEE ON ENVIRONMENT AND
PUBLIC WORKS

UNITED STATES SENATE

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

APRIL 1, 2004

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ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

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IMPLEMENTATION OF THE NEW AIR QUALITY STANDARDS FOR PARTICULATE MATTER AND OZONE

THURSDAY, APRIL 1, 2004

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR, CLIMATE CHANGE, AND
NUCLEAR SAFETY,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:38 a.m., in room 406, Senate Dirksen Building, Hon. George V. Voinovich (chairman of the subcommittee) presiding.

Present: Senators Voinovich, Lieberman, Thomas, Carper, Clinton, Jeffords [ex officio] and Inhofe [ex officio].

OPENING STATEMENT OF HON. GEORGE V. VOINOVICH, U.S. SENATOR FROM THE STATE OF OHIO

Senator VOINOVICH. The hearing will come to order.

I want to thank all of you for coming. We are here today to conduct oversight on the implementation of the new air quality standards for particulate matter and ozone.

The Clean Air Act requires the Environmental Protection Agency to establish National Ambient Air Quality Standards and assigns primary responsibility to the States to assure compliance with them. The NAAQS are set without consideration of costs to protect public health and welfare with an adequate margin of safety. Areas not meeting the standards are referred to as non-attainment areas and are required to implement specified air pollution control measures.

EPA is required to review the scientific data every 5 years and revise the standards, if appropriate. In 1997, EPA set a new, more stringent 8-hour ozone standard and a fine particulate standard of 2.5 ppm. This year EPA will finalize designations and implementation rules for both standards.

It is very important for us to put the standards in context. Our air is not getting dirtier, on the contrary, our air is significantly cleaner. I remember well when the Clean Air Act was enacted in 1970. I was a member of the Ohio House of Representatives and was working on legislation to create the Ohio Environmental Protection Agency. Since 1970, while gross domestic product has increased by 164 percent, vehicle miles traveled has increased by 155 percent, energy consumption by 42 percent and population by 38 percent. Emissions of the six criteria plants have been reduced by

48 percent. This success in improving our environment is simply not told enough. Air quality standards are an important part of the story. We still need to do a lot more.

I have been intimately involved with improving air quality throughout my 37-year public career. As Governor, I was very concerned with my responsibilities to the environment and believe strongly that we needed to do a better job in reducing emissions to improve the environment and protect public health. We worked to more than double the Ohio's EPA budget from \$69 million in 1991 to over \$149 million in 1998.

I am very familiar as the Administrator is with the difficult decisions that must be made to bring States and counties into attainment. When I began my term as Governor, 28 of Ohio's 88 counties were in non-attainment for ozone. We worked with the State legislature to create a situation where American Electric Power could install scrubbers costing \$616 million to reduce sulfur dioxide emissions at one of this country's largest coal-fired facilities.

As part of bringing the State into compliance we chose to implement it an automobile emissions testing program called E-Check because it made the most sense from a cost-benefit point of view. This program wasn't popular with the Ohio General Assembly and with the people of Ohio. As a matter of fact, the General Assembly passed a bill to remove the E-Check Program which I vetoed and the legislature chose not to override that veto.

Furthermore, we implemented regulations to capture vapors when motorists fueled their cars, required controls on industrial sources and pushed to get a 15 percent reduction in emission in each non-attainment area. Due to the success of these efforts air toxins in my State were reduced significantly from about 381 million pounds to 144 million pounds in several years. Since the 1970's, Ohio levels of carbon monoxide have been reduced by more than 70 percent, sulfur dioxide by 90 percent, lead by 95 percent and ozone by 27 percent.

While all Ohio counties meet air quality standards, these improvements have not been without cost. Over the last 10 years, Ohio has spent more on emissions reductions than New York, New Jersey, Massachusetts, Connecticut, Vermont, Rhode Island, Maine, New Hampshire, Maryland, Delaware and Washington, DC. combined. All of them combined is what we spent on our utilities.

The cost of attaining these new air quality standards for particulate matter and ozone is going to be more costly. This chart shows all the counties that were exceeding the new air quality standards over the 2000–2002 period. Although you may like the colors, this isn't a pretty picture. Yellow is for those counties not meeting the ozone standard, orange for PM_{2.5}, and red for both. The red shows all of the counties in this country that are not meeting either the ozone or particulate standard.

When surrounding counties are added, the number of non-attainment counties in the country is likely to be over 500 for the 8-hour ozone standard and over 200 for PM_{2.5}. This is no April Fool's Day joke, these standards are going to cast a wet blanket over some parts of our Nation. When EPA proposed the new standards in 1997, the agency estimated that bringing all areas into attainment

with standards by the year 2010 would cost \$46 billion annually. Another analysis claims significant job losses.

The projected impact of these standards has caused a great deal of concern in non-attainment counties that will cause the loss of jobs, restrict economic growth, discourage plant location and encourage manufacturers to move overseas. As was highlighted last week during the natural gas hearing which the chairman held, our manufacturers and businesses are in grave trouble today and are unable to compete in the global marketplace.

During the 1990's, we were able to bring new businesses to my State. For 3 consecutive years, Ohio was No. 1 in Site Selection Magazine's highly coveted Governor's Cup. While this is good news, the question is whether we can keep these businesses and attract more. When I look at this chart, I am not sure. This is a map of the projected non-attainment counties in Ohio. Right now business owners are looking at the same map and thinking twice about moving operations to or expanding existing plants in our State. This is happening right now.

Unfortunately the story gets worse before it gets better. This chart shows all the different clean air regulations that States, localities and businesses are going to have to deal with over the next decade. We are only at the beginning of this uncertain mess. This is what we are confronted with today in this country because of all of the various kinds of rules and regulations that have been set by the Environmental Protection Agency.

Additionally, as a result, our courtrooms are being cluttered with lawsuits by environmental and industry groups, we have not made the progress we could to improve our environment and protect public health. My theory is that because of the mess we have today, we are not doing as good a job in cleaning up the environment and we are not providing energy in the most efficient way possible in this country.

That is why, in my opinion, the Clear Skies Act, which I sponsored and co-sponsored with several members of this committee, is needed. It presents a very clear path forward on where we are going and when and provides the flexibility needed to get there. It cleans up the regulatory mess and greatly helps States and localities bring counties into attainment and provides the certainty needed to make significant environmental benefits.

Chart 5 shows the benefit of Clear Skies in terms of meeting air quality standards. This is really significant. By 2010, EPA estimates this legislation would bring 42 additional counties and 14 million people into attainment for PM_{2.5} and sooner than under existing programs. So we are going to go from this situation to this situation if we could get Clear Skies passed in this country. This is the President's major initiative in cleaning up the environment in this country. Under Clear Skies, more than 20 million additional people would be breathing air that meets the national standard by 2020.

There is no doubt that we can and should do more to improve our air quality. While bringing counties across the Nation into attainment for the air quality standards, we are going to make some progress. It would be very costly and cumbersome if we do not approach them carefully. The Clear Skies Act will get cleaner air fast-

er and reduce the negative impact of the new standards. We need this legislation to help States and localities deal with these standards. We need this legislation to provide certainty and keep jobs in this country. We need this legislation to dramatically improve our environment. While Clear Skies is needed, the provisions in EPA's implementation rules will have a significant effect.

I look forward to hearing from our witnesses today on how these standards can be implemented in a way that maximizes cleaning up the environment and protecting public health, and minimizes the impact on jobs in other localities and States across this Nation.

I remind my colleagues and the witnesses that this hearing is not about the standards themselves. The battle of standards, folks, is over. Now the question is how do we go about implementing them in the best way possible.

[The prepared statement of Senator Voinovich follows:]

STATEMENT OF HON. GEORGE V. VOINOVICH, U.S. SENATOR FROM
THE STATE OF OHIO

The hearing will come to order. Good morning and thank you all for coming. We are here today to conduct oversight on the implementation of the new air quality standards for particulate matter and ozone.

The Clean Air Act requires EPA to establish National Ambient Air Quality Standards (NAAQS) and assigns primary responsibility to the states to assure compliance with them. The standards are set without consideration of costs to protect public health and welfare with an adequate margin of safety. Areas not meeting the standards are designated as nonattainment and are required to implement specified air pollution control measures.

EPA is required to review the scientific data every 5 years and revise the standards, if appropriate. In 1997, EPA set a new more stringent 8-hour ozone standard and a fine particulate standard—or PM_{2.5}. This year, EPA will finalize designations and implementation rules for both standards.

It is very important for us to put these standards in context. Our air is not getting dirtier. On the contrary, our air is significantly cleaner.

I remember well when the Clean Air Act was enacted in 1970. I was a member of the Ohio House of Representatives and was working on legislation to create the Ohio EPA. Since 1970—while Gross Domestic Product has increased by 164 percent, vehicle miles traveled by 155 percent, energy consumption by 42 percent, and population by 38 percent—emissions of the six criteria plants have been reduced by 48 percent.

This success in improving our environment is simply not told enough, and air quality standards are an important part of this story. Still, we need to do more.

I have been intimately involved with improving air quality throughout my 37-year public career. As Governor, I was very concerned with my responsibilities to the environment and believed strongly that we needed to do a better job in reducing emissions to improve the environment and protect public health. We worked to more than double Ohio EPA's budget from \$69 million in 1991 to \$149 million in 1998.

I am very familiar with the difficult decisions that must be made by a State to bring counties into attainment. When I began my term as Governor, 28 out of Ohio's 88 counties were in non-attainment for ozone. We worked with the state legislature to create a situation where American Electric Power could install scrubbers costing \$616 million dollars to reduce sulfur dioxide emissions at one of the largest coal-fired power plants in the country.

As part of bringing the State into compliance with the NAAQS, we chose to implement an automobile emissions testing program—called E-check—because it made the most sense from a cost-benefit standpoint. This program was not popular and Ohio's General Assembly passed a bill to remove the program. I vetoed this bill because I understood the importance of programs such as this to meet the air quality standards.

Furthermore, we implemented regulations to capture vapors when motorists fuel their cars, required controls on industrial sources, and pushed to get a 15 percent reduction in emissions in each non-attainment area.

Due to the success of these efforts, air toxins in Ohio have been reduced significantly from approximately 381 million pounds in 1987 to 144 million pounds in

1996. Since the 1970's, Ohio levels of carbon monoxide have been reduced by more than 70 percent, sulfur dioxide by 90 percent, lead by 95 percent, and ozone by 27 percent.

While all of Ohio now meets the air quality standards, these improvements have not been without cost. Over the last 10 years, Ohio has spent more on emissions reductions than New York, New Jersey, Massachusetts, Connecticut, Vermont, Rhode Island, Maine, New Hampshire, Maryland, Delaware, and Washington, DC combined.

And the costs of attaining the new air quality standards for particulate matter and ozone will be even more costly. This chart shows all of the counties that were exceeding the new air quality standards over the 2000 to 2002 period. Although you may like the colors, this is not a pretty picture—yellow is for those counties not meeting the ozone standard, orange for PM_{2.5}, and red for both. When surrounding counties are added, the number of non-attainment counties in the country is likely to be over 500 for the 8-hour ozone standard and over 200 for PM_{2.5}.

This is no April Fool's Day joke, these standards are a wet blanket on the Nation. When EPA proposed the new standards in 1997, the Agency estimated that bringing all areas of the country into attainment with the standards by the year 2010 would cost about \$46 billion annually and other analyses claimed significant job losses.

The projected impact of these standards has caused a great deal of concern in non-attainment counties that they will cause the loss of jobs, restrict economic growth, discourage plant location, and encourage manufacturers to move overseas.

As was highlighted last week during the natural gas hearing, our manufacturers and businesses cannot absorb any more costs and still compete globally.

During the 1990's, we were able to bring new businesses to Ohio. For three consecutive years, starting in 1993, Ohio won *Site Selection Magazine's* highly coveted Governor's Cup, which recognizes the state in which the most new or expanded plant activity took place.

While this is the good news, the question is whether we can keep these businesses and attract more? When I look at this chart, I am not so sure. This is a map of the projected non-attainment counties in Ohio. Right now, business owners are looking at this same map and thinking twice about moving operations to or expanding existing plants in Ohio.

Unfortunately, this story gets worse before it gets better. This chart shows all of the different Clean Air Act regulations that states, localities, and businesses are going to have to deal with over the next decade. We are only at the beginning of this uncertain mess.

Additionally, as a result of our courtrooms being cluttered up with lawsuits by environmental and industry groups, we have not made the progress that we could to improve our environment and protect public health.

That is why the Clear Skies Act is so desperately needed. It presents a very clear path forward on where we are going and when, and provides the flexibility needed to get there. It cleans up the regulatory mess, greatly helps States and localities bring counties into attainment, and provides the certainty needed to make significant environmental benefits.

This chart clearly shows the benefit of Clear Skies in terms of meeting the air quality standards. By 2010, EPA estimates that this legislation would bring 42 additional counties with 14 million people into attainment for the PM_{2.5} standards sooner than under existing programs. Under Clear Skies, more than 20 million additional people would be breathing air that meets the national standards by 2020.

There is no doubt that we can and should do more to improve our air quality. While bringing these counties across the Nation into attainment for the air quality standards will make great progress, it could be very costly and cumbersome if we do not approach them carefully. The Clear Skies Act will get clean air faster and reduce the negative impact of the new standards.

We need this legislation to help States and localities deal with these standards. We need this legislation to provide certainty and keep jobs in this country. We need this legislation to dramatically improve our environment.

While Clear Skies is needed, the provisions in EPA's implementation rules will have significant effect. I look forward to hearing from our witnesses today on how these standards can be implemented in a way that maximizes cleaning up the environment and protecting public health and minimizes the impact on states and localities across the Nation.

I remind my colleagues and the witnesses that this hearing is not about the standards themselves. The battle on the standards has already been fought, and we will not be re-litigating them here today. They are what they are and counties across the country will need to meet them.

Thank you.

Senator VOINOVICH. I would now like to call on the chairman of our committee, Senator Inhofe. I am sorry, our Ranking Member is here.

Joe.

**OPENING STATEMENT OF HON. JOSEPH I. LIEBERMAN,
U.S. SENATOR FROM THE STATE OF CONNECTICUT**

Senator LIEBERMAN. Where was I? The air was clean enough for me to know exactly where I was, so I thank you. It is good to be back.

Welcome, Administrator Leavitt.

I was thinking as I was listening to the Chairman's opening statement that in the 15 years I have been privileged to be a member of the U.S. Senate, one of the most productive experiences I have had, which is to say one of the most satisfying that created really good results was the work that was done in 1990 on the Clean Air Act Amendments under former President Bush and Senator George Mitchell, a very bipartisan experience. Contentious, difficult, but ultimately produced real progress. Obviously the proof of a law is in its implementing and I do want to say what Senator Voinovich has said is true, that the air is cleaner today. It is one of the great successes of our government over the last decades. Programs has been made both in clean air and in clean water.

Clearly problems continue to persist as Senator Voinovich has also said. We are going to need exactly the same kind of bipartisan cooperation and leadership that brought forth the Clean Air Act amendments of 1990 to reach the goals and implement the standards that we want. The fact is that thousands of Americans are still dying prematurely because of the impacts of particulate matter. That is an extreme articulation of the statement but all the public health studies show that is true.

I can tell you that in Connecticut, my home State, a recent study found that over 40 percent of the children in Hartford have been diagnosed with asthma which is now a disease that has been linked to air pollution by peer-reviewed studies. It is through the implementation of the Clean Air Act that we are going to continue to do better and better and protect the health of the American people and the beauty of our natural environment.

As has been said, I know the EPA will soon release the color map showing which areas of America do and do not comply with the Clean Air Act and when it does, it is clear that large swathes of our country including I expect the entire State of Connecticut, will be, if I can put it this way, in the black as in polluted, not as in profitable, unfortunately. We have to do better. That says it all.

I want to comment on a few of the challenges ahead of us. First, with regard to NOx and SOx, the Administration's proposed NOx and SOx rules I think are real steps forward. I am troubled, however, about the two-phased implementation, 2010 and 2015. The reason given, which is there are not enough boilermakers to build the pollution control equipment, that seems to be a significant reason given. However, in October 2002, the EPA issued a report saying there were plenty of workers to build the needed equipment and I, therefore, urge the Administrator to talk this morning to that factor.

Another clear and present environmental danger comes from mercury. We have fallen far short in our efforts to limit toxic mercury emissions. This now has been shown to cause developmental problems with children, 1 in 12 women of child-bearing age have shown dangerous levels of mercury in their blood. Public Health agencies in 43 States, as you know, Administrator Leavitt, have issued formal advisories warning people against eating certain kinds of fish because of mercury contamination. In Connecticut, every fish taken from every lake and stream in our State have such a warning attached to them.

Greater mercury reductions are both technologically and I believe politically feasible. In Connecticut, on the last point, legislators on a bipartisan basis worked with industry and environmental groups to agree on a consensus proposal that would result in an 85–90 percent reduction in mercury emissions from all coal plants. Here I am concerned that rather than pushing forward on mercury reductions, the EPA is rolling back and appears to have retreated from its plans to require strict mercury reductions by 2007 and instead proposing a rule that would require no reductions that would not result without the rule until 2018. We can and must do better than that. That is why I was happy to join 44 of my colleagues in a letter that will be released today by Senator Leahy which asks EPA and Administrator Leavitt to withdraw the proposed mercury rule package and repropose a rule that better protects the public health and the environment.

Next, global warming, a third challenge on which I believe we cannot procrastinate. Last week, expert witnesses at a hearing of the Commerce Committee described the devastating effects of global warming on coral reefs, wildlife and arctic animals and tribes. One of the most riveting stories told is that robins have appeared in Native American Alaskan villages, some of the tribes having a history of 10,000 years and their vocabulary has no word for robin because they have never seen one before. So talk about the canary in the coal mine, this is a robin in a normally cold and inhospitable Alaskan village which is a warning to us.

Senator McCain and I have put forth what we believe is a practical progressive program to tackle this threat. Joined this week in the spirit of my opening remarks by 20 members of the House of Representatives, 10 Republicans, 10 Democrats who have introduced similar legislation. It is critically necessary for us to work together to deal with CO₂ emissions.

I have a final concern, Administrator, that I wanted to address to you that I hope you will be able to speak to this morning which is the concern that EPA is thinking of backing off on the court-mandated rule to reduce air pollution that hampers visibility in our parks, called the BART rule for Best Available Retrofit Technology. The rule as you know was required by the 1977 Clean Air Act but it has not been promulgated due to continuous delay in litigation. Here again, there is bipartisan interest in this. A former colleague, Senator Fred Thompson, was particularly active in pursuit of this and I hope you will reassure us that the efforts of EPA to clean up the air around our national parks will continue.

Mr. Administrator, in a speech that I was happy to read and that you recently gave, you observed that no one should see society's in-

terest in environmental improvement as a fad. I agree, you are exactly right. No one should view what people think about and worry about their health and the world that we leave to our children and grandchildren as a fad. That is exactly the policy and political challenge each of us must rise above and beyond party lines to work together to leave our children and grandchildren a world that is as great as the one we found but also as safe for their health.

I thank you for being here today and I look forward to your testimony.

[The prepared statement of Senator Lieberman follows:]

STATEMENT OF HON. JOSEPH I. LIEBERMAN, U.S. SENATOR FROM
THE STATE OF CONNECTICUT

Thank you, Mr. Chairman, and welcome Administrator Leavitt.

Mr. Administrator, one of my best moments since I came to the Senate was the passage of the 1990 Clean Air Act. We worked hard on that bill, during the first Bush administration, to come up with a bill that worked. The test of that bill is now in its implementation.

We need that kind of bipartisan leadership now in tackling our pressing environmental challenges. No area of the environment requires more attention than air pollution. Thousands of Americans are dying prematurely from the impacts of particulate matter released by power plants. In my home state of Connecticut, a recent study found that over 40 percent of children in inner-city Hartford have been diagnosed with asthma a disease that has now been linked to air pollution by peer-reviewed studies.

I am glad the Clean Air Act is at work to require progress on these measures. I am concerned, however, that we are not doing enough, quickly enough. The EPA will soon release the color maps showing which areas do not comply with the Clean Air Act and when it does, I have no doubt that swaths of our country—including the entire State of Connecticut—will be in the black, as in polluted. We must do better.

That Administration's proposed NO_x and SO_x rules are a step forward. But I am concerned about the fact that they would cut emissions in two phases one by 2010, the other by 2015. The reason? Not enough boilermakers to build the pollution control equipment. But in October 2002, the EPA issued a report that there were plenty of workers to build the needed equipment. The phase-in looks more like an unjustified break for polluters than a breakdown in boilermaking.

Another immediate environmental challenge we must confront now is mercury. We have fallen far short in our efforts to limit toxic mercury emissions from power plants. Mercury has been proven to cause development problems with children and 1 in 12 women of childbearing age have shown dangerous levels of mercury in their blood. Public health agencies in 43 states have issued formal advisories warning people against eating certain species of fish because of mercury contamination. In my State of Connecticut, every single lake and stream has such a warning.

Greater mercury reductions are both technologically and politically possible. In Connecticut, legislators worked with industry and environmental groups to agree on a consensus proposal that would result in an 85 to 90 percent reduction in mercury emissions from all coal plants.

But rather than pushing forward on mercury reductions, the EPA is rolling back. It appears to have retreated from its plans to require strict mercury reductions by 2007 and instead has proposed a rule that would require no reductions that would not result without the rule until 2018. We can and must do better. That's why I was proud today to join 44 of my colleagues in asking the EPA to do just that.

Global warming is a third challenge we cannot procrastinate on. Last week, expert witnesses at a hearing Commerce Committee described the devastating effects from global warming on coral reefs, wildlife, and Arctic animals and tribes. Despite the mounting evidence, we are doing next to nothing to reduce our ever-increasing greenhouse gas emissions.

Senator McCain and I have put forth a practical program to tackle this threat. Where there is a will, there is a way. If we work together to address this problem in a serious, bipartisan way, we can send a powerful signal to the Nation's investors and innovators to develop the long-term solution to our global warming problem.

Finally, I am concerned that the EPA is thinking of backing off on the court-mandated rule to reduce air pollution that hampers visibility in parks—called the BART rule for Best Available Retrofit Technology—in order to allow the Administration's

Interstate Air Quality Rule (IAQR) to go forward. The BART rule was required by the 1977 Clean Air Act, but has not been promulgated due to continuous delay and litigation. It is slated to be released on April 15, but I am fearful that they are continuing putting it into repose until after the IAQR is fully implemented in 2018.

Administrator Leavitt, in a speech you recently gave, you observed that no one should see society's interest in environmental improvement as a fad. You are exactly right in that. No one could view what people think about their health and the world they leave their children and grandchildren as a fad. That is the policy and political challenge we must rise to together or we and our children will suffer together. Thank you.

Senator VOINOVICH. Senator Inhofe.

**OPENING STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA**

Senator INHOFE. Thank you, Mr. Chairman. I appreciate your holding this hearing. It is on a topic of great interest to a lot of locations around the country, including my State of Oklahoma.

As an initial observation, I would like to ask your staff to put this up again. I don't think people have really paid attention to what has been happening. Since 1970 up to 2 years ago, the gross domestic product going up 164 percent, vehicle miles traveled, 155 percent, energy consumption \$2 percent, U.S. population increased 38 percent and yet the aggregate emissions down 48 percent. You don't see a success story like that very often. Certainly there are people who talk about that and they should. I think everywhere we go we need to carry that with us and show people that good things are happening, in spite of what they might hear to the contrary.

In the first 2 years of the Bush administration, the two major pollutants declined dramatically. Nitrogen oxide has gone down by 13 percent and sulfur dioxide has gone down by 9 percent. As Senator Lieberman said, the Clear Skies Initiative is the most aggressive reduction mandate in the history of this country of any President. I think people need to realize that.

The reason these areas will be designated non-attainment is that new health standards were developed that require lower ambient concentrations of pollution for public health reasons. Whether someone believes these standards have been set too low or too high is irrelevant for the purpose of this hearing. Unfortunately, many jobs will be lost unnecessarily. Mr. Chairman you have probably been the champion of that concept stating it every opportunity you get.

In the mid-1990's, I pushed for the EPA Administrator to identify and regulate the particles that are most harmful, known as speciation. Yet Administrator Browner utterly failed to take action. The communities across the country will suffer for it. Fewer jobs would be exported overseas if Administrator Browner had focused on harmful pollutants and didn't penalize communities whose emissions may be largely innocuous.

I want to make clear to Administrator Leavitt that I remain committed to correcting this flaw and look forward to EPA addressing it. The simple fact is communities will be required to meet these standards and it is important that they do so with the fewest lost jobs possible. We need to recognize that implementing these standards will cost jobs.

Businesses and areas designated as non-attainment face higher costs simply to do business. As Mr. Fisher noted in his written tes-

timony, obtaining an air permit in a non-attainment area is so complex, businesses are advised to hire consultants. That may be easy for some of the large corporations, but it is very difficult, if not impossible, for some of the smaller businesses to do.

With restrictions on existing businesses and extra burdens new manufacturers would face, these new standards could be a significant factor in whether these areas continue to grow and could even result in jobs exported overseas. It is for this reason that these standards be implemented in a rational way. It is critical that areas be given flexibility to meet the standard and that the implementation be coordinated with the expected benefits from other regulatory measures. In that vein, it is critical that designates properly account for the areas of the country that entered into early action compacts to meet their clean air requirements and thus ensure the implementation of standards and avoids yet again introducing uncertainty into the planning process and unnecessary costs.

I want to comment to the EPA in its proposal for trying to build in some flexibility. We need the flexibility and it is directly related to jobs.

Let me make one comment about my distinguished colleague, Senator Lieberman's comments on global warming. The first thing that I said over a year ago when I became Chairman of this committee was the one thing I wanted was to base our decisions on sound science. At that time, people were thinking that there was no science that would contradict this whole concept of global warming. However, since 1999, virtually every new scientific finding has refuted the whole concept, No. 1, that androgenic or man-made gases either CO₂, methane, cause climate change and No. 2, that it is changing at all. It is not just me saying this. Certainly I am not anymore qualified than anyone else at this table to make these judgments. We have to rely on the scientists and when you read the accord signed by some 4,000 scientists that refuted this, you had to stop and think. Look at the economic consequences should we adopt something such as signing onto a Kyoto-like treaty when the Horton Econometrics Survey said if we did this, it would cost 1.4 million jobs, it would double the cost of energy, it would increase your gasoline by 65 cents a gallon, it would cost the average family of ours \$2,700 a year. That is huge, Mr. Chairman. I think before jumping into something that is not scientifically based, we need to keep in mind that our job is to use good science and to consider all the factors and not just follow some fad, and that is exactly what we have been doing.

I look forward to your testimony, Administrator Leavitt and forward to pursuing this subject.

Senator VOINOVICH. Thank you, Mr. Chairman.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM
THE STATE OF OKLAHOMA

Thank you Mr. Chairman, for holding this hearing on a topic of great interest to a great many localities across the Nation. A great number of communities that have been fully in compliance with the Clean Air Act are soon to be designated as being in nonattainment with the new, far more stringent standards being implemented.

As an initial observation, I want to reassure the public that this does not mean our nation's air quality is deteriorating. In fact, the opposite is occurring. As this chart shows, from 1970 to 2002, our Gross Domestic Product and vehicle miles traveled both more than tripled and energy consumption and population increased about 40 percent, yet the pollution in this country was literally cut in half. And that improvement has continued under the helm of President Bush although national environmental groups rarely admit this inconvenient fact.

In the first 2 years of President Bush's first term, the two most major pollutants declined dramatically, with nitrogen oxides going down by 13 percent and sulfur dioxide going down by 9 percent—and I suspect that when the data is compiled, they will show further declines last year. And President Bush has proposed legislation that will reduce the utility sector's emissions of these pollutants by another 70 percent, the biggest emission reduction initiative ever proposed by an American President.

The reason these areas will be designated nonattainment is that new health standards were developed that require lower ambient concentrations of pollution for public health reasons. Whether someone believes these standards have been set too low or too high is irrelevant for purposes of this hearing.

Unfortunately, many of these jobs will be lost unnecessarily. In the mid-90's, I pushed then-EPA Administrator to identify and regulate the particles that are the most harmful—known as speciation. Yet Browner utterly failed to take action. And the communities across the country will suffer for it. Fewer jobs would be exported overseas if Browner had focused on harmful particulates and didn't penalize communities whose emissions may be largely innocuous. I want to make clear to Administrator Leavitt that I remain committed to correcting this flaw and expect EPA to revise its standards to target harmful particles.

The simple fact is that communities will be required to meet these standards and it is important that they do so with the fewest lost jobs possible. And we need to recognize that implementing these standards will cost jobs. Businesses in areas designated as nonattainment face higher costs simply to do business. As Mr. Fisher noted in his written testimony, obtaining an air permit in a nonattainment area is so complex, businesses are advised to hire consultants. That may be business as usual for a large company, but it's a luxury many small businesses simply cannot afford.

With restrictions on existing businesses and the extra burdens new manufacturers would face, these new standards could be a significant factor in whether these areas continue to grow. And could even result in jobs exported overseas.

It is for this reason that these standards be implemented in a rational way. It is critical that areas be given flexibility to meet the standard and that the implementation be coordinated with the expected benefits from other regulatory measures. In that vein, it is critical the designations properly account for the areas of the country that entered into early action compacts to meet their clean air requirements and thus ensure the implementation of the standards avoids yet again introducing uncertainty into the planning process and unnecessary costs.

I want to commend EPA in its proposal for trying to build in some flexibility into the way the Act is implemented regarding general non-attainment requirements versus more prescriptive measures.

I look forward to your testimony, Administrator Leavitt.

Senator VOINOVICH. Senator Jeffords.

**OPENING STATEMENT OF HON. JAMES M. JEFFORDS,
U.S. SENATOR FROM THE STATE OF VERMONT**

Senator JEFFORDS. Thank you, Mr. Chairman.

This hearing is very important and timely. The implementation of our Nation's ambient air quality standards of NAAQS and the Clean Air Act in general is a matter of life and death. Approximately 70,000 Americans die prematurely every year as a result of air pollution according to researchers at Harvard University. The main cause of these deaths is fine particulate matter, also known as PM_{2.5}. The bulk of this pollution comes from power plants, diesel fuel combustion and elsewhere. Ozone is a serious lung irritant that can trigger asthma or even cause it and has recently been linked to birth defects.

If the country was achieving the 8-hour ozone standard, we could prevent nearly 400,000 asthma attacks, 5,000 hospital admissions and about 600,000 lost school days each year. Unfortunately, the trend on ozone pollution has been going the wrong way for the last few years according to EPA's 2002 Trends report. Concentrations will increase as population grows and the average temperature rises, and 200 million Americans have an increased risk of cancer, reproductive dysfunction, developmental problems and other health effects do to air toxics exposure.

What has the Administration's response been to these troubling facts? To issue rules to guide the new source review, NSR Program, so that large polluting sources could be exempt from applying modern pollution controls permanently. This exemption would condemn thousands of people to earlier death every year in delayed attainment, to halt or slow down investigations in the enforcement of NSR requirements, not to mention obstructing congressional oversight, to propose power plant reductions that are too little and too late to help areas achieve attainment of the standards or to obtain quick recovery of ecosystems sensitive to acid rain, to delay non-attainment designations, to delay revisions to the air quality standards that would be more health protective, and to propose to violate a settlement agreement and defer any mercury reductions for at least 10 years longer than the law provides, unnecessarily exposing more than 600,000 women and children to health risks, further to pretend that man-made carbon dioxide emissions are not having an impact on the global climate system, to issue all sorts of environmental rules without an adequate consideration of the risk, benefits and costs associated with them. All of this adds up to more disease, damage and death due to closed door policymaking, and coincidentally, more profits for polluters. This Administration has a growing credibility gap, maybe even a credibility chasm on air pollution policy.

I am hopeful that Mr. Leavitt will have more luck than his predecessor in rebuilding trust with Congress and with the public but I am doubtful because of the White House influence. How could the Administrator build trust? To start, withdraw the mercury proposal as I and 44 other Senators are requesting today. Stop the filibustering of the PM_{2.5} review. Work constructively with Congress to get a four pollutant bill sooner rather than later. Add one new dangerous chemical to the list of hazardous air pollutant for the first time. Give Congress and this committee access to the documents on decisionmaking that we have requested. Do the analysis that the EPA promised on a wide range of mercury standards. Request an Inspector General investigation of industry memoranda in EPA's mercury rule. These things would be a start.

The Administration could also make sure that the ozone implementation rule does not add delay on top of the 7 years of delay we have already had. That delay has caused the people health train wreck because more stringent standards are needed now based on current scientific findings. Even this scientific standard review process has been delayed by those less interested in protecting public health.

I ask that a brief history of the delays in the review process and some studies from 2003 be placed in the record.

Senator VOINOVICH. Is there objection?

[No response.]

Senator VOINOVICH. Without objection.

HISTORY OF THE DELAYS—MILESTONES IN THE PARTICULATE MATTER AND OZONE
NAAQS REVIEWS

PARTICULATE MATTER (PM)

July 1997—Presidential memo directing completion of review within 5 years, by 2002

October 1997—FR Notice of Laying out Schedule for Review

February 1998—Draft PM CD Development Plan for CASAC Review

April 1998—FR Notice—Initial call for information

May 1998—CASAC meeting to review Development Plan

Summer 1998—NCEA began drafting chapters of CD

August 1998—Revised Schedule for Development of PM Workshop Draft Chapters

April 1999—Peer Review Workshop to discuss draft chapters of CD

May 1999—Request for recently published papers and manuscripts

October 1999—1st External Review Draft of CD

November 1999—OAQPS Development Plan for SP

December 1999—CASAC and public review of 1st Draft CD and Development Plan

September 2000—Original target date for completion of CD

March 2001—2d External Review Draft of CD

April 2001—Five years from completion of 1996 CD

June 2001—Preliminary Draft SP and RA Scoping Plan

July 2001—CASAC and public review of Second Draft CD, SP, and RA Scoping Plan

January 2002—Proposed Methodology for RA

February 2002—CASAC consultation on RA methodology

April 2002—3d External Review Draft of CD

May 2002—CASAC teleconference on RA methodology

July 2002—Five years from promulgation of 1997 NAAQS

July 2002—CASAC and public review of 3d Draft CD

November 2002—EPA workshop on statistical issues

December 2002—Health and environmental groups file 60-day notice

March 2003—Health and environmental groups file complaint in U.S. District Court

April 2003—Preliminary Draft Methodology for coarse particle RA

May 2003—CASAC consultation on coarse particle RA

May 2003—HEI Report on Reanalyzed Time-Series Studies

June 2003—4th External Review Draft of CD

July 2003—Consent Decree with Schedule for Review Filed in U.S. District Court

August 2003—CASAC and public review of 4th draft CD

August 2003—Draft OAQPS SP and RA

October 2003—CASAC teleconference to review framework for new 4th draft Chapter 9

November 2003—CASAC meeting to review 1st Draft SP

December 2003—First extension of Consent Decree filed in U.S. District Court

December 2003—5th Draft of CD Chapters 7 and 8

February 2004—CASAC teleconference to review 5th draft Chapters 7 and 8

February 2004—EPA initiates discussion of second extension to Consent Decree

OZONE

April 2001—Five years from completion of 1996 CD

July 2002—Five years from promulgation of 1997 NAAQS

November 2002—Draft Ozone CD Development Plan released for public comment

December 2002—Health and Environmental Groups file 60-day notice

February 2003—CASAC Teleconference to review CD Development Plan

March 2003—Health and Environmental Groups file Complaint in U.S. District Court

July 2003—Consent Decree with Schedule for Review Filed in U.S. District Court

October 2003—Peer Review Workshop to review draft chapters 2,3,5,6 of the CD

Note: CD = Criteria Document, SP= Staff Paper, RA= Risk Analysis

Senator JEFFORDS. Unfortunately the current version of the draft final rule to implement the 8-hour ozone standard is flawed, incomplete and late. The PM_{2.5} rule is late too. There are problems with revoking the 1-hour ozone standard. The new classification scheme should not be used to grant inappropriate extensions of attainment deadlines, especially if that would be unfair to areas that have attained.

I know my expectations are high but when life is in the balance, we can and must do better. I urge the Administration and the Administrator to bridge the chasm that currently looms and exists. By doing some of the things I have suggested and working with us in Congress, there might be a chance of rebuilding the trust and credibility that we must have in your office. That would go a long way to really make our air cleaner and our people healthier.

Thank you, Mr. Chairman.

Senator VOINOVICH. Thank you.

[The prepared statement of Senator Jeffords follows:]

STATEMENT OF HON. JAMES M. JEFFORDS, U.S. SENATOR FROM
THE STATE OF VERMONT

This hearing is very important and timely. The implementation of our nation's ambient air quality standards (or NAAQS), and the Clean Air Act in general, is a matter of life and death. Approximately 70,000 Americans die prematurely every year as a result of air pollution, according to researchers at Harvard University.

The main cause of these deaths is fine particulate matter, also known as PM_{2.5}. The bulk of this pollution comes from power plants, diesel fuel combustion and elsewhere.

Ozone is a serious lung irritant that can trigger asthma or even cause it, and has recently been linked to birth defects. If the country was achieving the 8-hour ozone standard, we could prevent nearly 400,000 asthma attacks, 5,000 hospital admissions and about 600,000 lost school days every year. Unfortunately, the trend on ozone pollution has been going the wrong way for the last few years, according to EPA's 2002 Trends Report.

Concentrations will increase as population grows and the average temperature rises. And, 200 million Americans have an increased risk of cancer, reproductive dysfunction, developmental problems, and other health effects due to air toxics exposure.

What has this Administration's response been to these and other troubling facts?

To issue rules to gut the New Source Review (NSR) program so that large polluting sources could be exempt from applying modern pollution controls permanently. This exemption would condemn thousands of people to an earlier death every year and delays attainment.

To halt or slow-walk investigations and the enforcement of NSR requirements, not to mention obstructing congressional oversight.

To propose power plant reductions that are too little and too late to help areas achieve attainment of the standards, or obtain quick recovery of ecosystems sensitive to acid rain.

To delay non-attainment designations.

To delay revisions to the air quality standards that would be more health protective.

To propose to violate a settlement agreement and defer any mercury reductions for at least 10 years longer than the law provides, unnecessarily exposing more than 600,000 women and children to health risks.

To pretend that man-made carbon dioxide emissions are not having an impact on the global climate system.

To issue all sorts of environmental rules without an adequate consideration of the risks, benefits and costs associated with them.

All of this adds up to more disease, damage and death, due to closed-door policy-making. And, coincidentally, more profits for polluters.

This Administration has a growing credibility gap, maybe even a credibility chasm on air pollution policy. I am hopeful that Mr. Leavitt will have more luck than his predecessor in rebuilding trust with Congress and with the public, but I am doubtful because of White House influence.

How could the Administrator build trust? To start:

Withdraw the mercury proposal, as I and 44 other Senators are requesting today.
Stop the filibustering of the PM_{2.5} review.

Work constructively with Congress to get a 4-pollutant bill, sooner rather than later.

Add one new dangerous chemical to the list of hazardous air pollutants, for the first time.

Give Congress and this Committee access to the documents on decisionmaking that we have requested.

Do the analysis that EPA promised on a wide-range of mercury MACT standards.

Request an Inspector General investigation of industry memoranda in EPA's mercury rule.

The Administration could also make sure that the ozone implementation rule does not add delay on top of the 7 years of delay that we have already had. That delay has caused a public health train wreck, because more stringent standards are needed now based on current scientific findings. Even this scientific standard review process has been delayed by those less interested in protecting public health.

I ask that a brief history of the delays in the review process and a list of some of relevant health studies from 2003 be placed in the record.

Unfortunately, the current version of the draft final rule to implement the 8-hour ozone standard is flawed, incomplete and late. The PM_{2.5} rule is late too. There are problems with revoking the 1-hour ozone standard. The new classification scheme should not be used to grant inappropriate extensions of attainment deadlines, especially if that would be unfair to areas that have attained.

I know that my expectations are high. But, when life is in the balance, we can and must do better. I urge the Administration and the Administrator to bridge the chasm that currently looms. By doing some of the things that I have suggested and working with us in Congress, there might be a chance of rebuilding trust and credibility.

That would go a long way to really making our air cleaner and our people healthier.

Thank you.

Senator INHOFE. Could I be recognized for a UC, a unanimous consent request? Mr. Chairman, I ask unanimous consent that we put in the record at this point a statement by Mr. Robert Stec, the Chairman and CEO, of the Lexicon Home Brands. He has actually put together a study on the number of manufacturing jobs that have gone overseas. I think this should be in the record.

Senator VOINOVICH. Without objection.

[The referenced document referred to may be found on page 206.]

Senator VOINOVICH. Administrator Leavitt, thank you for being here today. We look forward to your testimony.

**STATEMENT OF MICHAEL O. LEAVITT, ADMINISTRATOR,
ENVIRONMENTAL PROTECTION AGENCY**

Mr. LEAVITT. Mr. Chairman and Members, that chart is good news. It is good news for all Americans. Today, my purpose is to talk about our national strategy to take clean air to the next level. I will be introducing a strategy that will provide for the most productive period of air quality improvement in our Nation's history, a strategy that is not simply taking our previous experience for granted but is accelerating the velocity of our progress and will do so in a way that will protect our economic competitiveness.

I will talk today about four parts of that strategy. The first will be the Clean Air Ozone and Fine Particle Rule of 2004 which will be issued on April 15. Through that rule we will designate as prescribed in the Clean Air Act, the areas of this country that have not achieved attainment in meeting our new and more protective standard. Those designations have come after long discussions with

State and local officials working to meet the unique needs of each of the metropolitan areas involved.

The second will be to provide for a series of national tools that will be available for the purpose of each State meeting its Clean Air obligations. It is impossible for States to meet needs when there is interstate transport of pollution that they don't control. The same can be said with mobile sources. Today we will talk some about the Clean Air Interstate Rule of 2004 which will reduce the major pollutants of NOx and SOx by some 70 percent over the course of the next 15 years that will result in some \$50 billion being spent putting new equipment on old power plants that will provide for the highest amount of pollution being reduced in the least amount of time in our history.

We will also talk about the Clean Air Diesel Rule which will be promulgated by the end of this month. It will remove forever that black puff of diesel smoke that we have become accustomed to seeing from on-road vehicles and construction equipment. It will be something the next generation will never know and will contribute substantially to the length and quality of the lives of the people in this country. That is the second phase, the series of national tools that we are providing.

The third portion of the plan will be development of State implementation plans. Each State will come up with a plan that, when the national tools have been applied, will take care of the remainder. They will have 3 years to do that.

Last, the success period when we go into attainment. By 2015, I am happy to say that every Senator who sits at this table will find their areas for the most part in attainment. Oklahoma will be in attainment. Ohio, for example, will have gone from 30 counties not in attainment to 0.

Delaware will have gone from 3 counties in non-attainment to 0. Vermont has the good fortune of starting with none out of attainment but they will still be in attainment. Connecticut, you indicated most of the State will unfortunately be in non-attainment but only 3 counties will remain by 2015. That is good news, the most productive period of air quality improvement in our Nation's history.

With that, Mr. Chairman, I am looking forward to interacting with members of the committee. This process of going through designations of these ozone areas is not easy. Some parts of this as prescribed by the Clean Air Act are strong medicine, but necessary. It is a national prescription that Congress concluded we should move forward on. It will protect the health of our citizens. Without it, people will have shorter lives and not live as well, so this is an important undertaking. I look forward to our discussion.

Senator VOINOVICH. Thank you, Administrator.

Senator Carper, you weren't able to make your opening statement and I turned over your proxy to Senator Lieberman, but since you have recaptured the ranking membership, would you like to proceed with an opening statement?

**OPENING STATEMENT OF HON. THOMAS R. CARPER,
U.S. SENATOR FROM THE STATE OF DELAWARE**

Senator CARPER. I think I would. I just want to say to our friend and former colleague, Governor Leavitt, welcome. We are always pleased to have you here.

I am going to ask unanimous consent that my statement be entered for the record. I will just make a quick comment if I can.

You mentioned Delaware has three counties, the northern county, New Castle County where about two-thirds of our people live, Kent County in the central part of our State, the home of Dover Air Force Base and our State Capital; and the southern part of our State which is probably best known for our beaches, Bethany, Rehoboth and Dewey. We have a problem with non-attainment in a couple of those counties, we have a problem with non-attainment in our State.

I never liked it as Governor when I was faced with the threat of loss of transportation money for clean air sins that frankly were not entirely of our making. My fear is that given the rule you may be anticipating implementing, to pass Clear Skies we will still end up in 2015—Delaware is going to be in attainment, but a number of the counties around us—we are a little State surrounded by New Jersey to the east and Pennsylvania to the north and Maryland to the west and we have a number of counties around us that will still be in non-attainment in 2015. That is just not acceptable. I am pleased we are going to be making progress but we want to see more progress being made around us.

The longer we go in time the more we learn about the effects on public health, our health, from the stuff we are putting into the air. We will have a witness later today who is going to speak to that more directly. I am just troubled that while we seem to be making some progress, we are not making enough. In fact, we are not making it as quickly as I would like.

Having said that, welcome.

Senator VOINOVICH. Thank you, Senator Carper.

[The prepared statement of Senator Carper follows:]

STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM
THE STATE OF DELAWARE

Governor Leavitt, good to see you again.

I am looking forward to this morning's hearing. The clean air challenges my State of Delaware faces today, and will face in the years ahead, require the assistance of the Federal Government to solve. I am encouraged that the EPA is moving forward on implementing measures to address clean air issues. I am interested to learn how the EPA envisions states will achieve clean air and meet the National Ambient Air Quality Standards.

I recognize that achieving clean air across the country is a difficult task, and I do not pretend to understand all of the history of the Clean Air Act or the details of its voluminous set of regulations. However, I have a good enough understanding of the situation to see that Delaware's air quality will continue to be worse than what it should be for many years to come. And that is not acceptable to me, nor should it be to the EPA.

Delaware has three counties: New Castle, where 75 percent of the population lives and which is bisected by I-95. Kent, which houses the state capital, Dover, and the Dover Air Force Base. And Sussex, home to the Delaware beach towns of Rehoboth, Dewey, and Bethany and booming destination for retirees and second homes.

We expect that the entire State of Delaware will be designated as non-attainment for Ozone, and New Castle County will also be in non-attainment for PM_{2.5}. The State will continue to take steps to reduce ozone and fine particulate matter, but

there is only so much a little State like Delaware can do by itself to come into attainment. An important question is what will the EPA do to help us if much of the offending air comes from outside of the State?

We will hear from our witnesses today, including Mr. George Thurston, of the impacts ozone and fine particles have on humans. We are in agreement that more needs to be done to protect public health from these harmful pollutants. And we are likely also in agreement that 10 years from now, as the science and our understanding advance, we may find that we need to make even larger reductions.

But today, we should focus upon what states like Delaware are doing, and will do to meet the standards that EPA has proposed.

I see three major issues before us.

First, the agency is moving from the current ozone standard to a new, supposedly better standard that is designed to be more protective of public health. At some point, the old ozone standard will probably need to be removed so that the newer standard can take its place. I am interested in how the states will handle this transition, and if making the transition will delay progress toward cleaner air.

Second, I am interested to know if the Interstate Air Quality Rule—the plan the EPA is developing to achieve cleaner air—will actually result in counties like New Castle County Delaware being able to achieve the clean air standards? I believe that the modeling for the Interstate Air Quality Rule predicts that in 2015, 26 eastern U.S. counties will *STILL* fail to meet the new ozone standard. Further, 13 eastern counties are predicted to fail to meet the particulate matter standard. A number of these counties are in New Jersey, Pennsylvania, and Maryland—not too far from Delaware. So even if Delaware is able to meet the clean air standards, we will continue to be at the mercy of the winds blowing from outside the State that can carry dirty air across our border.

And finally, I am interested to learn if the standards that are being established, for both ozone and for particulate matter, are being set at the proper level. Our knowledge of the science behind public health increases each year, and we are learning more about the impacts of various pollutants on humans. I understand that the EPA is currently reviewing the particulate matter standard and could suggest an even tighter standard in the near future. If that is the case, we need to be confident that we are going to achieve at least the current standard, and possibly be able to go even further if the standard is revised.

If proposals such as the EPA's Interstate Air Quality Rule, or the Administration's Clear Skies Initiative are insufficient to meet the clean air standards we are discussing today, what would we do if even tighter standards are proposed. Today's hearing is not about multi-pollutant proposals, but we should come back later and consider the merits of the clean air proposal I have introduced—The Clean Air Planning Act. I am interested in discussing how that bill, by reducing power plant emissions of SOx and NOx, could be an additional tool to help States achieve cleaner air.

In closing, I am pleased that the EPA continues to work on ways to make the air cleaner. I know we have come a long way, and I appreciate that. I also appreciate that we have a significant amount of work ahead of us. Lets get started.

Mr. Chairman, thank you.

Senator VOINOVICH. I would like to start with a real practical point of view with my questioning. I have a letter from the Ohio EPA sent to Region V about Knox County, OH. I ask that it be inserted in the record.

OHIO EPA,
Columbus, OH, March 29, 2004.

Mr. THOMAS V. SKINNER, *Regional Administrator,*
U.S. EPA, *Region V,*
77 West Jackson Blvd.,
Chicago, IL.

Re: Knox County 8-hour Ozone Recommendation

Dear MR. SKINNER: I am writing to revise the recommendation for the nonattainment designation of the 8-hour ozone standard in the Columbus Metropolitan Statistical Area (MSA). Knox County was included as part of the Columbus MSA due to a monitored violation at the Centerburg monitor. This monitor is located in the extreme southwestern corner of the county in Hilliar Township. See enclosed map. Hilliar Township is located adjacent to the recommended nonattainment counties of Delaware and Licking. We do not believe that the ozone data from this monitor are

representative of the entire county but are, instead, an indication of the outer reaches of the impact of the Columbus MSA.

Knox County is a rural, agricultural county with a total population of 55,000. There are only two Title V facilities in the entire county, neither of which emit over one ton of either volatile organic compounds (VOCs) or nitrogen oxides (NOx). Based on the geographic location of the monitor and the lack of any significant sources of emissions in the county, it is apparent that any control strategy that will bring the Centerburg monitor into attainment must be directed to sources outside of Knox County.

We, therefore, are amending our July 15, 2003 recommendation to only include Hilliar Township as the portion of Knox County that should be included in the non-attainment designation of the 8-hour ozone standard.

Thank you for your consideration of this request. If you have any questions concerning this request, please feel free to contact me at 614-644-2782.

Sincerely,

CHRISTOPHER JONES,
Director.

Senator VOINOVICH. You don't have to go into the specifics but I am interested in the process of making non-attainment designations because it involves the Federal, State and local levels of government. I just get letters and letters, am I in or am I out, and many of them don't want to be in and there is a lot of debate going on in the States because there are a lot of counties that feel if they are in, it is going to have a negative impact on their economic development plans. I just wonder what are you doing to reconcile this. I know you have pressure on you from environmental groups who say they should be in, so how is this being handled?

Mr. LEAVITT. I would like to describe the full process to you and your colleagues. The Clean Air Act and subsequent consent decrees require the Administrator of the EPA to designate all parts of the United States as to their attainment or their non-attainment. In my role, I will be required to essentially create metropolitan areas that are consistent and we can say they are in non-attainment, so I will by rule, on April 15, meet that deadline and designate some 500-plus counties that are not in attainment.

The law requires that those who are not in attainment are so because they have not met the standard or they contribute to those areas that do not meet the standard. We have used a collaborative process with the States to determine an 11 part test that could be applied to each of the areas. The States were then asked to make suggestions or to make recommendations as to the counties or to the groupings of counties that should be considered in non-attainment. They made their recommendations. The EPA then had a period to analyze the recommendations and to either add or take away from their suggestions and we are now in the process of discussing between State and local government what those actual designations will be. That is the rule that will be finalized on April 15.

It has been a matter of a great deal of discussion. Some of the areas are very clear cut, some of them are not. We are working hard.

Senator VOINOVICH. Is the EPA going to make the final determination?

Mr. LEAVITT. The decision will be made on April 15.

Senator VOINOVICH. The EPA is going to reconcile if there is a difference in the State, you are going to come in and say, "We are the referee and we are going to call this one?"

Mr. LEAVITT. That is the obligation given the Administrator under the law.

Senator VOINOVICH. Look in the television and replay the play and then say this is the way it is going to be?

Mr. LEAVITT. That is the obligation I have, and I will meet that obligation.

Senator VOINOVICH. You stated in your testimony that you prefer that Congress pass the President's Clear Skies Act. You have issued some new regulations to try and compensate for the fact that we have not done anything in the area of Clear Skies. Why is it that you prefer Clear Skies to the present situation? You put that chart up here, the complex situation that my State is confronted with today and our local communities.

Mr. LEAVITT. Senator, may I suggest that one of the great pieces of environmental legislation that has passed in this country is the Clean Air Act. However, it is not without complexity and nearly all of those things you see on there are a reflection of the four corners of the Clean Air Act. It is complex but we are having success.

Senator VOINOVICH. The question is, in terms of preference, in terms of implementing the ozone and particulate rules, why is it that we'd be better off with Clear Skies than with this chart here with all these 'if', 'and', 'whereas' and 'but fors'?

Mr. LEAVITT. I became Administrator of the Environmental Protection Agency on November 6. Among my first duties was to send to 31 Governors a letter indicating that large portions of their States, or in the case of Connecticut, the entire State, would be found in non-attainment. Having just completed 11 years as Governor, I knew full well what those letters meant. I knew it would have economic consequences, I knew it would have health consequences and that the Governors would be deeply concerned and would need to have tools.

I also knew that there were many of my former colleagues who felt as if they were to take all the cars off the highways, cleanup the power plants in their areas, and close some factories, they still wouldn't be in compliance because of the problem of transport from one area to another and because of the capacity of mobile sources to move around, and that it was fundamentally unfair for me to send those letters saying you are going to be found in non-attainment without providing the tools that would have been provided under the Clear Skies legislation.

Therefore, I made the decision to move forward with what will be know as the Clean Air Rules of 2004, one of them being the Interstate Transport Rule. That is the rule that will reduce NOx and SOx by 70 percent and will require all power plants nationwide to invest in essence \$50 billion to put new equipment on old power plants.

To answer your question directly, the reason we needed these regulations is because the legislation hadn't passed and in order get into attainment, in order to make that clean map become a reality, these rules have to be in place or some tool for Governors and local communities to respond in the areas of interstate transport and mobile sources.

Senator VOINOVICH. The only thing I would say is from what I understand from the National Governors Association and from

State and local governments, they would prefer to have this in the law as prescribed in Clear Skies rather than buy rules because rules are subject to lots of controversy.

Mr. LEAVITT. Senator, could I echo that point? It is clear that the preferred way of resolving this would be with legislation. We support it, we want to move it forward and hope that can occur. There is I would say a 100 percent probability that these rules will be challenged in litigation by someone on perhaps many sides of the issue and it will take us time to work through that. Regrettably that has become a ritual of environmental action, but the States and local communities have to have these tools or they simply can't work their way through these non-attainment designations.

Senator VOINOVICH. Senator Jeffords.

Senator JEFFORDS. Is what you are saying is that the present rules are too strict?

Mr. LEAVITT. No. I am saying we need tools in order to resolve them. A good example is that many of the States in Senator Lieberman's neighborhood could take all the cars off their roads, they could close their factories and cleanup their power plants and still not be in attainment under this new, more protective standard that we support. They need to have a national approach on power plants and a national approach on mobile emissions. We will be proposing national tools that will, by their implementation, allow nearly every metropolitan area in this country to come into compliance and attainment and meet the standards I know you so much want to have met.

Senator JEFFORDS. Isn't it correct that the existing laws are stricter than Clear Skies?

Mr. LEAVITT. That would not be a true statement, in my judgment, Senator. We are moving from a 1-hour ozone standard to an 8-hour averaging measure. We are going in particulate matter down to particles 2.5 microns and smaller. Those are higher standards of health, they are more rigid and stringent standards and are more protective standards, and we support them.

Senator JEFFORDS. Thank you.

Senator VOINOVICH. Senator Lieberman.

Senator LIEBERMAN. Thanks, Mr. Chairman.

Administrator Leavitt, let me go to the comment I made in my opening statement about the NOx and SOx rule you propose which as I said I think represents a step forward but I am concerned about the two stages, the phasing in, and you have justified those two stages by stating there is not a sufficient labor force to install the pollution control equipment by 2010. However, as I indicated, an October 2002 report which is printed in the docket on that matter, it seems to say just the opposite, which is that there is sufficient work force, certainly at least as of that time.

I wanted to ask you, if it is established that the work force is there to make the tighter reductions by 2010, will you change the proposed rule to eliminate or at least significantly alter the dates of the phasing in?

Mr. LEAVITT. Senator, our industry survey that was done prior to the proposed rule being made, indicated that the Boilermakers Union did have significant recruitment and training problems through 2010. We are soliciting comment currently on this rule and

we will be making a reassessment based on the information we receive before we complete the rulemaking.

I will say that we are proposing a rule that will be the single largest investment in air quality improvement in this Nation's history. Over the course when it is fully implemented, \$50 billion will have been invested by the American people and it will result in more pollution being reduced in a faster time than in any period in our history, and we will be using the same strategy that was so successful with our acid rain success in the mid-1990's. What we find is that those power plants that have the most to reduce will do so the fastest and will do the most because of the market pressures. It is part of what I like to refer to at the EPA as the better way. We have picked the low hanging fruit in many cases, this is about getting to the more difficult reach and that is what this rule will imply.

Senator LIEBERMAN. As I said, I appreciate the positive change the rule will bring. I take it that what you have just said is that if there is further indication that the work force is capable of implementing the rule or rapidly that you would reassess and consider altering the phases?

Mr. LEAVITT. We are using a cap and trade strategy that provides incentives for people to accelerate. We will propose a glide pattern that will get us to the 70 percent reduction. The market will drive it just as it did with acid rain.

Senator LIEBERMAN. Incidentally, there is a good point made here which is that environmental protection is a job creator. It is an interesting comment that the judgment is that there may not be enough people in the particular field of endeavor to implement the rule as quickly as you or I might otherwise like to implement it. Maybe anybody thinking about what to do ought to think about going into this field. It sounds like it is going to be a profitable field for a period of years as a result of the rule you are contemplating.

Let me go to the other area I mentioned which is the national parks. It is my understanding that several of our national parks will have to be classified as non-attainment areas under the new 8-hour ozone regulations. That concerns me greatly as it does a lot of Americans, both because of the beauty of our natural resources and national parks but also because millions of Americans visit those parks every year and ozone is, as Senator Jeffords' statistics indicated, a significant health risk. So I think it is in all of our interest to work to bring the national parks, particularly into compliance.

I understand you will be releasing the EPA's proposed BART rules for haze reduction a little bit later this month. I wanted to ask you how many of our national parks do you believe will fail to meet the safety requirements of the 8-hour ozone standard?

Mr. LEAVITT. I will have to answer on the record with respect to the specific number. I don't know the answer to that sitting at this table. I will indicate to you that we are committed to improving visibility in our national parks. A very significant experience in my life was co-chairing the Grand Canyon Visibility Transport Commission, which I believe was among the pivotal points in our national strategy. It ultimately resulted in the Western Regional Air Partnership, which is not just changing the way the West solves

environmental problems but providing new collaborative tools across the country as an example.

We do plan to propose the best available retrofit technology provisions later this month. It is in response to a court remand. We intend to issue a rule that will contribute to visibility improvement and do it in a significant way.

Senator LIEBERMAN. Will the new BART rules bring our national parks into attainment within the 8-hour ozone standard?

Mr. LEAVITT. In time.

Senator LIEBERMAN. Details to follow?

Mr. LEAVITT. Details to follow.

Senator LIEBERMAN. There is some concern that you are considering putting the Bart rules into repose until 2018 on the theory that the Interstate Air Quality Rule will be good enough. Can you reassure us that is not your intention?

Mr. LEAVITT. Consulting with my colleague, we are currently engaged in a broad discussion and what we do will, in fact, meet the provisions of the law. I am not in a position at this point because we are in the rulemaking process. As we get further along I would be happy to give you a direct individual report.

Senator LIEBERMAN. I understand. I would close with an appeal that to put the BART rules in a repose on the theory that the Interstate Air Quality Rule is good enough, is in my opinion not the way to go and it doesn't make sense. The IAQR rules control different pollutants for different purposes and move to different standards and are not a substitute for the BART rule. I hope that after all these years and all the court battles and now the staff time to finalize the proposed BART rules by April that you will not take action that will not effectively delay them and the cleanup of air quality at our national parks for another 14 years.

I look forward to your statements on this in the next couple of weeks.

Mr. LEAVITT. Thank you. We will get back for the record on the matters I was not able to respond to.

Senator LIEBERMAN. Thank you.

Senator VOINOVICH. Senator Carper.

Senator CARPER. When I leave here today, I just want to have a better understanding of where we are in the process, first of all with the ozone standard, and second, with the particulate standard. Explain to me again where are we in the process with respect to an ozone standard and are we looking at tightening it further?

Mr. LEAVITT. In 1997, it was the opinion of the Environmental Protection Agency that the standard should be changed from a 1-hour standard, that is to say average over 1 hour on particular days to an 8-hour standard, which is considered a more protective standard.

Since 1997, we have been in the process of doing analysis and study. Most recently, our purpose has been to take the first step, which is to designate the areas that are in attainment and non-attainment with this new and higher protective standard.

On April 15, as the Administrator of the Environmental Protection Agency, I will issue a rule that will designate each part of the country as being either in attainment or out of attainment. That will happen on time and as expected. At the same time, we will

designate the classification of non-attainment among those who are not in attainment.

Senator CARPER. Say that again.

Mr. LEAVITT. At that time, we will also designate among those that have been indicated as in nonattainment, essentially the degree of nonattainment that they have achieved. There are six different classifications of nonattainment. There is marginal which is just above attainment status, there is moderate, then there is serious, then severe, there are actually two areas of severe, and then extreme. The further away from attainment a community is, the longer it has to provide a plan and to come into attainment, but the more aggressive it must be in being able to seek attainment. There are provisions of the law that will follow each of those classifications. They will have 3 years to create a plan. The EPA will then have 1 year in which to actually approve their plan and then implementation will need to follow.

Senator CARPER. During the 3 years States are working on their plan, I presume there is back and forth with EPA so that when you get to April 2007, there has been a fair amount of discourse and when their clock runs for the other hour, does EPA need that full year to determine whether or not the plan is going to cut the mustard?

Mr. LEAVITT. It should be the objective of every community to reach attainment and there are more than ample incentives for them to do so. While they are developing their plan, it is our hope and our optimism that many of them will begin immediately to implement those steps necessary to move them toward attainment. There are already communities who anticipate their non-attainment status, who have begun to implement the provisions necessary to get there. This is about clean air, it is about healthy air, it is about getting results, not simply following a process.

Senator CARPER. Other than our stewardship and our concern about the health of our constituents, what incentives do different counties have to move toward attainment?

Mr. LEAVITT. The status of nonattainment is not a happy outcome for anyone. Senator Voinovich indicated that there are many local government officials, some of whom you will hear from later today, who are gravely concerned about the impact it could have on their communities and are working with great devotion to cure or to heal that ailment.

One of the reasons we make these designations is to communicate to the citizens of those areas that the air they are breathing is currently not as healthy as our national standard or the protective standard that we have established as a Nation. So there is a communication aspect and it also clearly brings attention that causes public officials to move forward. So the incentives are clearly there. There are economic incentives because there are circumstances where it becomes more difficult for a business to site their facility there because they ultimately will have to find some way to reduce otherwise. So there are incentives here. Our purpose is to achieve clean air, not simply walk through a process.

Senator CARPER. I mentioned earlier we have three counties in my State and New Castle County is the northern-most county where about two-thirds of our people live. New Castle County,

Delaware is going to be designated as a non-attainment area under the 8-hour ozone standard. According to EPA's analyses, New Castle County is projected to still be out of attainment in the year 2010. Interstate 95 runs right through it, 295 and 495 run literally right through it as well. We are expected to still be out of attainment in 2010 even with the implementation of the proposed interstate air quality rule.

I don't expect you to be able to answer this but I want to ask you on the record. As you know, Senators Gregg, Alexander, Chafee and I have introduced legislation called the Clean Air Planning Act. My question is when would New Castle County come into attainment if our legislation, the Clean Air Planning Act, were enacted? I don't expect you sitting here today to be able to answer that. For us, that is an important question as we consider whether to enact Clear Skies, the Clean Air Planning Act which I have introduced, Senator Jeffords has his own proposal with a fair amount of support. My question is, for New Castle County, when could we expect to be in attainment if the Clean Air Planning Act were enacted?

Mr. LEAVITT. Mr. Chairman, do I have time to respond? I don't want to get off schedule. I saw a red light.

Senator VOINOVICH. I think what Senator Carper wants to do is if you can't answer that question today, he wants it on the record and he would like a response.

Mr. LEAVITT. May I parenthetically insert this? The structure of this national strategy frankly is very solid. We are saying here are the areas that are in nonattainment, some of which are in your State and some of which are in many other States. Here we are saying to the State and local communities are some tools that deal with problems that you can't deal with on your own, the interstate air quality issue where you have air pollution drifting from one region to another or the mobile source where it can come from anywhere and we don't want to control who comes in and out of a particular State. We are providing those tools and they are very powerful tools, powerful enough that, when combined with existing control programs, they will bring nearly every metropolitan community in the country on their own into attainment.

There are areas where they won't be powerful enough on their own and it is going to be incumbent on those local communities to develop in a collaborative way a neighborhood strategy to solve that problem. We have national standards, but we have to have neighborhood strategies. I hear what you are saying about wanting to have your idea modeled and we will do our best to do that, but I wanted to make clear that the fact that there are still some areas that may not be in attainment under this national strategy only implies that there are some areas who have a long ways to go, further than most areas. We need to help them, and we are, because without these national tools, they couldn't even get close. In most cases, they are getting very close just with the national tools we are providing.

Senator VOINOVICH. Senator Clinton.

**OPENING STATEMENT OF HON. HILLARY RODHAM CLINTON,
U.S. SENATOR FROM THE STATE OF NEW YORK**

Senator CLINTON. Thank you, Mr. Chairman.

Thank you so much, Administrator Leavitt, for being here once again. I so appreciate the cooperative relationship that we have developed and look forward to working with you.

I was told there was a chart before I arrived which showed that the gross domestic product has climbed as emissions have declined. I think that proves the point that economic growth and environmental protection go hand in hand, to choose one over the other is a false choice, but I am concerned that in the testimony today and in some previous Administration testimony the fact we have made progress at a period of time both economically and environmentally, is being used to argue that we can change direction now. I worry about that.

I have a specific question because in the work that I have been doing on environmental health, and I know Senator Jeffords made reference to this and we are going to have an excellent witness, Dr. Thurston, on the next panel to talk about the results of very important research. We know that the public health costs of not providing more clean air requirements are going to be severe.

Along with that, I understand you are on the verge through EPA of providing guidance to the States as part of a permitting process that would actually limit the options States can consider when applying best available control technology to new coal-fired power plants. As I understand the guidance, it would prevent States from considering fluidized bed combustion or even integrated gasification of coal, both of which are substantially cleaner and more efficient than conventional pulverized coal.

Why would the agency limit the States' options since what we are trying to do, as you just eloquently said, was to have neighborhood so-called State responses, why would you limit the States' options and curb the development of these and other important new technologies?

Mr. LEAVITT. I am going to confer because I don't know of any decision on any guidance at this point. Senator, we have made no decision on that point. Our basic philosophy at the agency is national standards, neighborhood solutions. That is to say we need to optimize the number of tools available to people to meet our high protective standards.

May I echo what has been said about the link between economic prosperity and environmental progress. Without economic prosperity, there is nothing that fosters pollution like poverty. We see very clearly at the Environmental Protection Agency that link and it is for that reason that our purpose in this national strategy is to accelerate the velocity of our progress but to protect our national competitiveness as we do it.

Senator CLINTON. I am delighted to hear that no guidance has been formulated and I would strongly urge that we do everything possible to incentivize new technologies because in your testimony, you state,

"Our past experience under the Clean Air Act suggests that development of cleaner technologies which is continuing on many fronts, will help even the

areas with the most difficult pollution problems make progress at a reasonable cost in new ways we cannot identify today.”

I could not agree more. I am one of those who think that we could have a jobs explosion in this country with clean energy, with smart technology, with pollution control devices and anything that the EPA can do to try to incentivize that, I think would have tremendously positive effects.

I know that when we tighten environmental and public health standards, we drive the private sector to innovate and we have had some very positive results from that. The cost of pollution control then comes down in ways that we couldn't have foreseen when the standards were set, and that leads me to a followup question.

Why do you think this experience applies to the control of ozone and particulate matter emissions but not to mercury emissions? Why are you backing a mercury rule that will not result in mercury specific emission controls on power plants until 2018 because if you follow the thinking that I agree with completely in your testimony about what we can do to force the private sector to innovate, I would argue strongly that just squarely impacts on what we could make happen with respect to mercury control as well.

Mr. LEAVITT. Senator, the discussion on mercury has occupied a great deal of my attention. It is something I feel deeply about on a personal basis. There have been a number of what I will term, for the purpose of description, fictions that have crept into this discussion and I think it would be valuable for me to clarify them.

One fiction is that the EPA does not view mercury as a toxin. The fact is mercury is a toxin and it needs to be reduced. Another fiction is that somehow the agency is seeking to roll back standards. The fact is there has never been a standard; this will be the first time that we will have regulated mercury from power plants in our Nation's history and we want to do it right.

The third fiction is that someone previously had indicated we could do it by as much as 90 percent. Senator, I have searched the records of the agency and I can find no place where a person representing the agency indicated that was possible and if they did, they were misinformed.

The next fiction is that it is possible between now and 2007 to get a 90 percent reduction on mercury from power plants. I have spent an enormous amount of time with the engineers and the scientists who not only understand this but who invented it, and it has become very clear to me that as optimistic as I am about the mercury-specific technology, particularly activated carbon injection, which I think is clearly the way we will get to large scale reductions, that it will not be adequately tested, nor widely deployable, until 2010. That is as close to a fact as I can provide you.

Another fiction is that we are somehow putting off the reductions until 2018. The fact is we are considering two mercury rules right now: first, that would be a MACT rule, which would have to be complied with by 2007, and the second, and what we think is more aggressive and in our opinion, a better way, which would allow us to reduce mercury emissions by 70 percent using a cap and trade system. We believe the second approach gets more reductions and happens faster, but we are receiving comment on both and trying to learn about both.

In both cases, there are short-term objectives that have to be met on mercury, and we have no interest or intention of putting off our action on this until 2018.

Senator CLINTON. I thank you very much for that answer, Administrator Leavitt. I look forward to further engagement with you on this issue because I appreciate the fact that it is a toxin, I worry about the cap and trade system creating hot spots that will have very damaging effects on the people who are directly impacted by those particular emission sources. So I look forward to having an ongoing discussion about this. I would hope though that we would keep in mind the fact that we have been quite successful in not only reducing emissions but creating technologies that have had spinoffs and very positive economic effects.

I would conclude by saying that if you look around the world right now, the Japanese, the European Union, they intend to corner the market on clean technology and pollution control devices. They are going to have a tremendous economic comparative advantage over us in this technology. I think that is unfortunate and it is being driven by government policy, not just by the market, because with any new venture oftentimes you need some support for investment and the like, so I think we are missing the boat by not being really aggressive in creating incentives and regulations that will both lower pollution and also trigger the development of technology.

Thank you.

Senator VOINOVICH. Thank you, Senator Clinton.

[The prepared statement of Senator Clinton follows:]

STATEMENT OF HON. HILLARY RODHAM CLINTON, U.S. SENATOR FROM
THE STATE OF NEW YORK

Thank you, Mr. Chairman.

I am pleased to be here today, and am pleased to welcome George Thurston of NYU back to the committee.

The air pollution issues that we are here to discuss today—ozone and particulate matter—are critical public health issues.

Ozone pollution causes a range of respiratory problems—from difficulty breathing, to aggravation of asthma, to lung damage. Ozone pollution is also linked to premature death.

Similarly, particulate matter pollution is linked to aggravation of heart and lung diseases and to premature death. I believe that Senator Jeffords has already stated that Harvard research indicates that as many as 70,000 Americans die prematurely each year as a result of air pollution. That is a staggering figure, and shows that we have a lot of work to do.

There was considerable controversy when the ozone and particulate matter standards that we are finally implementing were set in 1997.

Since that time, the scientific evidence has grown stronger, and suggests that even though we are just beginning to implement the 1997 standards, they may not be adequately protective of public health.

I want to briefly mention a couple of those studies, and I know that Dr. Thurston will expand on this point in his testimony.

The first is a Yale University study by Janneane Gent, which was published last October in the *Journal of the American Medical Association*. The study looked at 271 children under the age of 12 with active asthma in Connecticut and Massachusetts, and measured their response to two air pollutants, ozone and very small particulate matter.

The key finding from this study is that a 1-hour exposure to air containing 50 parts per billion of ozone caused a significant increase in wheezing and chest tightness in those children, and increased their use of symptom-relieving drugs. In other words, ozone exacerbates asthma in children at concentrations below the current 1-

hour level of 120 parts per billion and the new 8-hour exposure standard is 80 parts per billion.

The second study I want to cite is one that Dr. Thurston was principal investigator on. This study, published in 2002 in the *Journal of the American Medical Association*, found that long-term exposure to particulate matter is associated with an increased risk of death from cardio-pulmonary disease and lung cancer. The increased lung-cancer risk in polluted U.S. cities was found to be comparable to the risk to a non-smoker from living with a smoker.

Given these studies and the mounting evidence which suggest that ozone and PM pollution are harming our children and those who live in polluted areas, I think we need to move to quickly implement the new particulate matter and ozone standards. We also need to look at revising the standards, as the Clean Air Act requires. I understand that EPA has been dragging its feet on revising the PM_{2.5}.

They are certainly important issues in my State of New York.

The New York City metropolitan area is a non-attainment area under the 1-hour ozone standard. It will be a non-attainment area under the 8-hour standard as well, and it appears that most urban upstate areas will be as well.

Implementing these new standards will be complex, and I think there are a number of outstanding questions that I hope we will have time to get into today and in subsequent hearing.

Finally, I want to note that I am one of the 44 Senators who is today calling on Governor Leavitt to withdraw the proposed mercury rule and put out a new, more protective standard.

Senator VOINOVICH. I would like to say that I believe the new rules you are going to promulgate are ambitious in terms of cleaning up the environment and its impact on public health. Would you say that, yes or no?

Mr. LEAVITT. Yes, absolutely.

Senator VOINOVICH. And Clear Skies, the legislation I have introduced on behalf of the President and Senator Inhofe is ambitious in terms of reducing emissions and also the impact of emissions on public health?

Mr. LEAVITT. It would be the most aggressive this Nation has ever had.

Senator VOINOVICH. I would like to say this gross domestic product, picking up on what Senator Clinton had to say, is very, very robust but the world has changed in the last 4 or 5 years. Competition from China and from other countries around the world have impacted us. The litigation tornado that is cutting through the economy of the United States of America is having a negative impact on our jobs in this country, particularly in my State. Health care costs are soaring and making our businesses a lot less competitive than they were before. We had a hearing last week on natural gas. We are having people move out of this country because of the fact that we have limited the supply of natural gas and exacerbated the demand for it, and it is devastating my State.

I would like to say I think the economy has changed in America today and I would love to have that kind of growth but we are not by ourselves anymore, we are competing now in a global marketplace.

On the mercury issue, President Clinton and the EPA Administrator, and I don't want to get partisan here but I would like to get the record clear, did nothing on the mercury issue for 8 years. Two days after the Supreme Court ruling on the election, they issued a regulation that said mercury should be regulated and left office. Eight years and the day after the election, said mercury shall be regulated. If it was such a big problem, why didn't we deal with it 2 years before or 3 years before or 4 years before?

President Bush came into office and he didn't shy away from the issue. He developed the first ever proposal to reduce mercury emissions that is being picked at by a lot of people in this country.

Mr. Administrator, you and I have talked. My main concern about the mercury rule is that it could disproportionately affect one region of the country over another and further exacerbate the natural gas crisis by causing us to fuel switch. That gets into the issue of lignite coal and bituminous and sub-bituminous coal. I went through this when I was Governor in terms of the acid rain provisions of the Clean Air Act where they set up the rules so that it would advantage one area of the country over another.

I would like you to talk about those mercury rules and what are we doing about this problem?

Mr. LEAVITT. It is not our intention to, nor will we be issuing regulations that will, affect the coal distribution or the sale and purchase of coal on a regional basis. Also, one of the criteria for me is that we do this in a way that will allow us to protect our economic competitiveness. I think that graph shows that without economic vibrance, environmental progress does not occur. We have to accelerate the velocity of environmental progress, but it has to be done in a way that protects our economic competitiveness.

The keys to that are new technology, collaborative work focusing on the result and the use of markets. One of the criteria is we have to assure that when we move into regulating mercury, that we do it in a way that does not require fuel switching because ultimately that would not work to our advantage as a country.

Senator VOINOVICH. I would like to emphasize one other thing and that is in your testimony you talked about tremendous progress is possible because we are putting forward a number of air quality improvements that are about to become effective and will soon be adopted. The proposed interstate air quality rule you talked about should be even more dramatic—cuts in power plant pollution—you did a lot more with legislation, I think, the NOx CIP call which states you are implementing to reduce power plant emissions, is underway right now. Our power plants are dealing with reducing NOx standards for new cars and light duty trucks and the fuels that they use, and that is one of the questions I think you are going to have to answer, how effective is emission testing? We have a big debate in our State again, are we going to continue emissions testing, how good is it? We have not automobiles out today that are so much cleaner than before and if we don't have emissions testing, what other things should we have to do in order to meet the standards.

The standards for heavy duty, on-road diesel engines and the fuels they use, that is coming on board right now. You are also starting this new program in terms of buses which is another issue and we really need to move on that.

Construction agriculture, mining, airport and the fields they use, use voluntary diesel retrofit and link programs to reduce emissions from the existing fleet.

So you are moving forward with some pretty significant things and a lot of these things, in all fairness, started out before you came on board. There is some significant stuff going on out there and I think it is really important that we make it clear. What we

are trying to do is cleanup the air, reduce its impact on public health and at the same time, have an economy that provides jobs so that they can take care of themselves and family and we have vibrant communities. That is what we are trying to do here.

Senator Jeffords.

Senator JEFFORDS. I have two additional questions I would like to ask.

Clear Skies or this proposed interstate air quality rule won't really start getting serious reductions for a decade or more from now or perhaps 2015 at the best. Most PM_{2.5} and most ozone attainment areas will need those emissions reductions to take place by 2010 or sooner to achieve attainment by the deadlines. The Ozone Transport Commission has proposed much lower SO_x and NO_x caps and earlier deadlines that would help the region to attain on time.

If the goal of the Administration's proposals is to provide maximum reductions from the most cost-effective sources, that is power plants, to help States and areas reach attainment, then why are the deadlines so late and the reductions so minimal? I know this isn't a labor shortage issue because there will be plenty of boiler-makers available after 2007 or even earlier, assuming EPA keeps the NO_x SIP call on track.

Mr. LEAVITT. Senator, I have very good news for you. The vast majority, a very high percentage of the benefit of the interstate air quality rule happens in the early years, a very high percentage of it coming before 2010. On the ozone and fine particle rules, a very high percentage of our communities will have come into complete attainment prior to 2010. So we have front-loaded these. There is serious progress that is going to occur and it will happen soon.

There will be more pollution taken out of the air faster than at any time in our Nation's history. We have a national strategy that increases the velocity of our environmental progress and does it in a way that will protect our economic competitiveness. This is a solid national strategy. It is not one I don't take credit, this is something we have worked on as a country. The progress we are continuing over the past 30 years is historic. There has been a new environmental maturity that has come across this country that we will now build on because we have picked the low-hanging fruit. It is going to require that we use technology and collaboration and neighborhood strategies, that we focus on results, not just processing through these programs, and that we are using markets that will incentivize people to do more.

There is a great link between the incentives created by a cap and trade system and the development of technology. I agree with Senator Clinton, this is a huge opportunity for us economically and the world, and the best way for us to create incentives is to give people a reward when they achieve a technology that gets results that can be exported to the world. On many of these pollutants, we benefit when others in the world deploy the technology. Mercury is a great example. We produce a very small percentage of the mercury in the world. We need to be an example, a leader, and aggressive in doing it, but if we have technology, if we have ACI technology that is fully implemented, let us get it to the world. It puts Americans to work; it will cleanup the air; it will cleanup our waters. Women

who buy tuna fish for their children, will have the safety of knowing that not only are we doing it in America but American technology is being exported to other countries where the vast majority of it is produced.

Senator JEFFORDS. I appreciate that enthusiastic answer. Under the Clear Skies light cap and trade scenario, EPA predicts that approximately 200 power plants will not have applied advanced pollution controls for NO_x, SO_x or mercury by the year 2020, largely because of emissions banking and trading. Yet MACT requires that each and every unit at every power plant reduce emissions. How could your cap and trade proposal for the mercury possibly be more protective of public health than MACT at every unit?

Mr. LEAVITT. This is actually a matter we are taking comment on right now and trying to learn about. The concern you are expressing is whether there is a localized effect on mercury from a power plant. We want to learn about that. A lot of that concern was expressed in the acid rain debate. It didn't turn out to be the same kind of problem, but if there are health effects, we need to study them, we need to understand and learn about this. That is part of what we are receiving comment on right now from tens of thousands of Americans at public hearings across the country because we want to be responsive to that.

Senator JEFFORDS. Thank you.

Senator VOINOVICH. Senator Carper.

Senator CARPER. A month or two ago, I mentioned to you in a conversation we had that near the end of the Clinton administration an energy efficiency standard was adopted for air conditioners called SEER 13. I think it was adopted in the year 2000. It called for air conditioners to become 30 percent more efficient in their use of energy by the year 2006. I want to say maybe the second year of the Bush administration, maybe 2002, a less rigorous standard was adopted called SEER 12. The SEER 12 standard calls for 20 percent more energy efficient air conditioners by 2006. It ended in a court battle, as I think I have mentioned to you, in the Second District Federal Court. The court ruled a month or two ago that the more rigorous standard, SEER 13, should stand.

A number of us here in the Senate signed a letter to the President last month urging the Administration not to appeal the Second District Court decision. We have consulted with some of the air conditioning manufacturers in this country and late last month, their trade association went on record as saying they felt they could live with the more rigorous SEER 13 standard by 2006. A majority of us have called on the Administration, Democrats and Republicans in the Senate, simply to say we are not going to appeal the Second District Court decision, let us get on with adhering to the more rigorous efficiency standard.

I am told if the more rigorous standard stands, that come 2020, we will have to build 48 fewer new electric power plants. Most of them are going to be built with natural gas but by having the more rigorous conservation standard in place, we will reduce our need by as many as 48 fewer power plants. In addition, I am told by 2020, CO₂ emissions will be reduced biannually by 2020 2.5 million tons, simply by putting in place this more rigorous standard.

In our conversation earlier I urged you in your position to work within the Administration to try to convince your colleagues and the President not to appeal the decision. I have no idea if you can give us an update today on where the Administration is taking that but if you could, I would welcome it.

Mr. LEAVITT. As I think you are probably aware this is a rule-making that is being conducted at the Department of Energy. Therefore, it is one of the few controversies the Environmental Protection Agency doesn't seem to be in the middle of right now.

May I add that during the time I was Governor, we lived through a couple of western energy crises where the primary focus of our attention became energy conservation. We began to run campaigns publicly asking people to use more energy efficient devices and to reduce their energy usage. We accomplished it in one particular summer by as much as 20 percent, a huge impact economically, a huge impact environmentally.

I am not able to comment on the specific standard, I don't have information but may I say that in terms of a national strategy, learning to conserve energy is a very powerful tool in being able to meet our national economic and cultural goals.

Senator JEFFORDS. I have asked you privately and I ask you publicly to use your influence within the Administration. I have had a similar conversation with our Secretary of Energy. I would ask you to use your very considerable influence within the Administration to convince our President to simply say the decision has been made, courts have ruled, and we are going to live with that.

I want to go back to something raised by Senator Clinton. I have heard rumblings as well that our Federal Government, presumably EPA, may not be interested in moving the utility industry toward greater utilization of clean coal technology, fluidized beds, coal gasification efforts. The technology has been around for a long time. My understanding is it has been implemented in a rather limited way. I think there may be one or two operating coal gasification plants, I am told there are a couple others actually formally proposed or actively being planned. We are the Saudi Arabia of coal. We have more coal than probably any other country in the world. We have the technology that allows us to use it in ways environmentally friendly but I don't feel a sense of urgency or priority from the Administration or from the Congress. Rather than continue to build new natural gas plants and jacking up the price of natural gas, why don't we find ways to implement the technology, commercialize it.

I think you said in response to Senator Clinton's question that there was no decision made but it would be real encouraging to hear you say, that makes a lot of sense. It passes a common sense test for me. What do you plan to do to move us down that road?

Mr. LEAVITT. I will read you the note and then comment. The guidance on the new source review for new plants, we require them to consider new technologies. I have not received a recommendation yet, but let me comment philosophically.

I can't break into song over this matter. I don't think we would find any disagreement at either of our tables today about the fact that if we can produce zero emission coal in this country in the generation of electricity, it is a powerful driver of our economy and

it ought to be and is a priority. The Administration has committed \$1 billion for a project called Future Gen, a collaboration between the industry and the Department of Energy; EPA is involved, our labs are involved, another reason I am anxious to have you to our labs in North Carolina.

Senator JEFFORDS. Only if Senator Voinovich would come with us.

Senator VOINOVICH. I will do it.

Mr. LEAVITT. Call the travel agent.

This would be a powerful driver of the American economy. We have rich resources of fuel of coal. Without using them, we put upward pressure on natural gas which is having a substantial impact on large areas of our economy and keeping us competitive. It is a priority, it needs to be a priority. We can, I believe, in the course of the early part of this century produce the capacity to generate electricity with zero emissions from coal and if we do, it will be a driver not just in our country but in the world economy and we will be the leader.

Senator VOINOVICH. Thank you.

I would like to say Ohio University, my alma mater, is a leader in the country in clean coal technology and they are so excited and so is the Ohio Air Quality Authority on Future Gen and its potential. Thank you for the initiative and I would like to editorialize and say it would also help if we could get an energy bill passed because there are lots of stuff in the energy bill that deals with clean coal technology and moving us in that direction.

We are going to have a vote at 11:30 a.m. Senator Clinton, you still have some questions I am sure you would like to ask and we will try and wrap it up after Senator Clinton so we can get to the other witnesses before we have to go and vote and then come back and ask questions of the next panel of witnesses.

Senator Clinton.

Senator CLINTON. Thank you, Mr. Chairman.

I would like to submit for the record a letter going out today to Administrator Leavitt from 45 Senators including three Republicans, asking that EPA with respect to the mercury rule withdraw the entire proposed rule package and repropose a rule for adequate comment that meets the terms of the 1998 settlement agreement.

I agree with the Chairman that this has been going on a long time but the sequence of events are such that the 1990 Clean Air Act legislation mandated the study. It took longer to do than was anticipated. Originally, it was thought to be a 3-year study, it turned into a 5-year study. Shortly after the study was completed, the NRDC sued the EPA to force action, then proceeded to have a long, drawn out negotiation. There was a settlement reached in 1998 and under the terms of the settlement, rules were to be promulgated by December 2000 and that was shortly before the end of the Clinton administration. It is to the Bush administration's credit, although it is under a court order to proceed with mercury rulemaking and that is what we all want. We want good mercury rulemaking that makes a difference in the atmosphere. I think however we got here, whatever the sequence happened to be, we need to proceed as expeditiously as possible and there is considerable concern on the part of 45 of us about the proposed rule.

In addition, I know there was a recent white paper issued by the EPA Office of Research and Development on mercury control technologies last week. The paper cast doubt on most of the agency's arguments regarding the availability of technology for mercury control and potential emissions reductions. I would also like to submit "The Control of Mercury Emissions from Coal-Fire, the Electric Utility Boilers," a report done by the Office of Research and Development from the EPA from the Research Triangle Park, North Carolina for the record.

Senator VOINOVICH. Without objection.

[The referenced document referred to may be found on page 185.]

Senator CLINTON. This report says that existing widely used technology such as fabric filters could achieve a 90 percent reduction of mercury at bituminous coal plants and 72 percent removal at sub-bituminous. If you added a wet scrubber, the reduction is 98 percent. It further says that activated carbon injection technology, which can be added in 1 year's time, can achieve 70 percent reduction in mercury from all coal types by 2010. Adding a fabric filter to that which can be done in 2 years achieves a 90 percent reduction. This is without new technology. This is not even going as far as Senator Carper and I would like to see but using existing technology. I hope Administrator Leavitt, as you do study this important rule, you will take a look at this report. I don't understand a lot of it, it is very technical but I know you have lots of people around you who do and really calculate the cost of this.

I am one of those who have long advocated doing whatever we could to incentivize the utility industry to take these actions. This is a public health issue. This affects all of us. The numbers of people who are going to be impacted by the continuing level of emissions is such that we are paying on one hand for health care costs when we could be trying to find a way of acting much more efficaciously and cost effectively to deal with this problem at the source.

Again, this letter from 45 Senators, including 3 Republicans, will be on the way to you but the bottom line is we all need to work together to get this underway. I think there is a perception that you are very thoughtfully trying to go through all this and I don't in any way doubt that, because I trust you to really take a hard look at all this, but there are other factors at work, other concerns and special interests at work and it is so important that we go as far as we possibly can technologically.

If there are costs associated with it, let us honestly look at those costs. Let us not end the rulemaking at a point less than where we should just because there are costs attached to it. Let us figure out whether there is a way we can help to defray them or deal with them but it is so critically important.

I thank you for your consideration.

Mr. LEAVITT. Quick responses on both of those. As you indicated, I am under a consent decree to act by December 15, 2004. Given the nature and complexity of this, we are moving forward with all rigor to assure that we get there. It is my intention to do it in a way that will serve the best interests of the American people and those who have, as we all have, concerns.

This turns, in large measure, around the technology. The paper you have, I have read and have been doing all I can to understand

it. I have had a chance to spend enough time crawling around the blueprints of power plants to begin to know more than I expected I would, but I would just make this conclusion. There are places and ways that you can use other technologies to get high percentages but they are unique.

In the Northeast for example, in New England, there are a couple of power plants that have achieved high levels of reductions. They bring in coal from the Philippines and they have been able to use particular combinations of circumstances that allow them to uniquely do it, but you can't deploy that over 1,200 power plants. We have every reason to be optimistic about ACI technology. So far, we have used ACI technology on medical waste incinerators, and we have used them very effectively and we have been able to achieve almost 90 percent on municipal waste incinerators.

We haven't had that experience yet on coal-fired power plants. In fact, we have never put ACI technology on a coal-fired plant and had it used over a period of time sufficient to know whether it will work with all kinds of coal in all kinds of circumstances. If we are going to be asking the American people to invest billions into this technology, and we are, we ought to make certain that it works. So the reason we are at the 2010 conclusion isn't because it doesn't exist, it is because we have to have it adequately tested and widely deployable. There are lots of considerations, as you said.

My purpose is to do this by the time the court has ordered me to do it and to do it in a way that will clearly make the biggest gains we can, but do it in a way that will also protect our competitiveness. I believe we can do that. As you have suggested, technology is the key, but we ought not to move until we have the technology. Once we have the technology, it will take care of the problem.

Senator VOINOVICH. Thank you, Administrator. I am delighted to know that you are getting into the issue of mercury because there is a big debate out there about where the technology is. There are some that argue that co-benefits from NO_x reduction of emissions would do a great deal to reduce mercury but then how do you go to the next step. With the letter coming from many of my colleagues, you are going to be in the eye of the storm on this one. Again, it is good science that will make the difference.

Thank you very much for being here. We appreciate the new leadership you are bringing to the Environmental Protection Agency. Thank you for your conscientiousness and your commitment to making our air cleaner and minimizing the impact on public health and also understanding that we have to do that within the framework of the economy of this country and right now, jobs, jobs, jobs.

Thank you.

Senator CLINTON. Mr. Chairman, if I could correct the record, it is seven Republicans, not three.

Senator VOINOVICH. I bet they are from the Northeast.

Senator CLINTON. Well, that is right. Not all of them, though. John McCain is on there.

Senator VOINOVICH. Will the other witnesses come forward? I have just been informed that the vote has now been moved to 12 o'clock.

We are very fortunate to have Robert Eckels, County Judge, Harris County, TX. For those folks not from Texas, a County Judge in our neck of the woods is a County Commissioner. Michael Fisher is president of the Greater Cincinnati Chamber of Commerce, and George D. Thurston is from New York University School of Medicine, Division of Environmental Medicine is also with us today. We are very happy to have all of you here.

We will move quickly into the testimony and I would like to call on Judge Eckels first.

**STATEMENT OF ROBERT ECKELS, COUNTY JUDGE,
HARRIS COUNTY, TX**

Mr. ECKELS. Mr. Chairman and members of the subcommittee, my name is Robert Eckels. I am the County Judge for Harris County, TX.

Senator VOINOVICH. What city is in Harris County?

Mr. ECKELS. Houston is our county seat. We have 35 cities in the county and about 1.5 million people.

I want to thank the committee for allowing me to be here today to testify and asking me to comment on implementation of the 8-hour ozone and fine particulate National Ambient Air Quality Standard.

In the years that I have served as a legislator first and later as Harris County Judge and as a member of the Board of Directors of the National Association of Counties, I can tell you from first-hand experience that air quality issues are among the most complex that any elected official can experience. Clean air is of vital interest to all of us. It is important for the health of our citizens and for the health of our economy.

We have made good progress but as we have noted here this morning, much more work is needed. I would like to relay to the committee my personal experiences in developing clean air plans to maintain the 1-hour ozone standard in the Houston-Galveston region. I believe it is relevant to what other major metropolitan areas are about to experience as the 8-hour ozone and fine particulate standards are implemented.

We have embarked on a consensus plan with industries investing \$4 billion over the next 3 years to reduce nitrogen oxides by 80 percent. The Texas Legislature funded the Texas Emission Reduction Program, a \$150 million per year on a 7-year grant to reduce emissions from mobile source sectors faster than the Federal controls would otherwise achieve. We have reformulated the diesel in our region, reduced speed limits, and in some cases, banned the use of commercial law maintenance before noon and initiated the first phase of a light rail mass transit system in the Houston Area at a \$350 million cost without Federal funding. This is on top of an 80 percent reduction in industrial and automobile hydrocarbon emissions over the past 20 years. I believe it speaks well for our strong commitment to clean air in the Houston region.

As a public official, I also worry about the economic vitality of our region. In 2000, our local chamber of commerce, the Greater Houston Partnership, sponsored an independent socioeconomic study of our clean air plan by respected economists at the University of Chicago and Houston.

The study concluded that by 2010 the region would have 38,000 fewer jobs, reduce gross regional product by \$3.5 billion and reduce tax receipts to the State and local governments by \$300 million each year. There are serious economic consequences by any yardstick but we did feel they were important for us to attain that 1 hour standard.

Looking to the future, some 530 counties nationwide will be designated as nonattainment for the 8-hour ozone standard. We are in the process of making similar determinations for the fine particulate standard. EPA is now in the process of developing the regulatory framework for States to implement these standards and their modeling shows that many of these areas will attain the standards with measures already in place or planned. I do want to commend the EPA and the Administration for their efforts.

However, some large metropolitan areas such as Harris County in the Houston region, Philadelphia, the New York City metropolitan area, that same modeling shows continuing nonattainment of 8-hour ozone standard as far out as 2020. This is after significant reduction in transport emissions, cleaner fuels and engines and local 1-hour ozone control measures. It presents several important public policy issues for EPA, local elected officials and for this committee to consider.

The first policy issue for consideration is the attainment deadlines proposed for some of these areas. EPA has proposed attainment deadlines of the 2010 to 2013 timeframe well before emission reductions from Federal measures such as transport and mobile source controls are fully realized. As a result, in these areas, we will not be able to submit approval State implementation plans to the EPA and in such circumstances, the Clean Air Act imposes sanctions including the loss of Federal highway funds which in our county alone could be up to \$1 billion a year.

One options suggested is to have States volunteer to move into a more severe air quality classification to get more time for attainment. I can tell you as an elected official it is not really a feasible option. The second issue is attainability of the standards. I am not here to say we need to change or eliminate the 8 hour ozone or fine particulate standard, that is for public health professionals to decide. I can say that the EPA modeling suggests these standards will not be attainable in some areas in the foreseeable future despite our best efforts.

Again it places the severe economic sanctions under the Clean Air Act. I don't think it is good public policy, it creates division in our community and results in litigation which further slows the clean air process.

Where do we go? First, I would say we need attainable standards and attainment deadlines that are technically and economically feasible. We need sound public policies that will not attain them in the foreseeable future. Senator Carper and Administrator Leavitt agreed earlier, it is not really fair to be held responsible for the actions of others. So I believe we should capture the admission reductions benefits from existing and pending Federal control measures before implementing the next round of the very high cost controls at the local level.

We need to take a closer look at how our current air quality management process is working and how it can be improved. We have invested literally hundreds of billions of dollars over the last few years at the Federal, State and local control measures in many of these non-attainment areas and suggest that we have systemic science and policy problems that need to be addressed.

In conclusion, speaking as a representative of the National Association of Counties, many of the rural and suburban counties in our communities are brought into the plans because they are up wind from a non-attainment area or large urban area. They need a seat at the air quality table as well and should not be penalized solely due to geography.

They need the resources, support and flexibility from the Federal agencies you have oversight for.

I share your comments earlier that clean air and economic development are interrelated and they do not have to be mutually exclusive. It is an obligation, as we develop policy, that the citizens of this country expect us to take very seriously a solution I think they will be looking closely for.

Senator VOINOVICH. Thank you. Are you representing NaCo today?

Mr. ECKELS. In my capacity as a former chairman of the Committee on Environment and Energy for NaCo and as a member of the board of directors. I am here as a NaCo representative as well.

Senator VOINOVICH. It would be very, very helpful if NaCo, the National Governors Association, the U.S. Conference of Mayors, the Municipal League would spend some time looking at where we are going in this area and come back with some of your thoughts to the committee. You are the ones who are going to have the obligation to implement these rules and regulations. A consensus among the various groups, a bipartisan consensus would be greatly appreciated by me and all the members of this committee.

Mr. ECKELS. This is an issue that cuts across all the counties and we will be happy to do that for you.

Senator VOINOVICH. Mr. Thurston.

STATEMENT OF GEORGE D. THURSTON, NEW YORK UNIVERSITY SCHOOL OF MEDICINE, DEPARTMENT OF ENVIRONMENTAL MEDICINE

Mr. THURSTON. There has been a lot of discussion of the costs of meeting the clean air standard. What I really want to talk about today are the ongoing costs we have of adverse health effects to the U.S. public, the fact that we have not met these standards, and that we need to meet them as rapidly as possible so that we stop incurring those health costs.

The adverse health consequences of breathing ozone or particulate matter are serious and well documented. Ozone is a highly irritating gas which is formed in our atmosphere in the presence of sunlight from other "precursor" air pollutants, including nitrogen oxides and hydrocarbons. These precursor pollutants, which cause the formation of ozone, are emitted by pollution sources including automobiles, electric power plants, and industry.

Particulate Matter air pollution is composed of two major components: primary particles, or "soot," emitted directly into the atmos-

phere by pollution sources such as industry, electric power plants, diesel buses, and automobiles, and; “secondary particles” formed in the atmosphere from sulfur dioxide and nitrogen oxide gases, emitted by many combustion sources, including coal-burning electric power plants.

Observational epidemiology studies have shown compelling and consistent evidence of adverse effects by ozone and PM including: decreased lung function, a measure of our ability to breathe freely; more frequent respiratory symptoms; increased numbers of asthma attacks; more frequent emergency department visits; additional hospital admissions, and; increased numbers of daily deaths.

Among those people known to be most affected by the adverse health implications of air pollution are: infants, children, those with pre-existing respiratory diseases, such as asthma and emphysema, older adults, and healthy individuals exercising or working outdoors.

In my own research, I was principal investigator of an NIH funded research grant that showed in an article published in the Journal of the American Medical Association (JAMA) that long-term exposure to particulate matter air pollution is associated with an increased risk of death from cardiopulmonary disease and lung cancer, as displayed in Figure 1. In fact, the increased risk of lung cancer from air pollution in polluted U.S. cities was found in this study to be comparable to the lung cancer risk to a non-smoker from living with a smoker. We really have no choice. You can choose whether to live with a smoker or not but you have no choice but to breathe the air in the city that you live. Thus, the health benefits to the U.S. public of meeting these new air quality standards by reducing ozone and particulate matter will be substantial.

Air pollution affects a much broader spectrum of human health than mortality. This is actually something I presented in 1997, when the late Senator Chafee was running the committee, pointing out the pyramid of effects, not just mortality. I made up these working estimates of what kind of health benefits there could be in New York City on an annual basis from meeting the then proposed standards.

Unfortunately we haven’t made a lot of progress if you look at the next figure. The other plot showed from 1970, but I don’t know how long we are going to try to take credit for what happened in the 1970’s. We have to look more recently. Over the last 20 years, we have been basically flat. This is from an EPA trends report. From 1993 to 2002, the last 10 years of data reported, was actually a 4 percent increase nationwide in ozone. We are not making a lot of progress in recent years.

Similarly, the next chart is from a paper that is being published soon. We can see, while there was great progress made in controlling fine particle levels over time, since 1995 the progress has slowed significantly, sort of like ozone: flat. If you look at the map, you see where the biggest problems are. The green areas are where we are clearly meeting the standard. These are spatial averages of metropolitan areas.

The places where we have a problem are in yellow, orange and red. We see the worst problems are in California, which is largely traffic related, and then in the eastern United States in the Ohio

Valley and Midwest and the Southeast. If you look at this plot, you will see a lot of the problems we are having today are related to the large sulfur oxide emissions from coal-fired power plants. To paraphrase a fairly famous political campaign, "It's the power plants, stupid", and they are really causing a lot of pollution. I agree with the Administrator: we need a regional approach, and go after the low hanging fruit, which he says are all gone. But, really, the fact is that we changed the New Source Review (NSR) regulations to change the compact that was made when the Clean Air Act was developed in the 1970's which was that the power plants would be exempted from the requirements of the Clean Air Act until they upgraded. That was a covenant that was made.

These new changes proposed in the New Source Review are violating that covenant, and allowing these sources which, if you are worried about jobs, then I agree with what Senator Inhofe said, we ought to go after the most pernicious particles, which certainly coal-fired power plants and residual oil power plants are among those. We ought to go after the things uncontrolled, the low hanging fruit. Certainly, these power plants, this bulls eye, certainly points to those power plants.

Overall, we must move forward in a vigorous fashion to achieve the new PM and ozone standards throughout the Nation as quickly as possible. If we don't, the U.S. public will unnecessarily continue to bear the ongoing diminished quality of life and health care costs we presently pay because of the adverse health effects of these air pollutants.

Thank you for this opportunity to testify.
Senator VOINOVICH. Mr. Fisher.

**STATEMENT OF MICHAEL FISHER, PRESIDENT, GREATER
CINCINNATI CHAMBER OF COMMERCE**

Mr. FISHER. I appreciate the opportunity to be here today. I think my role is going to be to talk about a community that has been in a non-attainment status, albeit moderate nonattainment for ozone.

First of all, our chamber is a 6,000 member chamber. We have companies ranging from the biggest companies in the world like Procter and Gamble, Toyota and GE Transportation to sole proprietors. About 80 percent of our businesses have fewer than 50 employees in the greater Cincinnati area. About 1,000 of our companies are manufacturing companies.

Our region is unique. We have a 15 county region covering three States and that three State dimension makes it particularly interesting for these kinds of issues and approximately 2 million citizens.

To put these comments in some personal context, I actually am only recently in the civic role of the Chamber president. I have spent the majority of my career as an entrepreneur building what became a successful global automotive supplier, creating 2,500 jobs in 11 countries the vast majority of which are in the United States, so I do know a little bit about creating jobs. I am also a life long fourth generation resident of Cincinnati. I have four kids and our 8-year-old son, Johnny, has asthma, so I am very sensitive and keenly interested in these issues that affect health.

As a Chamber and as a community, we are about trying to capture our place as one of the world's favorite American business centers. Certainly you can't be favorite without having a great economy and a healthy community.

Our Chamber has been very involved in clean air for some time. We were a co-founder of a regional ozone coalition. We are currently working with our metropolitan planning organization (authority), OKI on the forthcoming standards and even our Chamber website has helpful hints about what you can do for cleaner air.

I think as recognized during previous testimony by Administrator Leavitt on the national scale, even at the local level, Cincinnati, while being in nonattainment, has made significant progress over the last number of years. I think it is also a bit ironic that in 3 weeks I will be back in Washington leading a delegation of Cincinnatians to receive recognition at the National Press Club as being one of America's Most Livable Communities and yet we have this black eye and stigma of being considered a non-attainment area as we sit here today.

To be a little more specific about impact and so forth in our community, in 1995 there was a study that projected about 14,000 manufacturing and spinoff jobs would be lost in our community in the 1995-2000 period. In fact, from 1995-2003, 35,000 manufacturing oriented jobs have been lost. We know that is not exclusively related to this non-attainment designation but we know non-attainment has been a factor.

It has also been a significant factor relative to business expansion and new business investment. Many of you may know that about 80 percent of a region's job growth comes from existing businesses and their expansion. The extra costs and complexities involved with compliance has been a disincentive. Our Chamber has been very involved in international economic development attracting foreign companies and companies around the country to invest in our region. We have been told that our non-attainment status has been a reason why some companies haven't even considered investing in our region. In fact, one environmental consultant said specifically four companies chose not to make additional investment in our area because of our non-attainment status.

I think it has been captured already today but the current laws tend to be a bit confusing. When I referenced this increased cost to business, let me make a couple of points. We have found in Hamilton County, our core urban area, they have encouraged us, businesses I should say, to have a consultant engaged in the permitting process. While we think it is good to have consultants and attorneys employed, that is not the type of job growth we are typically most interested in.

In fact, as I talked to some friends of mine who are in the plastic bag manufacturing industry and the specialty chemical industry, the length of time required for permitting has been particularly problematic to them as they pursue new business. We are talking 12 to 18 months in some cases.

Referencing in particular the utilities and coal industry, our big utility, Cinergy will spend about \$1.2 billion on emission control equipment between 1990 and 2010 and another industry that is important to our region in this case represented by a company like

AK Steel who is spending over \$65 million in emission controls at a time when they are being challenged on many other fronts competitively.

We also experience some interesting things in terms of process versus substance which we can get into in terms of our being recognized as being in nonattainment because the fact is our air is cleaner and meeting all standards and we have not experienced one monitoring violation since 1995. Again, I think it is a process versus results dilemma at times.

Senator VOINOVICH. Mr. Fisher, could you wrap up your testimony?

Mr. FISHER. Yes, sir.

Finally, in terms of help from Congress, again, we seek predictability, ample time for businesses to implement new and best technology as Senator Clinton referenced, being sensitive to compliance costs particularly as related to small businesses and encouraging incentives in every way.

With that, I thank you for the opportunity.

Senator VOINOVICH. I appreciate you all being here today.

Mr. Thurston, I want to mention the fact that according to the statistics I have in front of me, in the last couple of years NOx has gone down 13 percent and sulfur dioxide has gone down 9 percent. It is my understanding that these are precursors for ozone and PM.

First of all, is New York City in attainment?

Mr. THURSTON. I don't think it has been designated yet. That is about to happen.

Senator VOINOVICH. No, no, I am talking about the current ambient air standards. Have they met the current ambient air standards?

Mr. THURSTON. I don't believe so but I am not an expert on attainment.

Senator VOINOVICH. That is interesting because I wonder how many of these communities on this board haven't even met the current ambient air standards and are now being asked to take on some more responsibilities. That would be an interesting statistic.

Mr. Fisher, what impact do you believe these new ambient air standards are going to have in terms of your community, in terms of job creation? I was shocked that you projected the loss of 14,000 jobs between 1995 and 2000. Am I correct, you said between 1995 and 2003, it has been 35,000?

Mr. FISHER. These were manufacturing jobs.

Senator VOINOVICH. Have you done any calculation on what impact these new standards are going to have on the economy of your region?

Mr. FISHER. I don't think we have statistical projections yet but we do know, as I referenced anecdotally, we have national site location consultants telling us our non-attainment status and these increasing standards will make it difficult for companies to consider making investments in our region.

Senator VOINOVICH. Are you familiar with the Clear Skies legislation?

Mr. FISHER. Somewhat.

Senator VOINOVICH. Mr. Eckels, are you familiar with it at all?

Mr. ECKELS. Yes, sir.

Senator VOINOVICH. I would like you to comment on the alternative between Clear Skies and understanding, and you were here for the things I ticked off when Administrator Leavitt was here that there are national things going on. In fact, Mr. Fisher, I don't know if you know this or not, but some of the most significant research on the issue of particles is being done at the Children's Hospital at the University of Cincinnati. I visited with them and am anxious to see what they have to say.

Judge Eckels, could you comment on this versus Clear Skies and your opinion in terms of the alternative?

Mr. ECKELS. My personal opinion is that Clear Skies is a much simpler approach. It has at a local level a much easier compliance for the attainment for the local jurisdictions, particularly on the East Coast. There are still some areas that don't fall into attainment under Clear Skies. Houston is one of them that still does not meet the standards but in general, it is a much easier method. The State implementation plan for most local jurisdictions, most States would simply be Clear Skies and that would be the end of their plan. It would not be a long, cumbersome, expensive process for them because they would, through the efforts of the Clear Skies legislation, have a very simple process and fall into compliance with the requirements of the Act.

Senator VOINOVICH. In other words, with something like Clear Skies, it lays out NO_x, SO_x, mercury over a period of time that the States in putting together their SIP, it would be easier to try and put something together to comply with this rather than dealing with silos that are out there in terms of the current law.

Mr. ECKELS. Clear Skies is much easier for the local jurisdictions and the States to put together than the current complex process that has evolved and the frustrations we have particularly in areas like Houston and throughout the Nation is that so many of the provisions of the State implementation plan requires Federal action. We cannot control the cars, we don't have a national clean car yet, we don't have national clean fuel, we don't have national clean diesel, so we are having to find things that eat around the edges of the plan and we are not able to under the current schedule capture national clean cars.

Even if you have a national clean car, you have a fleet turnover issue and probably New York is worse than Houston. The cabs there are not known for being new cars. So you have to have time for that to implement. Clear Skies lets us capture all those Federal control measures and makes it much easier for the States and localities to comply with the rules and do their State implementation plans.

Senator VOINOVICH. Senator Carper.

Senator CARPER. Judge Eckels, you are a judge, right?

Mr. ECKELS. County Judge of Harris County. It would be equivalent to county executive or county mayor in other parts of the country.

Senator CARPER. We don't have county judges in my State, we have State judges. Our county commissioners are county commissioners, so thank you for clarifying that.

I want to go back to something I thought I heard you say, talking about being in compliance. Even under the Clear Skies proposal of

the Administration, you would still not be in compliance I think you said by 2020. As you probably heard from earlier questions, there are other alternatives to Clear Skies. One is that proposed by Senator Jeffords, very rigorous standards and a rigorous timetable. A number of us have come up with what we think is a third way of getting at the same issue. It is called the Clean Air Planning Act. I don't even know if you are familiar with it but if you are not going to be in compliance in your county under the Clear Skies proposal, I am wondering where you would be in compliance in the third way if the Clean Air Planning Act was adopted.

Mr. ECKELS. I cannot speak to your legislation. I know that on the specific legislation Senator Jeffords has sponsored, the modeling and the information we have seen on that shows us not in compliance under any of these standards because of the issues of fleet turnover and implementation. When you look at the motor vehicles and the motor source emissions, it takes time for the new cars to come into place. When you look at the new diesel emissions, the clean fuel can come on board much quicker but it is probably a 20-year replacement cycle on the heavy diesel emissions. Then we have the larger Federal controls on trucks, ships, airplanes, locomotives, things we cannot control locally. I will be happy to look into the legislation you have sponsored in well but in general, we have not seen any other legislation that would bring every area into compliance with the requirements of the Act by 2020. There are still going to have to be some local controls and we are willing to do those things but it seems it would be more sensible and as you mentioned earlier that we would first take those things we cannot control locally, the Federal Government could capture those benefits plus Federal controls, the transport issues you are dealing with in this committee, the national standards for fuels and vehicles, that we would capture those benefits before we start the much more expensive marginal benefits we have to do locally. We are even saying people can't mow their yards in the morning. That is measuring pounds of emission reduction, not tons of emission reductions. It is very expensive and very inconvenient for folks.

As we start evolving in that process and as we learn from the control measures we put in place, we can start developing better science and better measures and better economics to make it work for everybody.

Senator CARPER. I don't know what your experience is in Houston with the mass transit but are you all using mass transit as a way to achieve attainment?

Mr. ECKELS. Yes, sir, we are.

Senator CARPER. Give me some idea of what you are doing.

Mr. ECKELS. We have probably the Nation's most extensive use of high occupancy vehicle lanes, dedicated bus lanes in the major thoroughfares coming in and out of the city. We move tens of thousands of people through what is evolving into the high occupancy toll lanes in some cases. We have built our first train.

Senator CARPER. Do you let folks who are using energy efficient cars and hybrids use your HOV lanes?

Mr. ECKELS. We have not to this point. To this point, it is a three-plus passenger car pool typically. We have had a unique partnership between the Harris County Toll Road Authority and our

community. The county owns the toll roads and we are now building a high occupancy toll facility that is essentially a transit facility that was not built with FTA dollars, it is a totally different issue on flexibility but we used local toll revenue to build the transitways for the buses. We will mix single occupancy vehicles on there to help pay for the transit facility but it provides a better, more efficient transit facility both on West Park and I-10. We are in the middle of the county doing the commuter rail study, partnering with Metro and the transit agency. They have built an 8 mile segment of light rail in downtown Houston where we have recently passed a referendum to have 70-plus miles of light rail. I don't think the money is there for that totally but we will be merging the light rail and commuter rail building on the bus/car pool program.

Beyond the Metro service area, Metro serves probably two-thirds of the Houston region through our regional transportation planning council which I also chair. We are establishing expanded van pool, car pool and alternative fuels.

Senator CARPER. Other than that what are you doing?

[Laughter.]

Senator CARPER. That was pretty comprehensive.

Mr. Thurston, I am struck by the fact that over in Europe about 40 percent of the cars, trucks and vans sold last year were diesel powered. They have lower sulfur diesel fuel over there that is mandated and produced than we do. I was at the Detroit auto show about 2 months ago and talked to a fellow named Dr. Dieter Zetcha who is the CEO of Daimler Chrysler. He shared with me a partnership they are entering with Archer Daniels, a big agricultural company to see if we couldn't expand the use of clean burn, lean burn diesels in this country. Forty percent in Europe were lean burn/clean burn diesel last year. I think in this country it was about .4 of 1 percent by comparison.

As you know, as we go forward in time, we have more stringent emission standards for diesel powered vehicles. The folks at Daimler Chrysler and Archer Daniels are interested in seeing if there is a way to use renewable fuel to mix it with diesel fuel and soy bean oil. We are trying to do that in our part of the world as well. We have a soy/diesel mixture of 20 percent soybean oil, 80 percent diesel, reduce our dependence on foreign oil, provide another way to use a commodity we have a little bit too much of.

I just want to ask some of your thoughts on our ability to try to address our dependence on foreign oil, to help reduce the emissions of CO₂, diesel puts out a lot less emissions of CO₂ than regular gasoline powered engines, internal combustion engines. Talk to us as we go forward with ever more stringent requirements for clean diesel, what are the implications for introducing a new generation of diesel powered vehicles in our country.

Mr. THURSTON. I certainly think that new technology is really the way to go to address our pollution problems. I think that is what America is about. It is about confronting problems, not delaying and putting them off. Senator Voinovich forgot to ask me about the Clean Skies Program. It seems to me that the Clear Skies Program is years and years away and there is lots and lots we could do sooner and faster.

I mentioned the new source review. If that were implemented vigorously by this Administration, that would cleanup things really fast and cheaper and have less impact on places like New York. Senator Voinovich pointed out New York has a problem with ozone and PM. I served on the State DEC's committee and they showed us some analysis where if they zeroed out all the pollution sources in New York State, they still would violate the standards because of all the pollution spewing across our border. I think every State has a right to have air that meets the air quality standards entering it and that is not happening today. A lot of it has to do with the power plants that I pointed out.

We have to be much more vigorous in going after those and cleaning up the diesel emissions. The sulfur regulations that were implemented by the last Administration that are going into effect now are going to do a lot to help California. We saw on the plot I had that they have a problem with fine particles. Those sulfur reductions are going to lower the particle levels in southern California because of that. Also the new diesel regulations are going to lower that problem. We are addressing the California problem pretty well and they are going to be making progress.

If you look nationwide over the last decades in the EPA reports, California has the largest progress that is being made in meeting the ozone standards. One of the worst is the Midwest, Region 5. That is because we have these power plants and they are just not being cleaned up. I visited a power plant years ago in Pennsylvania and they had two units. One of them was grandfathered in and was burning coal with no controls and spewing pollution and the one next to it had modern emission controls on it, had coal cleaning plant, kind of a dirty place and I don't recommend it but it had the effect of cleaning up the pollution. They had one unit putting out a minimal amount of pollution and another one right next to it that was putting out pollution uncontrolled. Why? Not because they couldn't, because they didn't have to. I think it is time we lived up to that covenant that when they upgrade these plants, they implement the emission controls that were promised to people like Senator Muskie back in the 1970s when these deals were made. Now we are abrogating those agreements by not implementing the new source review properly. We need to do that, implement all of these controls.

Senator CARPER. Let me say to Mr. Thurston, I appreciate the answer. It wasn't the answer to my question but that was a good answer.

Senator VOINOVICH. We have a vote and Senator Clinton hasn't had a chance to ask her questions yet.

I would like to say to you that we respectfully disagree on new source review. I think we need certainty here and I think the Administration has come back with a new rule on new source review, it is understandable, it tells everyone where they are and will get us out of the environment that we are in today where power plants have in the past increased the efficiency of their facilities by putting in new boilers, producing energy at less cost, in many instances not pumping up more emissions into the air and reducing them instead of having a situation today where everybody is in court over this issue. If you look back over the record in terms of

where we are in the environment in terms of cleaning up the environment, the lawsuits have really clogged our efforts to make this country have better air.

If we could get some understanding for example with Clear Skies, maybe with a combination of Clear Skies and Senator Carper, some understandable, clearcut way of doing this, I think we would be far more ahead in terms of cleaning up the environment, its impact on public health and at the same time providing energy sources we need in this country so that we can continue to be competitive in the global marketplace. It is this harmonization that I think we should be striving for today.

Mr. THURSTON. I agree, we disagree because I am no lawyer but I understand that the effect of these lawsuits has many times been to speed up things like getting the criteria documents finished sooner and issues like that, so moving things forward through using the lawsuits. You talk about costs and the thing I have to keep reminding you is you are trying to lower costs. The way to lower costs is to clean up the air because these costs are being born by the American public. All we are doing is talking about transferring the costs we are paying right now in health effects to the American people back to the polluters. That seems fair. That seems like justice and justice delayed is justice denied.

Senator VOINOVICH. Let me tell you this. From somebody who has lived in a manufacturing State, I am sorry that some people don't understand but I have lived in a manufacturing State, I consider myself to be an environmentalist but if we don't balance this thing between some of you on the environmental side.

Mr. THURSTON. I am not on the environmental side, I am on the health side.

Senator VOINOVICH. The point is if we don't balance it, all we are going to do is move the jobs to China, to India and other countries. It is happening now and they are moving into countries that don't have the environmental regulations that we have. For instance, global warming, if you move the jobs over to China where they don't have the environmental laws that we have here in the United States or India or some of these other countries, in terms of global warming, instead of helping the problem, you exacerbate the problem.

Senator CARPER. Believe it or not there is a third way and it is the Clean Air Planning Act I keep talking about which you and I need to talk about a little bit more.

Senator VOINOVICH. I am supposed to be the Chairman here, not you. Forgive me.

Senator Clinton.

Senator CLINTON. I would like that to continue. Maybe we can reach some kind of deal here because clearly as is evident there are strongly held opinions on all sides of this. The bottom line for me as I keep saying over and over again is that I think we are spending money in other areas that we don't need to spend because we have not figured out how to incentivize those who are responsible for the emissions to move more rapidly to clean them up. I don't understand why this is so complicated. I believe there are solutions out there that for whatever reason we seem to be dug in on different points of view.

My bottom line too is that I am deeply concerned about the health effects. The more studies that are done, the more we know how much we are paying in health care costs because of the effects of particulate matter and ozone. One of the other studies that has been done also published in the Journal of the American Medical Association last October looked at 271 children under the age of 12 with active asthma in Connecticut and Massachusetts and measured their response to two air pollutants, ozone and very small particulate matter. The key finding is that a 1-hour exposure to air containing 50 ppb of ozone caused a significant increase in wheezing and chest tightness in those children and increased their use of symptom relieving drugs. In other words, ozone exacerbates asthma in children at concentrations below the current 1-hour level of 120 ppb and even the new 8-hour exposure standard of 80 ppb.

It is absolutely true that New York City's metropolitan area is a non-attainment area under the 1-hour ozone standard. It will be a non-attainment area under the 8-hour standard and we have an epidemic of asthma. The highest concentration of asthmatic children in our country are in Harlem and parts of the Bronx. As Dr. Thurston said, if we could eliminate every source of pollution that we had any control over, if we were given the tools to do that right now, if we could wave a magic wand and every taxicab and truck moved to clean fuel or clean diesel, whatever it might be, if we could control every emission that we had within the boundaries of New York City and New York State, we would still not meet the attainment standards. So this is a national problem.

Dr. Thurston, the one chart you showed about ozone air quality, I think that is a chart that shows ambient concentration.

Mr. THURSTON. That is right.

Senator CLINTON. So yes we can see national standards of decreasing NOx and SOx, but if you look at a map of the country, if you take those national standards, yes, we are doing a good job in seeing it fall in many parts of the West because they don't have the wind currents, they don't have the industrial sources, but if you look at southern California and look at east of the Mississippi and go to places like Cincinnati or New York City, you see concentrations of particulate matter and ozone. This chart is the ozone air quality and the concentration has not decreased. In fact from 1983 to 1992 it decreased 18 percent but from 1993 to 2002 it increased 4 percent.

We have a problem in the eastern part of the United States and we are not acting in an expeditious manner to deal with that. I respect totally the Chairman's commitment to jobs and he knows a lot about this. He was a very successful mayor and Governor and the State he represents is one of the economic engines of our country. I just honestly believe that it is not an either/or issue, that we can do both.

I understand Mr. Fisher's point about places where you are trying to recruit jobs that are from other parts of the country saying instead of going to Cincinnati because you are a non-attainment area, we will go to Austin, TX or go to Las Vegas, NV because you look at the figures and they are doing better. They are not doing better because of actions they have taken on themselves, they are doing better because of national conditions that you have very little

control over in Cincinnati or that we have little control over in New York.

I know this remains a point of contention and disagreement about the best way to proceed. I think everybody shares the same goal but we are gridlocked and it is unfortunate because we are seeing increases in concentrations of ozone and we are seeing impacts on health that are costing us money.

I would like to ask the panelists to clarify in writing because we have to go vote any other suggestions you have. I read your testimony, but it is quite a general testimony and I understand but perhaps on behalf of not just yourself, Judge Eckels, but the National Association of Counties and perhaps Mr. Fisher on behalf of the Chamber and others and certainly Dr. Thurston because we are too smart a country not to figure this out.

With respect to some of our competitors like China and India, we have no leverage over them and I think we have to develop some other means of trying to do so.

Mr. THURSTON. Couldn't we have U.S. companies building plants abroad to behave responsibly and build plants that meet the standards we meet here? Is there any way to do that?

Senator CLINTON. No, but I think there are ways through trade agreements and through perhaps invigorating some kind of international effort, we have obviously put Kyoto aside and there were good reasons in many minds to do that because there was no real standard imposed upon the developing countries but now I understand China has moved to impose some standards of its own with respect to emissions. So we should encourage that, we should provide incentives and assistance for that.

Mr. THURSTON. We should provide the technology that they can use and that is where we can get jobs, out of the environment that we can gain jobs by being first with the technology that others will use.

Senator CLINTON. I agree with that and I am very fortunate to represent some companies in New York that have a lot of this technology and are hoping to have a national market some day and are looking for an international market but right now there are not many incentives to do that.

Mr. Chairman, we will keep working on this and we will hopefully come up with some consensus at some point. I hope in our lifetimes.

Senator VOINOVICH. Thank you.

I would like to say, Mr. Thurston, in terms of the Future Gen Project, I think you heard that mentioned earlier, that is I think a very, very good initiative. My feeling is we should develop our clean coal technology, we should use it, take advantage of it. We should sell it or give it away to other nations so that we help reduce their emissions and deal with the problem of global warming.

Mr. THURSTON. I agree with you on that.

Senator VOINOVICH. Good. I just want to thank you all for coming. I would like to mention that the National Association of Manufacturers wanted to be here to testify and weren't able to. I am going to insert this in the record, without objection.

[The referenced document referred to may be found on page 208.]

Senator VOINOVICH. I would hope the three of you on the panel, if you get other questions, would be willing to answer those questions in writing and get them back to us.

Last but not least, Judge Eckels, I really, as the former chairman of the National Governors Association, president of the National League of Cities and as you know, there are a lot of good things we did together as a team. We were able to get the TANF legislation passed, the unfunded mandates and a lot of other things. I think it is really incumbent on the national organizations for you to get together and come back here with your thoughts on where we are going and how we ought to get there.

Mr. ECKELS. We will have that for you, sir.

Senator VOINOVICH. Thank you.

[Whereupon, the subcommittee was adjourned, to reconvene at the call of the chair.]

[Additional statements submitted for the record follow:]

STATEMENT OF MICHAEL O. LEAVITT, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to come before you today to discuss the status of the Environmental Protection Agency's (EPA) progress in implementing the National Ambient Air Quality Standards for fine particle (PM_{2.5}) and ground-level ozone pollution. I am proud to say that our implementation of these standards demonstrates that we are increasing the velocity of environmental progress. As an Agency and as a country, I believe we have initiated the most productive period of air quality improvement in the history of our Nation.

On April 15 of this year, I am required by consent decree to tell certain local areas across the country that their air quality does not meet Federal health-based ozone standards. Later this year, pursuant to the schedule Congress enacted in the Consolidated Appropriations Bill of fiscal year 2004, I will do the same for those areas that do not meet Federal health-based fine particle standards. As a former Governor, I understand what this means.

That is why I also want to tell the affected state and local governments, and their citizens, that the Federal Government is doing its part to help them meet these standards and improve air quality. That is why the Agency is moving forward with both the Interstate Air Quality Rule (IAQR) that we proposed last December and the proposed nonroad rule for construction, agricultural and industrial diesel equipment. Those two programs, as proposed, combined with other existing programs, including the Tier 2/gasoline sulfur standards for cars and light trucks, the NOx SIP Call Rule to reduce interstate ozone transport, and the Clean Diesel Program for new trucks and buses, would bring well over half of the counties now monitoring nonattainment into attainment with the fine particle and ozone standards between now and 2015.

In 1997, EPA adopted health-based standards for fine particles and ozone. At the time, the standards were controversial, especially the fine particle standards. Numerous parties challenged the standards in the courts. After several decisions, including a Supreme Court decision, the legal questions surrounding the standards were largely resolved in EPA's favor. Since the standards were issued, the scientific understanding of the fine particle problem has grown and deepened independent reviews of the scientific basis for EPA's decision, and additional research, have affirmed the need to regulate fine particles.

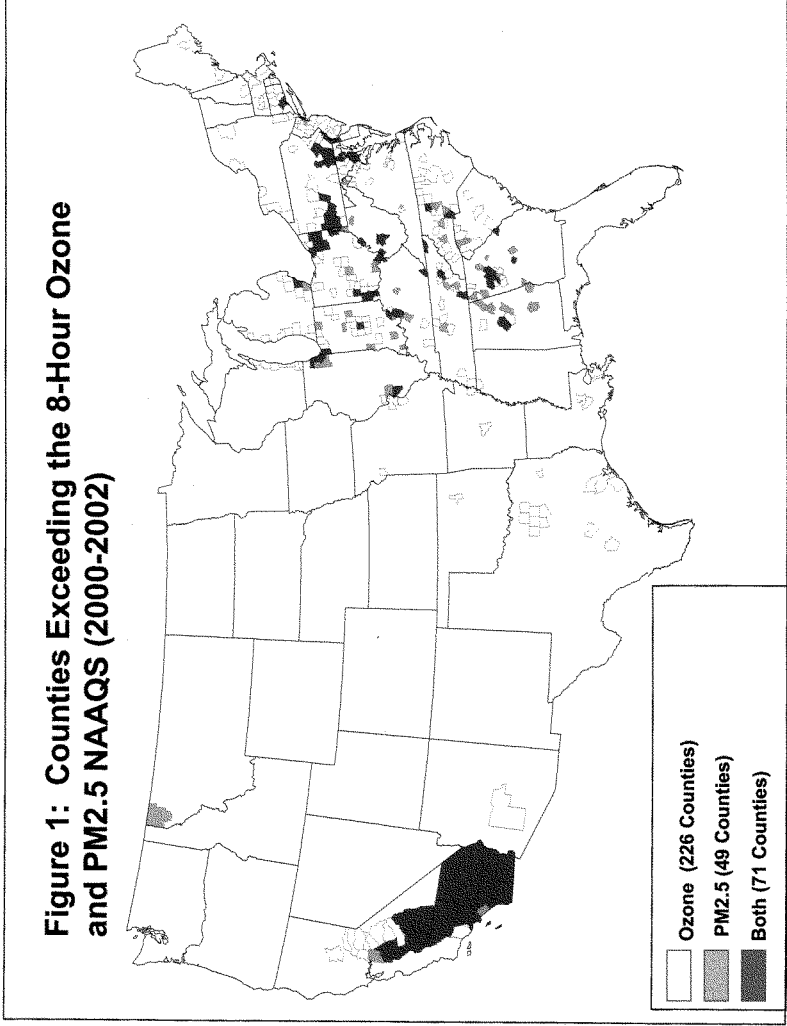
With the legal issues settled, and our understanding of the science even further advanced, we are focusing on implementation of the standards. When the PM_{2.5} and 8-hour ozone standards were adopted, some raised significant concerns about whether it was possible to reduce air pollution enough to meet the standards at a reasonable cost. The picture is much improved since 1997. Today we already have proposed or adopted national programs that will bring many areas in the country into attainment with these standards at a reasonable cost. Our past experience under the Clean Air Act suggests that the development of cleaner technologies, which is continuing on many fronts, will help even the areas with the most difficult pollution problems make progress at a reasonable cost in new ways we cannot identify today.

My testimony will focus on two different aspects of implementing these standards. First, in the Clean Air Act, Congress established a framework for attaining air quality standards. This framework includes milestones for defining the scope of the problem, setting forth solutions, and measuring progress. Today I will report on where we are in meeting these milestones. The second major aspect of implementation is identifying and achieving the emission reductions necessary for communities to meet the standards. We are doing this in a better way than we have done in the past. Even though we are at a relatively early stage in the implementation process (State plans are not due until 2007), we have already identified major steps that EPA needs to take at a Federal level and are well on our way to adopting these measures. We are also working with our State, Tribal and local partners to address ozone and fine particle problems in a coordinated manner. We have put together a package of actions combining Federal action on stationary, mobile and nonroad sources that put us on the way toward meeting the national standards for fine particles and ozone.

BACKGROUND

Before discussing *what* we are doing to reduce fine particle and ozone pollution, I would like to explain *why* we need to reduce this pollution to bring healthy air to our communities.

Of the many air pollutants regulated by EPA, fine particle pollution is perhaps the greatest threat to public health. Dozens of studies in the peer reviewed literature have found that these microscopic particles can reach the deepest regions of the lungs. Although it is difficult to establish causality, exposure to fine particles is associated with premature death, as well as asthma attacks, chronic bronchitis, decreased lung function, and respiratory disease. Exposure is also associated with aggravation of heart disease, leading to increased hospitalizations, emergency room and doctor visits, and use of medication. Based on 2000–02 data, 65 million people live in counties showing violations of the fine particle standards (see Figure 1). At the present time, $PM_{2.5}$ violations are occurring primarily in California and in the eastern half of the United States.



Particulate matter is the general term used for a mixture of solid particles and liquid droplets found in the air. $PM_{2.5}$ describes the “fine” particles that are less than or equal to 2.5 micrometers in diameter. $PM_{2.5}$ is formed mostly through atmospheric chemical reactions. These reactions involve a number of precursor gases including sulfur dioxide (SO_2) from power plants and industrial facilities; nitrogen oxides (NO_x) from power plants, automobiles, diesel engines, and other combustion sources; carbon formed from organic compounds, including a number of volatile organic compounds from automobiles and industrial facilities; and ammonia from animal husbandry. These chemical reactions take place in the hot summer and cooler autumn and winter seasons. $PM_{2.5}$ can also be emitted directly from certain sources, such as industrial facilities, diesel engines and fire. $PM_{2.5}$ concentrations can be elevated at all times of the year, not just in the summertime. Changing weather patterns contribute to yearly differences in $PM_{2.5}$ concentrations from region to region. Also, $PM_{2.5}$ can also be transported into an area from sources found hundreds or thousands of miles upwind.

Ground-level ozone continues to be a pollution problem in many areas of the United States. Ozone (a major component of smog) is a significant health concern, particularly for people with asthma and other respiratory diseases, and children and adults who are active outdoors in the summertime. Ozone can exacerbate respiratory symptoms, such as coughing and pain when breathing deeply. Ozone may reduce lung function and inflame the linings of the lung. Ozone has also been associated with increased hospitalizations and emergency room visits for respiratory causes. Repeated exposure over time may permanently damage lung tissue. Based on 2000–02 data, more than 110 million people live in counties that have monitors registering violations of the 8-hour ozone standard (see Figure 1).

Ozone is rarely emitted directly into the air but is formed by the reaction of volatile organic compounds (VOCs) and NO_x in the presence of sunlight. Ground-level ozone forms readily in the atmosphere, usually during hot summer weather. VOCs are emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer and commercial products, other industrial sources, and biogenic sources. NO_x is emitted from motor vehicles, power plants, and other sources of combustion. Changing weather patterns contribute to yearly differences in ozone concentrations from region to region. Ozone and the pollutants that form ozone also can be transported into an area from pollution sources found hundreds of miles upwind.

CLEAN AIR ACT FRAMEWORK—MILESTONES FOR ASSESSING PROGRESS

The Clean Air Act establishes a joint Federal and State process for air quality management. The process starts when EPA sets (or revises) National Ambient Air Quality Standards (NAAQS.) These standards are based on the best available scientific information and are to be set at a level requisite to protect public health with an adequate margin of safety and to protect public welfare from adverse effects. Although States are given primary responsibility for developing plans to meet the standards, EPA also issues Federal rules that will result in emission reductions at a national or regional level.

In 1997, EPA set fine particle standards. Although EPA had previously issued standards governing particle pollution, this was the first time that EPA specifically regulated particles 2.5 microns or smaller. At the same time, EPA also set a new ozone standard, measured over 8 hours instead of 1 hour, that is more protective of public health. Setting these standards triggers Federal, state and local actions to ensure that all areas in the country meet these standards. Although some of these actions were delayed due to litigation, we are now implementing these standards.

The first phase in implementing these standards is to assess and define the scope of the problem by designating areas with respect to their attainment status. The Clean Air Act requires that those areas that violate the standards, or contribute to a violation, be designated “non-attainment” areas. All other areas are attainment or unclassifiable. States, Tribes, and EPA collect data from air quality monitors and evaluate the results. The calculation for determining whether an area is violating the ozone or fine particle standard is based on 3-years of air quality data. Based on this data, States and Tribes recommend to EPA each area’s designation and, considering additional factors, also recommend to EPA each area’s boundaries. EPA responds to the recommendations and explains any modifications to the State and tribal recommendations. Then, EPA issues a final action setting each area’s boundaries and its designation. As part of this process for many ozone areas, EPA also sets the date by which each non-attainment area must come into attainment. Air quality designations inform citizens living and working in an area of the quality of air that they are breathing.

Under the Clean Air Act, once an area's designation as a non-attainment area becomes effective, a number of Clean Air Act provisions designed to bring areas into attainment are triggered. States, some Tribes, and local governments develop implementation plans that contain enforceable measures to reduce emissions and demonstrate that non-attainment areas will come into attainment. These plans can rely on a combination of Federal, State and local measures to achieve the necessary air quality improvements. These plans generally are due 3 years after the effective date of the designation of a non-attainment area. EPA reviews these plans to ensure that they meet the minimum Clean Air Act requirements.

Progress on Milestones for Fine Particles

We are in the process of designating areas with respect to their fine particle attainment status. These designations will be based on data from a new monitoring network that Congress funded and that EPA and the States installed after the fine particle standards were set. Under the Consolidated Appropriations Bill of fiscal year 2004, States and Tribes were to give us their recommendations for designations of areas as attainment, nonattainment or unclassifiable and for the boundaries of those areas in February 2004. As of March 19th, 44 States and 2 Tribes have submitted their recommendations. In late summer, we will send letters to the States responding to their recommendations. The public will have an opportunity to submit additional information before EPA designates areas in December 2004.

Fine particle State Implementation Plans (SIPs) will be due in February 2008. EPA intends to propose a rule this June that would describe the minimum elements required for a fine particle SIP, and intends to finalize this rule later this year or early in 2005. The Clean Air Act requires areas to attain the fine particle standards as expeditiously as practicable. Given the guidance in the Clean Air Act, attainment dates for PM_{2.5} are expected to range from about 2010 to 2015 depending on the severity of the air quality problem and other factors.

Progress on Milestones for Ozone

We are farther along in designating areas with respect to their ozone attainment status because we already had an ozone monitoring network in place when we issued the revised ozone standards in 1997. States and Tribes have submitted their recommendations, EPA has provided initial responses to those recommendations and given the public an opportunity to comment on them. No later than April 15, 2004, EPA will issue a final action designating all areas of the country with respect to their 8-hour ozone attainment status. (This date is set forth in a consent decree entered to resolve a lawsuit).

As a former Governor, I know that, for many non-attainment areas, setting the area's boundaries is not a decision to be made lightly. I have already spent much time talking to representatives of specific areas and States to ensure that EPA is adequately taking specific local circumstances into account. In setting boundaries, EPA started with the presumption that they should mirror the boundaries of the consolidated metropolitan statistical area (CMSA) or metropolitan statistical area (MSA) (as defined in 1999). The presumed boundaries can be adjusted, however, based on 11 factors that EPA negotiated with the States. These factors include traffic and commuting patterns, meteorology, population density, and location and size of emissions sources. EPA's role is to ensure that the law is applied consistently across the country, while taking into account the particular facts in each area. Decisions about non-attainment areas in one State or Tribal area can impact our choices in other areas. We are working with our Regional offices and the various Tribes and States now to ensure that the designations I make are fair and defensible.

After areas are designated nonattainment, they will have 3 years to submit plans demonstrating that they will attain the 8-hour ozone standard. The Clean Air Act requires areas to attain the ozone standards as expeditiously as practicable. Given the guidance in the Clean Air Act, attainment dates are expected to range from 2007 to 2019 depending on the severity of the ozone problem and other factors.

In response to the Supreme Court decision on the NAAQS, EPA is issuing an 8-hour ozone implementation rule to clarify the Clean Air Act requirements that apply to state plans for meeting the 8-hour ozone standard. We proposed this rule in June 2003, and will issue it as a final rule in two parts. The States, affected sources, environmental organizations, as well as the public at large, have offered substantial input in the development of this rule. The first phase of the rule contains a system for categorizing areas based on the severity of their air quality problem, sets deadlines for attaining the standards, defines when EPA will revoke the 1-hour ozone standards, and defines requirements to avoid "backsliding" or losing progress in air quality improvements as we make the transition from implementing the 1-hour standard to the 8-hour standard. We intend to issue this phase no later than April

15, 2004. We intend to finalize a second phase of this rule late this summer. After publication of the second phase of the rule, we anticipate providing an outreach program to facilitate States' understanding of the provisions of the rule.

IMPLEMENTING THE STANDARDS—PROGRAMS TO REDUCE OZONE AND
FINE PARTICLE POLLUTION

The Clean Air Act sets up the framework for assessing our air quality problems and our progress in addressing them, but in large part it leaves open what I believe is the most interesting and most pressing issue—how do we reduce pollution to make the air cleaner so that the standards are met. I am very pleased to report that we already have a plan to bring many areas of the country into attainment with these standards, even though we are just at the beginning of the time period that the Clean Air Act set up for the development of attainment plans. While we know that in some places local controls will be key for areas to attain the standards, EPA is focusing on the two major sources of pollution that are best controlled at the national level power plants and new mobile sources. By controlling these sources, we will eliminate or significantly reduce the fine particle or ozone pollution problem across large parts of the country. Thus, States will know the scope of the air quality issue they need to address, which will help them focus their planning efforts.

We have initiated as an agency and as a country what I believe will be the most productive period of air quality improvement in the history of our Nation. EPA projects that adopted and proposed regulatory measures, combined with other existing Federal and state programs, will bring well over half of the areas of the country into attainment with the fine particle and ozone standards between now and 2015. With these programs, even before new local controls are considered, our projections indicate that the number of Eastern counties in the United States violating the ozone and fine particle standards in 2015 will drop from 317 to 39, as highlighted in Figure 2. In addition to the health benefits of reducing fine particle and ozone pollution, these programs will also help improve visibility, decrease acid rain, and reduce eutrophication of our lakes, streams and rivers.

This tremendous progress is possible because we are putting forward a suite of air quality improvements that are about to become effective or will soon be adopted:

- the proposed interstate air quality rule, which should make even more dramatic cuts in power plant pollution;
- the NOx SIP Call, which States are implementing to reduce power plant emissions;
- standards for new cars, and light duty trucks and the fuels they use; standards for heavy-duty on-road diesel engines and the fuels they use;
- the proposed standards for new heavy-duty nonroad diesel engines (used in construction, agricultural, mining, airport service, etc.) and the fuels they use; voluntary diesel retrofit and idling programs to reduce emissions from the existing fleet, including school buses.

Power Plants

EPA has proposed the Interstate Air Quality Rule, which would cap power plant emissions of sulfur dioxide and nitrogen oxides in the East by 70 and 65 percent respectively below 2000 levels. This would go a long way to help many areas attain the fine particle standards and, to a lesser extent, the ozone standards.¹ Power plants emit 63 percent of the country's SO₂ emissions, which are a major contributor to fine particle pollution. They also emit 22 percent of man-made NOx emissions, which contribute to fine particle pollution year-round and to ozone pollution in the summer. We proposed that power plants reduce these emissions through a cap-and-trade program, which would tell industry what level of reductions are required but allow them to make them in the most economical way. Although we would prefer that Congress pass the President's proposed Clear Skies Act, the emission reductions are so important that we are moving forward to cut emissions administratively. I signed the proposed Interstate Air Quality Rule (IAQR) last December and intend to finalize it later this year. This rule will dramatically reduce fine particle pollution. We estimate that, in 2015, the IAQR as proposed would avoid 13,000 premature deaths and 1.3 million lost work days annually. Based on the most recent data (2000–02), 99 counties with monitors in the Eastern United States violate the fine particle standard. EPA projects that the proposed Interstate Air Quality Rule

¹To achieve the required reductions in the most cost-effective way, the proposal suggests that States regulate power plants under a cap and trade program similar to EPA's highly successful Acid Rain Program. Emissions would be permanently capped and could not increase.

and other Clean Air Act programs would bring 86 of these violating counties into attainment.

This year, EPA and 19 States and the District of Columbia will be complying with the NOx SIP Call, a 1998 rule pursuant to which power plants and large industrial sources will significantly reduce NOx emissions in the summer. Full implementation of the NOx SIP Call in 2007 (including Phase II, as proposed) is expected to achieve about a 1 million ton NOx emissions decrease annually. Compliance with the NOx SIP Call requirements will bring many areas into attainment with the 8-hour ozone standard, and the IAQR will further help the remaining non-attainment areas meet the standards.

Since 1995, EPA has been implementing the Acid Rain Program to reduce SO₂ and NOx emissions from power plants nationwide. The centerpiece of the program is an innovative, market-based "cap-and-trade" approach to achieve a nearly 50 percent reduction in SO₂ emissions from 1980 levels. The results of the program have been dramatic and unprecedented. Compliance has been nearly 100 percent. Reductions in power plant SO₂ emissions were larger and earlier than required, providing earlier human health and environmental benefits. Now, in the tenth year of the program, we know that the greatest SO₂ emissions reductions were achieved in the highest SO₂-emitting states; acid deposition dramatically decreased over large areas of the eastern United States in the areas where reductions were most critically needed; trading did not cause geographic shifting of emissions or increases in localized pollution (hot spots); and the human health and environmental benefits were delivered broadly. The compliance flexibility and allowance trading has reduced compliance costs by 75 percent from initial EPA estimates.

Cars, trucks, school buses and other mobile sources

Emissions of NOx and other pollutants will decrease significantly as a result of a series of EPA regulations controlling emissions from new mobile sources and the fuels they use.

EPA has proposed, and will finalize in the near future, new emission standards for nonroad diesel engines used in construction, agricultural, and industrial operations. These engine standards will be combined with requirements limiting sulfur in the fuel for these engines, which will allow optimal performance of the engines' pollution control equipment. EPA's proposed nonroad standards are estimated to reduce 127,000 tons of PM and 826,000 tons of NOx in 2030, which is estimated to prevent annually in 2030 9,600 premature mortalities, 16,000 non-fatal heart attacks, over 8,300 hospital admissions, and 5.7 million days when adults must restrict their activity because of pollution related respiratory symptoms.

The benefits of the proposed nonroad rule will be added to those from two other mobile source rules. With this model year (2004), 25 percent of cars and light trucks must comply with the Tier II program, announced in 1999, which established tighter tailpipe standards for new passenger vehicles and limited the amount of sulfur in gasoline. The program will be fully phased in by 2009. The heavier light-trucks have a slightly delayed phase-in schedule, with 100 percent by 2009. This rule required for the first time that larger vehicles like SUVs, minivans and pick-up and trucks meet the same standards as cars. The associated gasoline sulfur standards will ensure the effectiveness of low emission-control technologies in vehicles. These new standards require passenger vehicles to be 77 to 95 percent cleaner than those on the road today.

Fine particle and ozone pollution will also decrease as a result of a rule announced in 2000 to clean up pollution from new diesel trucks and buses. When fully in effect, these rules will result in diesel trucks and buses being 95 percent cleaner than today's models for smog-causing emissions and 90 percent cleaner for particulate matter. The rule also requires very low sulfur diesel fuel to enable the use of advanced aftertreatment technologies. As a result of this program, there will be a dramatic transformation of diesel engines over the next decade. We estimate that this program will prevent 8,300 premature deaths and 1.5 million lost work days.

Although EPA's mobile source standards will reduce pollution from new mobile sources, they do not require reductions from existing vehicles and equipment. Given the long life span and high level of emissions from existing diesel engines, significant air quality benefits are possible by reducing these emissions. EPA is working with state and local governments on creative, voluntary programs to reduce emissions from existing engines. For example, the President has requested \$65 million in fiscal year 2005 funding for the Clean School Bus USA program, which would assist school districts across the country in replacing or retrofitting school buses.

Clean School Bus USA addresses the growing concerns about children's exposure to diesel exhaust. The vast majority of the nation's schools buses are older technology diesel buses that produce as much as six times the pollution as a new school

bus. Since school buses can remain in service for 30 years, today's kindergartner will have graduated from college by the time the full benefits of the new engine standards are fully realized. Some of the cleaner technologies that will be used to meet future diesel emission standards are available now and are practical for use in today's school buses. Clean School Bus USA is designed to jump-start the process of upgrading the fleet so that today's generation of school children can reap the benefits of technologies that are available now to reduce emissions.

CONCLUSION

Bringing healthy air to our communities is a responsibility we all share. I am proud to report that EPA is doing its part to bring areas into attainment with the fine particle and ozone standards by issuing tight controls on power plants and new mobile sources. We are looking forward to continuing to work with state and local governments to ensure that all communities have healthy air.

Figure 2: 2015: Counties Projected to Exceed the 8-Hour Ozone and PM2.5 NAAQS Without Additional Local Measures



RESPONSES BY MICHAEL O. LEAVITT TO ADDITIONAL QUESTIONS
FROM SENATOR INHOFE

Question 1. It is not clear that EPA has provided sufficient supporting data and analysis for the regional EGU proposed reductions in Phase II. This could mean that EPA's findings concerning Phase II EGU regional reduction requirements are premature, or subsequent corrections may be needed. EPA has not provided modeling of Phase I projected reductions, nor has it indicated that it is appropriate to do so.

Has EPA considered updating emissions inventories for Phase II by conducting additional studies and modeling on Phase I that include (1) all emission reductions made in upwind states and (2) local and statewide reductions in downwind states in order to assess what appropriate targeted additional emissions reductions are required from EGUs in order to bring the remaining non-attainment areas into attainment?

Response. EPA established the list of states subject to the proposed CAIR using a "contribute significantly" test on the basis of their modeled contribution to non-attainment in 2010 and the cost-effectiveness of obtaining state-level emissions reductions. In a separate and independent step we evaluated the ability of states—assuming that they controlled specified sources—to comply with the level of emissions reductions we determined to be highly cost-effective. In that separate step we determined that the highly cost-effective reductions could not be fully achieved by 2010, due to logistical and other resource reasons. Our proposed solution for achieving the full level of reductions determined to be highly cost-effective is to implement the reductions in two phases, with the Phase I effective in 2010 and Phase II effective in 2015. The proposed rulemaking reviews our analysis of local control measures, as well as the basis for our conclusion that the reductions for upwind States are required. We will address this issue in the final rule documents.

Question 2a. Has EPA considered modifying the cost-effectiveness component (costs per ton) of its "significant contribution" test in order to measure the comparative cost-effectiveness of upwind reductions on downwind states to assure that both the most effective and the lowest cost reductions are being pursued for bringing the remaining non-attainment areas into attainment?

Response. This question raises an important issue, and one on which the Agency has requested public comment and will address in the final decision on CAIR.

In the proposed CAIR, EPA proposed to use the same approach for determining "significant contribution" that it had used in the NO_x SIP Call, which was upheld by the United States Court of Appeals for the District of Columbia Circuit. In the NO_x SIP Call, EPA included both an air quality and a cost-effectiveness component in the determination of whether one state "significantly contributes" to another area's non-attainment problem. In that rule, EPA defined the cost component of the "contribute significantly" test in terms of a level of cost effectiveness (i.e., dollars spent per ton of emissions reductions), and then looked at whether controls were "highly cost effective."

To determine what controls (if any) would be "highly cost-effective" for power plants, EPA compared power plant controls to other recently adopted SO₂ and NO_x control strategies. This evaluation provided ranges of cost-effective control strategies. EPA believes that controls with costs toward the low end of the range may be considered to be highly cost-effective because they are self-evidently more cost effective than most other controls in the range.

EPA's analysis also looked at other factors, including the applicability, performance, and reliability of different types of pollution control technologies for different types of sources, and other implementation costs of a regulatory program for any particular group of sources. Based on these considerations, EPA proposed requirements based on highly cost-effective emissions reductions obtainable from electric generating units.

After determining highly cost-effective controls through these criteria, EPA then conducted air quality modeling of the resulting amount of emissions reductions. EPA believes that the observed air quality improvements confirm that the highly cost-effective controls are needed.

EPA also noted in the preamble to the proposed CAIR that comparisons of the cost per ton of pollutant reduced from various control measures should be assessed carefully. Cost per ton of pollutant reduction is a convenient way to measure cost effectiveness, but it does not take into account the fact that any given ton of pollutant reduction may have different impacts on ambient concentration and human exposure. These differences would depend on factors such as the relative locations of the emissions sources and receptor areas, and the mix of pollutants in the atmosphere. EPA solicited comment in the CAIR proposal on whether to take such consid-

erations into account and what, if any, scientifically defensible methods may be available to do so.

Question 2b. Do you believe EPA has the CAA regulatory burden to make an affirmative finding on a state-by-state basis that each state in Phase I should be included in Phase II due to a continuing “significant contribution” to downwind nonattainment after considering local and intrastate measures in downwind states?

Response. EPA established the list of states subject to the proposed CAIR using a “contribute significantly” test on the basis of their modeled contribution to nonattainment in 2010 and the cost-effectiveness of obtaining state-level emissions reductions. In a separate and independent step we evaluated the ability of states—assuming that they controlled specified sources—to comply with the level of emissions reductions we determined to be highly cost-effective. In that separate step we determined that the highly cost effective reductions could not be fully achieved by 2010, due to logistical and other resource reasons. Our proposed solution for achieving the full level of reductions determined to be highly cost-effective is to implement the reductions in two phases, with the Phase I effective in 2010 and Phase II effective in 2015. The proposed rulemaking reviews our analysis of local control measures, as well as the basis for our conclusion that the reductions for upwind States are required. We will address this issue in the final rule documents.

Question 2c. Do downwind states have primary responsibility for bringing areas into attainment and maintaining attainment?

Response. The state (or states) where the designated non-attainment area is located has responsibility for planning for attainment of the standards. This would include coordinating with other States that contribute to the non-attainment problem. However, regardless of downwind states’ efforts to coordinate solutions to the non-attainment problem, upwind states significantly contributing to nonattainment in downwind states have an independent, and equally important, responsibility to mitigate their interstate contribution.

Question 2d. Please provide us with your views on these points and any legal bases to conclude otherwise.

Response. Clean Air Act (CAA) section 101(a)(3) provides that “air pollution prevention . . . and air pollution control at its source is the primary responsibility of States and local governments. . . .” This provision assigns responsibility to all states—upwind and downwind—and neither limits responsibility to the downwind state nor assigns it primarily to downwind states. Various other sections provide requirements and mechanisms for controlling upwind emissions. These include, among others, section 110(a)(2)(D) (the “good neighbor” provision that requires every State implementation plan (SIP) to prohibit sources in the State from emitting emissions in amounts that contribute significantly to nonattainment in a downwind State), section 126 (which authorizes downwind States, or political subdivisions, to petition EPA to control upwind sources that significantly contribute to downwind nonattainment), section 176A (which establishes interstate transport commissions), section 184 (which establishes special requirements for control of interstate ozone). These provisions indicate that Congress has apportioned responsibility for achieving clean air to the upwind significant contributors. We are not aware of legal authority to the contrary.

Question 3a. Before proceeding with Phase II, and in order to assure that the estimated health benefits are realized, it would be prudent for EPA and other government agencies to conduct speciation studies specifically aimed at the different components or subspecies of PM_{2.5} to identify those components associated with the greatest ill-health effects. John Graham, Director of the OMB Office of Information and Regulatory Affairs, has urged EPA to redirect research funds to address this very issue when he stated in his December 2001 letter to then-EPA Administrator Christine Todd Whitman that there is “emerging evidence that some types of fine particles may pose a greater health risk.” At that time, Dr. Graham recommended that EPA retarget some of its research budget to study the *comparative* effects of different types of particles.

“If research can identify those particles most responsible for health risks, it may be possible to design controls that do more for public health and cost the economy less than would occur through policies that assume all particles are equally toxic.”

What actions has EPA taken to fund additional PM speciation studies targeted at the relative toxicity of different components of PM and what studies will be completed before Phase II has gone into effect?

Response. EPA's Particulate Matter Research Program comprises a coordinated effort that targets not only what health effects arise from exposure to air pollution, but also what attributes of particulate matter (PM) are "causal" with regard to health. EPA agrees with Dr. Graham that information from this research may be important in ensuring that control strategies are designed and focused on the PM sources that most strongly impact public health, and to provide a sound scientific basis for the development of future PM standards. Consistent with both the recommendations of the NRC panel on research priorities for particulate matter and Dr. Graham's comments, EPA has invested substantial funding to support research into the potential "causal attributes" of the relationship between particulate matter and health effects, including both physical measures, such as size, and of course chemical composition. As recommended by the National Research Council Committee on PM research priorities, source attribution has evolved to become the focus of the PM Research Program. This research spans the spectrum from empirical laboratory studies to those in the field and is being integrated between health effects and monitoring.

Examples of EPA research addressing this question are the extramural toxicological studies in humans and animals using combustion derived PM—initially diesel emissions, which have become a growing concern. EPA has redirected efforts from other sources that now are better understood (e.g., metals from oil fly ash) to exploring empirically the role of organic materials in lung, cardiac, and systemic outcomes. These studies are cross-laboratory and encompass significant investment in directed source understanding. Speciation profiles from the sources and the inclusion of novel approaches are being explored in an effort to develop biologic profiles with sources which can be used in field studies. The Detroit Exposure and Aerosol Research Study (DEARS) is a new project starting this year and continuing for the next several years to link personal PM-component exposures to local monitoring data and source attributed contributions in people strategically selected around Detroit. This area has multiple sources making it ideal for such study. The associated Children's Asthma Study that follows school children in the area who are most exposed to mobile sources is expanding that source data base from the El Paso studies reported 2 years ago.

In addition, EPA is revising its monitoring program to decrease the multiple types of monitoring programs now in place to a more strategic and integrated program (NCORE). Considerable efforts have been made by the Air Office to ensure that EPA understands the needs of the research community with respect to air quality monitoring. Our goal is to devise a monitoring program that will serve to expand efforts in assessing regional PM compositional differences and associated health outcomes. In keeping with Dr. Graham's suggestion, we have tasked HEI with coordinating the design and execution of possible multi-pollutant, multi-city studies that would take advantage of our extensive monitoring to examine the role of specific components and sources. Indeed, HEI has already had workshops specifically on how the monitoring program can be used to enhance its research agenda to explore source attributed health effects.

A variety of these studies will be completed before Phase II goes into effect. However, given the our inability to predict the results of these studies, it is not possible to determine whether sufficiently informative information will be available in time for use in Phase II.

BACKGROUND ON STUDIES OF THE HEALTH RISK FROM PARTICLES

Several hypotheses regarding the role of specific PM components have emerged from EPA-sponsored and other research since 1997. The latest scientific information on these issues is included in the ongoing review of the scientific criteria and standards for PM. In essence, EPA's assessment is that the weight of evidence from multiple studies indicates that there are adverse, PM-associated impacts on human health, and that multiple components and combinations of the PM and gaseous pollutant mixtures may be involved.

Although much of what we know about the health effects of PM and its constituents comes from community epidemiological studies; the chemical composition of PM has received considerable scrutiny in toxicology studies. Studies of inorganic constituents have generated the most data to date. Sulfate and nitrate anions derived from combustion emissions or atmospheric processes usually combine with other constituents in PM, especially the water soluble materials. Although the intrinsic, independent toxicities of sulfate and nitrate appear to be rather low, such components are associated with adverse health effects in a number of studies. It is hypothesized that these substances may influence the toxicity or bioavailability of other PM components. Little is actually known about the cardiovascular effects associated

with acidic aerosols, and the possibility that they might mediate some of the reported PM effects is now being explored in EPA-funded programs.

EPA toxicology studies have found that inhalation of certain metals resulted in inflammation in the lung and cardiac arrhythmias. While these studies were conducted with doses or concentrations of PM higher than typical ambient conditions, they demonstrate the potential for similar effects to occur in humans. Nevertheless, perhaps the most striking evidence for the importance of metals is from studies of PM-associated metals extracted from ambient filters in the Utah Valley at the site of a steel mill that was temporarily closed because of a labor dispute. Human and animal exposure studies, as well as laboratory tests, using material from particles collected when the plant was open and closed observed a similar pattern and types of effects. These EPA-supported studies corroborate the results of a separate study that found a decrease in hospital admissions for similar causes in the local population while the plant was closed.

EPA is investing substantial resources toward investigating the toxicity of other chemical attributes of PM. For example, organic constituents are of particular concern, due, in large part, to the contribution of various industrial sources as well as diesel and other mobile sources to the fine PM fraction. While not as directly toxic as some of the metal compounds, certain organic compounds appear to be able to generate oxidants that might have delayed or subtle effects not readily measured by conventional methods.

Question 3b. What procedures does EPA have in place to incorporate the results of these studies (and other studies conducted worldwide on this subject) into decisions on the design of Phase II?

Response. The proposed Clean Air Interstate Rule (CAIR) is driven in large part by the need to address significant contributions of upwind sources to non-attainment by downwind areas of the primary and secondary PM_{2.5} and ozone standards. We have chosen to propose implementation of cost effective reductions in two phases based on our assessment of the feasibility and costs associated with eliminating such significant transport that contributes to non-attainment.

Based on the information we have on the health and visibility effects of PM and its components, Phase II of the proposed CAIR is appropriate and necessary, and is likely to produce very significant health and environmental benefits.

The most appropriate vehicle for incorporating new information would be the process Congress established in the Clean Air Act for reviewing and, as appropriate, revising the ambient air quality standards for fine particles. If new, peer-reviewed information on the health effects of fine particles or components of fine particles becomes available, it should be incorporated into an appropriate future review of the criteria and standards for particulate matter, and, if necessary, an additional rule-making might also be appropriate to determine whether changes to Phase II of CAIR would be appropriate.

Question 4a. Should EPA measure the "significance" of upwind contributions to PM_{2.5} non-attainment in terms of relative contribution to the exceedance level?

Response. EPA is currently conducting a rulemaking process, including reviewing public comments, to decide the appropriate way to measure the significance of upwind states' contributions to downwind non-attainment areas. Your question raises an issue that we are considering and that will be addressed more fully in the documents supporting the final Clean Air Interstate Rule (CAIR).

To determine which states are significantly contributing to downwind nonattainment and what level of emissions reductions should be required, in CAIR, EPA has proposed to use the same basic approach for determining "significant contribution" that it used in the NOx SIP Call, which was upheld by the United States Court of Appeals for the District of Columbia Circuit. In the NOx SIP Call, EPA included both an air quality and a cost-effectiveness component in the determination of whether one state "significantly contributes" to another area's ozone non-attainment problem.

The proposed air quality impact assessment for PM_{2.5} involves evaluating the impact of SO₂ and NOx emissions from upwind states on downwind nonattainment of the annual average PM_{2.5} standard. EPA has proposed that a state's maximum impact on the most affected downwind non-attainment area is the critical metric for determining inclusion under the air quality component of the two-part test. Using this metric, EPA proposed that a state that is causing at least 0.15 ug/m³ impact on a downwind area's annual average PM_{2.5} level would be subject to emissions reduction requirements. EPA is taking comment on this and other proposed metrics.

Prior to issuing the proposed CAIR, EPA considered several other metrics to quantify the relative contribution of upwind states to downwind receptors. For example, EPA examined the contribution above the level of the annual PM_{2.5} NAAQS

of upwind states to downwind nonattainment. This metric does not substantially change the relative ordering of upwind states with downwind impacts when compared to the maximum impact metric (which EPA proposed to use).

Question 4b. In the IAQR, a state emissions budget is determined based on IAQR percent reduction of the overall regional emission inventory. Thus, a state contributing a relatively small amount to downwind non-attainment is treated the same as a state contributing a relatively large amount to downwind non-attainment. Emission budgets are set for the states without regard to the impact of those states on downwind non-attainment. The net result could be over-control in many areas and under-control in others. Please comment on this issue.

Response. In the CAIR proposal, EPA establishes emission budgets only for those states that the modeling shows contribute significantly to downwind nonattainment with the 8-hour ozone and fine particle standards. The state emissions budgets are based on control opportunities and not on differences in absolute downwind impact.

However, all of the measures in EPA's calculation for how a state would meet the emissions budget are highly cost effective, and in that sense there is no over-control in any state. As illustrated by our modeling predictions, some of the counties that we project will attain the ozone and PM_{2.5} NAAQS because of Federal measures, including the proposed Clean Air Interstate Rule, would have new design values below the level of the NAAQS. Given the uncertainties in the projections and the many advantages of a uniform level of control in the power sector (among the states affected), EPA believes this outcome is appropriate for this rule.

EPA-based emissions control responsibility, in part, on the relative cost-effectiveness of control measures, in terms of dollars per ton of pollutant reduction. Cost per ton of pollutant reduction is a convenient way to measure cost effectiveness, but it does not take into account the fact that any given ton of pollutant reduction may have different impacts on ambient concentration and human exposure, depending on factors such as the relative locations of the emissions sources and receptor areas. An alternative approach might adopt the effect of emission reductions on ambient concentrations in downwind non-attainment areas as the measure of effectiveness of further control. EPA solicited comment in the CAIR proposal on whether to take such considerations into account and what, if any, scientifically defensible methods may be available to do so.

There are counties and states for which the Clean Air Interstate Rule alone will not be enough for the area to reach attainment for ozone and PM_{2.5}, and in that sense there is under-control. These states will need to identify and implement appropriate additional local or state-wide measures. EPA believes this outcome is appropriate.

EPA solicited comment in the CAIR proposal on whether to take such considerations into account and what, if any, scientifically defensible methods may be available to do so.

Question 5. Why has EPA indicated a preference for states to conduct NOx allowance auctions and to have states retain the revenues? This is somewhat similar to a provision I changed in S.1844, the Clear Skies Act of 2003 because it reallocated wealth in a manner that encouraged increased reliance on natural gas when the Nation is facing difficulties meeting its current supply needs. What is your rationale for increasing the cost of emission control to power generators above and beyond the cost of the controls themselves?

Response. In the proposed rule and supplemental notice of CAIR, EPA proposed to give each state the flexibility to choose its own allocation method. EPA proposed an example allocation to give states the benefit of that information. In the proposal's preamble, EPA discussed various options available to states, including an auction. In the supplemental notice to the CAIR proposal, EPA provides an example allocation methodology that includes an input-based allocation for existing units with provisions for updating the data that will take new units into account.

Allocating allowances through an auction has a number of benefits. Auctions ensure that all parties, including the general public, have access to allowances. Auctions should also be the most economically efficient way to allocate allowances since sources would bid their perceived values for allowances. Auctions treat existing and new sources in a similar fashion. Auctions also eliminate the permanent right to emit and can provide distortion-free revenues to States.

State auctions of some portion of their allowances should not encourage increased reliance on natural gas. Since allowances have a value in the allowance markets, allocating them for free impacts the distribution of wealth among different generators. However, any generator selling in a market would seek to operate (and burn fuel) to meet energy demand in a least cost manner, and this does not depend on how the permanent allowances were allocated. Thus, the choice of method of allo-

cating permanent allowances whether distributed on the basis of a historic baseline or auctioned, would not be expected to result in increased reliance on natural gas, or in fact result in changes in generators' choices for fuel consumption.

Question 6. EPA also stated in the Preamble of the proposed rule that it might require states to auction a portion of a state's allowance budget and to fully retain the revenues for a state to use as it sees fit. What authority does EPA cite for such a mandate?

Response. The preamble of the proposed CAIR states that EPA "strongly encouraged each State to consider reserving a portion of its allowance budget for an auction." EPA has not proposed to require such an approach.

RESPONSES BY MICHEAL O. LEAVITT TO ADDITIONAL QUESTIONS
FROM SENATOR VOINOVICH

Question 1. In your testimony, you mention a "suite of air improvements" that will help bring counties into attainment. How do you expect these Federal regulations to be consolidated into State Implementation Plans?

Response. When states prepare their state implementation plans, including demonstrations of how they will bring areas into attainment with the NAAQS, states are allowed to take into account the projected emission reductions from Federal regulations. EPA provides guidance to States on how to calculate credit for emission reductions for federally mandated control measures. For instance, for highway mobile source emissions, EPA updates the "MOBILE" model used to calculate future emission factors (grams of emissions per vehicle mile) for various operating conditions. In preparing the demonstration of attainment for its implementation plan, a State would project emissions into the future—accounting for all currently applicable emission limits, including Federal measures—and use those emissions projections as input to a photochemical grid model to predict ambient ozone concentrations. If those concentrations show that the area would continue to be violating the ozone standard at the future date, the State would have to adopt sufficient additional control measures such that the concentrations would be indicative of attaining the standard.

In addition, EPA performs photochemical modeling on a broader scale, sometimes covering a number of States, to assess the effect of national and regional control measures on transported ozone and precursor emissions. In performing their own atmospheric modeling for specific non-attainment areas, the State would account for the future effects of those national and regional measures (viz., lowering future ozone concentrations) that affect those non-attainment areas based on the EPA modeling.

Question 2. EPA has concluded that attainment will be reached in many counties as a result of the Interstate Air Quality Rule (IAQR) and several other new Federal standards. However, the IAQR has been proposed to be implemented in two phases with deadlines of 2010 and 2015 and Subpart 1 non-attainment areas must demonstrate attainment by 2009 or 2014. What effect does this mismatch have on EPA's analyses? Is EPA considering synchronizing these years?

Response. Assuming that EPA finalizes PM_{2.5} designations by the statutory deadline of December 2004, the PM_{2.5} attainment deadlines would be no later than early 2010, or no later than early 2015 for areas receiving a maximum 5-year extension. In addition, the Administrator can grant up to two 1-year extensions under certain circumstances. EPA's modeling analysis of projected air quality in the years 2010 and 2015 will provide useful information to states with non-attainment areas. Because of the structure of the proposed CAIR emissions trading program, which creates a strong financial incentive for early reductions to "bank" allowances, EPA projects that many participating power plants will begin to reduce SO₂ emissions prior to the phase I emissions cap year of 2010. (For purposes of attainment of the PM_{2.5} standard, early SO₂ reductions are more beneficial than early NO_x reductions.) These substantial early reductions should provide air quality benefits even for non-attainment areas with attainment dates in early 2010.

When a state develops and submits its overall implementation plan in 2008, it will need to provide for each area a demonstration supporting a date for attainment that is "as expeditiously as practicable." In its demonstration, the state will be able to take credit for any emission reductions projected under CAIR in addition to any reductions projected from other national, state, and local programs. Based on its analysis, the state will need to propose an attainment date for each of its non-attainment areas. The proposed attainment date can range up to 2015, depending on factors specific to each area. Thus, the CAIR modeling for 2010 and 2015 will pro-

vide important information about potential air quality benefits from the EGU reductions. Because attainment dates will be established on a case-by-case basis, we believe that the modeling for CAIR will provide useful information to support state attainment planning.

Question 3. You stated in your testimony that you “prefer that Congress pass the President’s Clear Skies Act.” Why is legislation better than the regulatory approach you are now taking? How specifically is the legislation better for helping states and localities meet the NAAQS?

Response. The President committed to enacting multi-pollutant legislation using a flexible market-based program which would reduce NO_x, SO₂ and mercury, and increase regulatory certainty for the utility sector. EPA was directed by the President to propose this legislation the Clear Skies Act—and work with Congress to enact it. Clear Skies is a strong nation-wide program that requires statutory changes. Comparing our experience on the Acid Rain Program with the NO_x SIP Call and the Section 126 petitions demonstrates the benefit of having certain key issues resolved by Congress rather than left to Agency rulemakings. Congressional resolution of key issues decreases the possibility that the program will get tied up in protracted litigation, provides states with greater certainty of the timing of the reductions, and ensures a consistent, nation-wide market system.

Question 4. During the hearing, I inserted a letter into the record from Ohio EPA that was sent to EPA’s Region 5 office about Knox County in Ohio. The letter was amending Ohio’s recommendation to only include part of Knox County. On April 15, EPA designated several counties across the Nation as only in partial nonattainment for the standards but not Knox County. What criteria did EPA use in making a determination on whether to designate a county as partial nonattainment?

Response. Knox County, contiguous to the Columbus consolidated metropolitan statistical area (C/MSA), was measuring a violation (88ppb) of the 8-hour ozone national ambient air quality standard based upon the most recent air quality data (2001–2003). EPA’s policy was to designate full counties as nonattainment if they had a violating ozone air quality monitor and had no other “clean” monitors in that same county. This was the case for Knox County, Ohio. Exceptions to this policy were made for very large western counties, counties divided by high mountain ranges, and mountain top/national park areas—none of which applied to Knox County. Also, since cities and townships are the building blocks for OMB’s C/MSA definitions in the New England states, EPA honored this distinction.

Question 5a. What has been EPA’s experience with the effectiveness of emissions testing programs?

Response. Regardless of their individual design, stringency, or level of enforcement—all of which can impact the effectiveness of individual vehicle inspection and maintenance (I/M) programs—the overall effectiveness of I/M as a control strategy varies depending upon the timeframe under consideration. For example, an I/M program developed in response to the 1990 Clean Air Act’s (CAA) original I/M requirements is likely to have been more effective in terms of tons of excess emissions reduced than is likely to be the case with a brand-new I/M program starting today. Vehicle standards and relative vehicle durability have evolved over time, as has the proportion of vehicles built to meet these changing standards. The in-use fleet of vehicles is constantly turning over to cleaner and more durable vehicles. One of the side effects of this fleet turnover is that the mass of excess emissions from which the I/M credit is drawn is itself shrinking. It is also important to note that the effectiveness of an individual I/M program will vary depending upon when in the program’s lifetime it is being evaluated. For example, a brand-new I/M program tends to be at its most effective during the first few test cycles, when previously undetected vehicle tampering and years of poor maintenance can be identified for the first time and corrected.

Studies that purport to assess the effectiveness of individual I/M programs have varied widely in their conclusion depending on the type of I/M program being evaluated, when, and at what age, using what combination of evaluation methodologies. That is why the National Research Council’s (NRC) July 2001 report, “Evaluating Vehicle Emission Inspection and Maintenance Programs,” refrained from providing a one-size-fits-all assessment of I/M effectiveness based upon its survey of numerous I/M effectiveness studies. Instead, the NRC reported a range of potential I/M effectiveness. As a general matter the turnover of the automotive fleet to cleaner vehicles with improved durability reduces the emissions impact of I/M programs over time. EPA took this into consideration, among many other factors, in updating the emission impact of I/M programs in its MOBILE model in 2003. Nevertheless, the re-

maining air quality benefits of I/M are still significant and needed by many areas in the country—a conclusion echoed by the NRC's July 2001 I/M report.

Question 5b. What are some alternatives?

Response. Under the Clean Air Act, the level of flexibility and discretion an area has with regard to adopting I/M versus some alternative measure depends on several criteria, most notably: (1) air quality classification, and (2) local urbanized population. For example, if an ozone non-attainment area is classified as serious or worse, and it has a 1980 Census-defined urbanized population of 200,000 or more, the 1990 Act requires that such an area implement an enhanced I/M program as a non-discretionary, mandatory measure¹. Similarly, if an ozone non-attainment area is classified as moderate, and it has a 1990 Census-defined urbanized population of 200,000 or more, such an area must implement a basic I/M program (at a minimum).

On the other hand, an ozone non-attainment area that has successfully redesignated to attainment may be able to shift its I/M program from an active to a contingency measure if it can demonstrate that doing so will not interfere with the area's ability to meet its other, applicable requirements under the CAA. One way an area can demonstrate such non-interference is by replacing the emission reductions lost as a result of discontinuing the I/M program with reductions from other, non-mandatory, previously unclaimed control measures. The range of possible alternative control measures that falls under these criteria will vary from area to area, depending upon what is already in (or required to be in) the applicable State Implementation Plan (SIP).

Question 5c. If a state chooses not to continue an emissions testing program, does their SIP need to make up these reductions in addition to what is needed to meet the new standards?

Response. If an existing I/M program area which was previously only required to have a basic I/M program has already or can successfully redesignate to attainment for the 1-hour ozone standard (and is not classified under the 8-hour standard at a level which would trigger the I/M requirement on its own) then the area may qualify to shift the I/M program from an active measure to a contingency measure as part of the area's maintenance plan. Before converting I/M to a contingency measure, however, the area must demonstrate that doing so will not interfere with the area's ability to meet its other CAA requirements, including attainment of all applicable National Ambient Air Quality Standards (NAAQS). One way to demonstrate non-interference is by replacing the emission reductions lost as a result of discontinuing the I/M program with reductions from other, non-mandatory, previously unclaimed control measures. Such additional measures would need to be included as part of the SIP revision converting the I/M program to a contingency measure.

If an existing I/M area is not able to redesignate to attainment for the 1-hour standard prior to revocation of that standard on June 15, 2005 (and is also designated as nonattainment for the 8-hour standard, regardless of classification or subpart) then that area will be required to continue implementing an I/M program until it has attained the 8-hour ozone standard. Whether the I/M program that must be implemented is basic or enhanced will be determined by whichever ozone classification is worse—the area's 1-hour or 8-hour classification. For example, if an area was classified as serious nonattainment under the 1-hour standard (and was therefore required to implement an enhanced I/M program for that standard) but is classified as only moderate nonattainment for the 8-hour standard (which would normally only require a basic I/M program) the area must continue implementing an I/M program that meets the enhanced I/M performance standard. In other words, having a less severe classification under the 8-hour standard than under the 1-hour standard does not grant the I/M area a license to downgrade its program from enhanced to basic.

Question 6. Can EPA speed up their schedule for the PM_{2.5} implementation rule? What is EPA going to do to help communities and states deal with the unfamiliar PM_{2.5} non-attainment designations?

Response. The draft PM_{2.5} implementation rule has been transmitted to OMB for interagency review. We hope that the rule will be proposed soon.

EPA has been working with State and local air quality agencies in a number of ways in preparation for addressing non-attainment area problems. EPA has issued

¹ Within an Ozone Transport Region (OTR), enhanced I/M is required for any metropolitan statistical area (MSA) with a population of 100,000 or more, regardless of the area's attainment status for ozone.

a number of national rules in the past several years (e.g. Tier II on-road vehicle standards, heavy duty diesel engine standards, nonroad diesel engine standards) to reduce emissions of PM_{2.5} and its precursors, and we are actively working to finalize the Clean Air Interstate Rule to reduce SO₂ and NO_x emissions from electric generating units. We have a significant program in place to encourage and subsidize diesel engine retrofits in trucks, buses, and other vehicles. EPA has also provided grant funding to STAPPA/ALAPCO to develop a “Menu of Options” document providing technical information on technologies and programs to reduce emissions of PM_{2.5} and its precursor pollutants.

In addition, EPA has been working with State and local agencies on the improvement of a number of technical tools needed to assess future strategies for reducing PM_{2.5} concentrations. These tools include air quality models, emission inventories and emission factors, meteorological data bases, analyses of air quality monitoring data, analyses of chemical composition of PM_{2.5} in various urban areas, and specialized in-depth studies in several cities under the SUPERSITES monitoring program.

Question 7a. North Carolina recently filed a Section 126 petition against several “upwind” states, including Ohio, on the new 8-hour ozone and PM_{2.5} standards. What impact could the Section 126 petitions have on the implementation of the NAAQS?

Response. Section 126 of the Clean Air Act is designed to remedy interstate pollution transport. Section 126(b) authorizes States to petition EPA for a finding that major stationary sources or groups of sources in upwind states are contributing significantly to non-attainment problems in downwind states.

The North Carolina petition requests that EPA make a finding that emissions of sulfur dioxides (SO₂) and nitrogen oxides (NO_x) from large electric generating units in 13 States are contributing significantly to PM_{2.5} and/or 8-hour ozone non-attainment problems in North Carolina. EPA is currently evaluating the petition and has not yet proposed whether to grant or deny the petition.

If EPA grants the petition, EPA would establish Federal control requirements for the affected sources to mitigate the pollution transport. Reducing the interstate transport would assist the downwind petitioning State in achieving its clean air goals as well as providing cleaner air in the upwind States where the reductions would be occurring.

In a separate action published on January 30, 2004, EPA proposed the “Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (Interstate Air Quality Rule),” now known as the Clean Air Interstate Rule (CAIR). This action is a regionwide, state implementation plan (SIP) based transport program. That is, the action proposes to require 29 States and the District of Columbia to submit SIP revisions reducing SO₂ and/or NO_x emissions that are contributing significantly to PM_{2.5} and 8-hour ozone non-attainment problems in downwind States. North Carolina’s section 126 petition is seeking reductions from the same types of sources and pollutants as proposed in EPA’s CAIR. North Carolina’s petition relies, in part, on EPA’s findings and analyses supporting the CAIR proposal.

In the CAIR proposal, EPA observed that it may receive section 126 petitions, and that if it did, it would expect to approach them in the same manner as it approached section 126 petitions during the NO_x SIP Call rulemaking—which, like CAIR, was a regionwide SIP-based transport program—that is, to approve the section 126 petitions only in the event that States failed to fulfill their obligations under the CAIR.

Question 7b. Could the possibility of these petitions being successful undermine the ability of localities to adequately plan with some reasonable degree of certainty as to what actions they will be required to undertake to meet the NAAQS?

Response. As noted above, in the CAIR proposal, EPA observed that it expected to approve any section 126 petitions it may receive only in the event that States failed to fulfill their obligations under the CAIR. Under this approach, any obligations that might affect sources under the section 126 petitions would be consistent with the CAIR obligations. However, EPA is in the process of completing the CAIR rulemaking and beginning action on the North Carolina section 126 petition, and EPA cannot speculate as to the possible outcome of its action on the petition or the effect of that action on localities.

Question 8. Does the Agency plan to work, in consultation with DOE, to analyze the impact of the new NAAQS on fuel supply and demand?

Response. EPA will meet the obligations under E.O. 13211 to analyze energy implications of any Federal control programs that EPA adopts to help achieve the NAAQS and consult with DOE as required by Executive Orders.

RESPONSES BY MICHEAL O. LEAVITT TO ADDITIONAL QUESTIONS
FROM SENATOR CARPER

Question 1a. I understand that New Castle County in Delaware will be designated as a non-attainment area under the 8-hour ozone National Ambient Air Quality Standard. According to EPA modeling data for the Interstate Air Quality Rule, New Castle County is projected to be out of attainment in 2010 even with implementation of the proposed Interstate Air Quality Rule. When would New Castle County come into attainment if the Clean Air Planning Act were enacted?

Response. Under the Clean Air Planning Act (CAPA), we expect that New Castle County would come into attainment with the 8-hour ozone standards in the same timeframe as it would under either Clear Skies or the proposed Clean Air Interstate Rule (CAIR). We previously analyzed the projected impacts of CAPA on 8-hour ozone using a linear interpolation technique. This interpolation technique was based on changes in NOx emissions. The results of this analysis indicate that this Act would provide ozone reductions similar to the Clear Skies Act in 2010 and 2020 (which is not surprising given the similar levels of eastern NOx emissions projected under the two proposals). For New Castle County, our modeling for Clear Skies and the proposed CAIR indicates that this county would be out of attainment in 2010 under CAIR or Clear Skies and would be in attainment in 2015 with baseline control measures (i.e., with currently adopted control programs such as the NOx SIP Call and motor vehicle controls). (Modeling was not completed for interim years.) We expect the same attainment status and timeframe under CAPA.

Question 1b. When would Delaware's two other counties, Kent and Sussex, achieve attainment under the proposed Interstate Air Quality Rule?

Response. Our modeling for the CAIR proposal projects that both Kent and Sussex counties would be in attainment in 2010 with baseline control measures (i.e., currently adopted control programs such as the NOx SIP Call and motor vehicle controls). Modeling was not completed for interim years between the present day and 2010, so it is not possible to pinpoint the exact year in which attainment would be reached.

Question 1c. When would these three counties achieve attainment if the Clean Air Planning Act were enacted?

Response. We expect that each of these counties would achieve attainment of the 8-hour ozone standards under CAPA in the same timeframe as they would under Clear Skies or CAIR given that similar levels of eastern NOx emissions are projected under all three of these proposals.

Question 2a. I understand that numerous neighboring counties in the mid-Atlantic region states of Maryland, Pennsylvania, and New Jersey will be designated as non-attainment areas under the 8-hour ozone National Ambient Air Quality Standard. When will counties in these states come into attainment if the Interstate Air Quality Rule is enacted?

Response. Table 2-1 shows the 2010 and 2015 projections for ozone design values for counties in Maryland, Pennsylvania, and New Jersey under the modeling done for the proposed CAIR.¹ Counties with design values less than 85 ppb are projected to attain the 8-hour ozone standards. Many of the counties in these three states are projected to come into attainment in 2010 or earlier if the CAIR (formerly known as the Interstate Air Quality Rule) were adopted as proposed. (Note that we project future 8-hour ozone design values based on county-level 2000–2002 design values and the model-predicted change between a 2001 base case and each of the future year simulations.)

¹Tables 2–1 and 2–2 are based on modeling done for the proposed CAIR. When EPA issues the final rule, it will use updated information and modeling.

		2010 Ozone Projections (ppb)	2015 Ozone Projections (ppb)
State	County	2010 IAQR Control Case	2015 IAQR Control Case
Maryland	Anne Arundel	91	86
Maryland	Baltimore	85	82
Maryland	Carroll	81	78
Maryland	Cecil	90	85
Maryland	Charles	79	74
Maryland	Frederick	80	76
Maryland	Harford	93	88
Maryland	Kent	88	84
Maryland	Montgomery	81	78
Maryland	Prince Georges	85	81
Maryland	Washington	74	70
New Jersey	Atlantic	79	76
New Jersey	Bergen	87	86
New Jersey	Camden	92	90
New Jersey	Cumberland	85	81
New Jersey	Gloucester	95	92
New Jersey	Hudson	84	83
New Jersey	Hunterdon	89	86
New Jersey	Mercer	98	95
New Jersey	Middlesex	95	92
New Jersey	Monmouth	89	86
New Jersey	Morris	87	83
New Jersey	Ocean	104	101
New Jersey	Passaic	81	79
Pennsylvania	Allegheny	84	81
Pennsylvania	Armstrong	79	75
Pennsylvania	Beaver	81	78
Pennsylvania	Berks	80	75
Pennsylvania	Blair	70	67
Pennsylvania	Bucks	97	94
Pennsylvania	Cambria	75	71
Pennsylvania	Centre	73	69
Pennsylvania	Chester	83	79
Pennsylvania	Clearfield	74	70
Pennsylvania	Dauphin	79	74
Pennsylvania	Delaware	86	83
Pennsylvania	Erie	79	75
Pennsylvania	Franklin	79	74
Pennsylvania	Greene	75	72
Pennsylvania	Lackawanna	73	68
Pennsylvania	Lancaster	82	77
Pennsylvania	Lawrence	68	65
Pennsylvania	Lehigh	83	78
Pennsylvania	Luzerne	71	67
Pennsylvania	Lycoming	67	63
Pennsylvania	Mercer	80	75
Pennsylvania	Montgomery	89	88
Pennsylvania	Northampton	82	78
Pennsylvania	Perry	71	67
Pennsylvania	Philadelphia	92	90
Pennsylvania	Tioga	72	68
Pennsylvania	Washington	80	77
Pennsylvania	Westmoreland	76	72
Pennsylvania	York	80	75

Question 2b. When would they come into attainment if the Clean Air Planning Act were enacted?

Response. We would expect that, under CAPA, the future ozone concentrations for counties in Maryland, New Jersey and Pennsylvania would be similar to those given above under the proposed CAIR given the similar projected levels of NO_x emissions for the two proposals.

Question 3. In keeping with EPA's recently announced commitment to undertake further analyses in support of the proposed Utility Mercury Reductions Rule, I request that the Agency undertake a more detailed analysis of the Clean Air Planning Act of 2003 (S. 843). Specifically, I request that EPA analyze the S. 843 mercury provisions with the same models, to the same level of analysis (i.e., state-level emissions), and reporting results for the same analytical endpoints as EPA used in analyzing the proposed Utility Mercury Reductions Rule and its new analyses of additional alternatives to those proposed in the rule.

In addition, as EPA undertakes analysis of the mercury program included in S. 843, I request results for SO₂ and NO_x using the same models, level of analysis, and analytical endpoints employed in the detailed analysis of Clear Skies and recent regulatory proposals.

Response. Please see the attached letter from Assistant Administrator Holmstead to Senator Carper, dated July 26, 2004.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 26 2004

OFFICE OF
AIR AND RADIATION

The Honorable Thomas R. Carper
United States Senate
Washington, DC 20510

Dear Senator Carper:

Thank you for your May 19, 2004 letter, co-signed by three of your colleagues, to Administrator Michael O. Leavitt, concerning the proposed Clean Air Mercury Rule. I am writing to address the concerns and questions expressed in your letter.

I share your concerns about the health effects associated with mercury and understand the importance of ensuring that we have conducted sufficient analysis to support our regulatory decisions. Given the high level of public interest in our proposed Clean Air Mercury Rule, I extended the public comment period to June 29, 2004. We are currently in the process of reviewing the public comments we have received and will then decide what additional analysis is appropriate for the rulemaking process.

We have enclosed the benefit/cost analysis of S.843 that was previously provided to you. This analysis was based on the economic modeling we did of S.843 using the Integrated Planning Model (IPM). As noted in your letter, we previously provided you a summary of this analysis and the underlying computer model outputs. For the benefits analyses, EPA used simplified approaches that it developed to provide more timely information to compare different multi-pollutant scenarios, particularly in the context of the legislative debate. For purposes of legislative debate and decision-making, these approaches provide expedited estimates of monetized health and visibility benefits, avoided premature mortality, and the number of counties brought into attainment that can legitimately be compared to estimates from the comprehensive and detailed modeling that we used to project benefits for Clear Skies.

I am pleased to provide you state-level mercury, SO₂ and NO_x emissions information for S.843 for 2010 and 2020 (see enclosed table). These are the same years for which we reported state level emissions for Clear Skies. To compile the S.843 state-level emission projections, we used the previously generated IPM output data. Because the estimation of state-level emissions requires additional processing of IPM output, it is not completed for every model year. Therefore, consistent with our analysis of Clear Skies, we did not project state-level emissions information for 2005 and 2015.

Your letter also requests incremental costs and benefits of the S.843 mercury program. Because mercury is controlled by both NO_x and SO₂ controls, as well as mercury-specific controls, EPA analysis of multi-pollutant programs does not provide individual total costs of control by pollutant. In our previous analysis (enclosed) EPA provided the total cost of the program for all three pollutants and the marginal cost of control by individual pollutant.

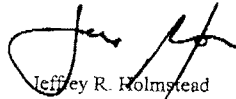
You also had several questions related to projected attainment status under S.843. The enclosed benefits analysis contains our projections of how S.843 would affect the number of counties that would monitor nonattainment for ozone and for PM_{2.5} in 2010 and 2020. This previous analysis for ozone used a linear interpolation technique based on changes in NO_x emissions. The results of this analysis indicate that S.843 would provide ozone reductions similar to Clear Skies and to the proposed Clean Air Interstate Rule (CAIR) in 2010 and 2020. We have enclosed a table showing projected ozone design values under the CAIR. We expect that S.843 would produce very similar results because projected eastern NO_x emissions under CAIR and S.843 are very similar.

As we have indicated previously, the economic impact of S.843, however, would be very different. As you may recall, EPA's analysis of the costs of NO_x, SO₂ and mercury limits imposed by S.843 would be 53 percent higher in 2010 than the cost of Clear Skies' requirements for those pollutants. On a net present value basis, for the time period 2005 to 2030, the cumulative cost of S.843 is \$82.7 billion, 57 percent more than the net present value of the cumulative cost of Clear Skies for the same period (\$52.5 billion). Our analysis also suggests that the pollution control equipment that the power sector would be required to install over the next decade to meet the levels analyzed in S.843 would stretch the limits of available labor and other construction resources.

I hope you will find the new information in this letter, which was based on pre-existing computer model runs, to be useful. Unfortunately, to answer the other information requests in your letter would take a significant amount of additional modeling and analysis. Given that the resources necessary to do the additional work are being used to assist us in meeting our regulatory obligations, and given our understanding that the Senate Environment and Public Works Committee does not plan on moving multi-pollutant legislation for power plants this year, we regret that we are not in a position at this time to conduct additional computer modeling of legislative proposals.

Again, thank you for your letter. If you have further questions, please contact me or your staff may contact Diann Frantz, in EPA's Office of Congressional and Intergovernmental Relations, at (202) 564-3668.

Sincerely,



Jeffrey R. Holmstead
Assistant Administrator

Enclosures

Enclosures

Projected Emissions by State, In 2010 Under Clean Air Planning Act of 2003 (S.843)			
State Name	Total SO2 Emissions (1,000 tons)	Total NOx Emissions (1,000 tons)	Total Hg Emissions (Tons)
Alabama	285	74	0.72
Arizona	48	30	0.13
Arkansas	21	45	0.42
California	11	14	0.04
Colorado	70	50	0.14
Connecticut	5	4	0.03
Delaware	31	8	0.09
Florida	169	67	0.36
Georgia	182	60	0.70
Idaho	0	1	0.00
Illinois	198	77	0.72
Indiana	346	86	0.85
Iowa	141	53	0.43
Kansas	52	24	0.40
Kentucky	236	65	0.56
Louisiana	32	30	0.33
Maine	3	2	0.01
Maryland	69	22	0.31
Massachusetts	16	8	0.10
Michigan	321	84	0.80
Minnesota	71	55	0.39
Mississippi	48	10	0.15
Missouri	220	53	0.87
Montana	16	12	0.23
Nebraska	89	31	0.32
Nevada	14	19	0.10
New Hampshire	4	3	0.04
New Jersey	22	9	0.11
New Mexico	42	19	0.33
New York	68	41	0.29
North Carolina	216	61	0.76
North Dakota	55	24	0.61
Ohio	348	98	1.26
Oklahoma	132	75	0.64
Oregon	15	9	0.05
Pennsylvania	190	72	1.24
Rhode Island	0	2	0.00
South Carolina	145	32	0.32
South Dakota	0	0	0.00
Tennessee	202	45	0.56
Texas	321	180	1.96
Utah	31	45	0.08
Virginia	98	29	0.31

Washington	5	10	0.12
West Virginia	162	39	0.71
Wisconsin	181	69	0.71
Wyoming	43	25	0.31
National	4972	1867	19.62

Projected Emissions by State, in 2020 Under Clean Air Planning Act of 2003 (S.843)			
State Name	Total SO ₂ Emissions (1,000 tons)	Total NO _x Emissions (1,000 tons)	Total Hg Emissions (tons)
Alabama	152	47	0.41
Arizona	46	23	0.11
Arkansas	21	44	0.08
California	11	2	0.01
Colorado	64	44	0.14
Connecticut	1	2	0.03
Delaware	8	6	0.05
Florida	140	39	0.30
Georgia	60	37	0.48
Illinois	149	70	0.48
Indiana	245	71	0.62
Iowa	128	48	0.16
Kansas	40	19	0.28
Kentucky	144	49	0.39
Louisiana	32	27	0.05
Maine	3	1	0.00
Maryland	21	14	0.21
Massachusetts	6	4	0.10
Michigan	192	70	0.37
Minnesota	43	45	0.21
Mississippi	15	6	0.09
Missouri	119	37	0.48
Montana	12	10	0.13
Nebraska	66	27	0.16
Nevada	14	17	0.05
New Hampshire	1	2	0.03
New Jersey	13	5	0.11
New Mexico	43	21	0.14
New York	25	14	0.17
North Carolina	82	55	0.38
North Dakota	52	28	0.29
Ohio	158	66	0.77
Oklahoma	132	68	0.17
Oregon	9	4	0.02
Pennsylvania	134	56	0.84
South Carolina	44	25	0.16
South Dakota	1	6	0.01
Tennessee	64	32	0.26
Texas	244	119	1.16
Utah	29	45	0.06
Virginia	48	27	0.18

Washington	6	6	0.09
West Virginia	112	31	0.46
Wisconsin	111	48	0.27
Wyoming	33	23	0.24
National	3074	1437	11.18

14) The EPW Committee has repeatedly requested analysis of the costs and benefits of different multi-pollutant strategies, like the Jeffords-Collins-Lieberman Clean Power Act, since May of 2001. To date, the Committee has received cost information, but has not received any analysis of the benefits of Senator Jeffords' Clean Power Act, Sen. Carper's Clean Air Planning Act, or Sen. McCain and Sen. Lieberman's Climate Stewardship Act. Please provide at this time complete benefits analysis, taking into account all health care-related values and ecosystem effects due to projected emissions reductions, of these three non-Administration bills that are currently before the Senate EPW Committee.

Clean Power Act and Clean Air Planning Act

Attached please find EPA's analyses of the costs and benefits of Senator Jeffords' Clean Power Act and of the costs and benefits of Senator Carper's Clean Air Planning Act of 2003. (The cost analysis that was requested by Senators Jeffords and Lieberman, and previously provided by EPA, can be found at <http://www.epa.gov/air/jeffordslieberm.pdf>.) The cost analyses summarized here contain EPA's estimates. The Energy Information Agency has also analyzed the costs of these bills: [http://www.eia.doe.gov/oiaf/servicrpt/ccs/pdf/sroiaf\(2003\)03.pdf](http://www.eia.doe.gov/oiaf/servicrpt/ccs/pdf/sroiaf(2003)03.pdf).

For these benefits analyses, EPA used simplified approaches that it developed to provide more timely information to compare different multi-pollutant scenarios, particularly in the context of the legislative debate. For purposes of legislative debate and decision-making, these approaches provide expedited estimates of monetized health and visibility benefits, avoided premature mortality, and the number of counties brought into attainment that can legitimately be compared to estimates from the comprehensive and detailed modeling that EPA used to project benefits for Clear Skies.

EPA's analysis shows that all three bills would bring a significant number of areas into attainment with the fine particle standard compared with continued implementation of existing Clean Air Act programs. In 2010, Clear Skies is projected to bring 42 additional counties into attainment, CAPA would bring an additional 48 and CPA would bring 53 additional counties into attainment. Clear Skies and CAPA respectively are projected to bring 35 and 38 additional counties into attainment in 2020.

These attainment gains come, however, at very different costs. EPA's analyses project that both CPA and CAPA would cost significantly more than Clear Skies. Clear Skies is projected to cost \$4.3 billion and \$6.3 billion in 2010 and 2020, respectively. In comparison, CAPA's program costs are 53% higher in 2010 (\$6.6 billion) and 57% higher in 2020 (\$9.9 billion). On a net present value basis, for the period 2005 to 2030, the cumulative cost of Senator Carper's bill is projected to be \$82.7 billion - 57% more than the net present value of the cumulative cost of the Clear Skies legislation for the same period (\$52.5 billion). The projected cost differences are even greater for Senator Jeffords' bill. For instance, relative to Clear Skies, CPA's program costs are projected to be almost 300% higher in 2010 (\$16.5 billion). In addition, pursuing sharp reductions in CO₂ from the electricity generating sector alone would cause a dramatic shift from coal to natural gas. CPA is projected to increase electricity prices 39% in 2010 and 50% in 2015, whereas Clear Skies is projected to have only a small impact on electricity prices. This dramatic

shift could endanger national energy security, substantially increase energy prices, and harm consumers, especially the poor.

The compliance dates and control levels of CPA and CAPA will also increase their costs. In constructing the Clear Skies Act, we were conscious of not extending beyond the limits of available labor and other construction resources even though Clear Skies requires very substantial increases in installation of advanced pollution controls. CPA requires control technology installations in a very short time frame, which could hinder electricity reliability. Achieving the ambitious emissions reductions under Clear Skies will require large-scale installation of emissions control technologies. CAP and CAPA would require even more control technologies to be installed.

Both CPA and CAPA would require reductions in CO₂ emissions, but doing so would increase the cost significantly if electric generators must directly reduce to meet the emission targets. Clear Skies does not require reductions in CO₂ emissions. The Administration opposes mandatory reductions in greenhouse gases and is pursuing a multi-part climate program that includes: enhanced research on the science of climate change; increased research and development on climate change mitigating technologies; a stated goal to reduce intensity of greenhouse gases by 18%; voluntary reduction programs for near-term emissions; and continued support for limiting long-term concentrations of greenhouse gases in the atmosphere to a safe concentration.

All three bills would bring a significant number of areas into attainment with the fine particle standard compared to continued implementation of existing control programs, however, this does not mean that the three bills would result in different levels of air quality. Clear Skies and other multi-pollutant bills may affect the extent to which the power generation and other sectors will need to reduce emissions so that areas can attain the air quality standards, but will not affect the requirement that all areas must reduce pollution enough to bring them into attainment with the health-based standards.

Climate Stewardship Act

We have not prepared a benefits analysis of Sen. McCain and Sen. Lieberman's Climate Stewardship Act.

Clean Power Act of 2001 (CPA)

Cost Information

- The cost analysis requested by Senators Jeffords and Lieberman was previously provided by EPA and can be found at: <http://www.epa.gov/air/jeffordslieberm.pdf>
 - Jeffords and Lieberman requested EPA to undertake an economic assessment of four technology-based scenarios. Scenario A: Standard Technology Scenario was used for the national benefits analysis.
 - In 2010, incremental annual program costs for Scenario A were projected to be \$16.5 billion with electricity prices projected to increase by 39%.
 - In 2015, incremental annual program costs for Scenario A were projected to be \$17 billion with electricity prices projected to increase by 50%.

Benefits Information

- NAAQS attainment under CPA 2001:

Notes on Methodology: The estimates of additional counties attaining the PM_{2.5} and ozone air quality standards were derived by interpolating the results from the most recent analysis of the Clear Skies Act of 2003. For PM_{2.5}, analysts determined the relationship between the overall reductions in SO₂ and the change in fine particles in nonattaining counties. This relationship was applied to the SO₂ reductions projected for CPA in 2010 to estimate expected attainment benefits for PM_{2.5}.

A similar approach was used for NO_x emissions and ozone. Although some ozone reductions were forecast, they were small enough that they yielded no additional attainment benefits over the Clear Skies analyses for ozone in 2010. The approach for ozone is more uncertain in this case because the geographical distribution of NO_x reductions could not be considered in the analyses. Nevertheless, the overall reductions are small enough that we would not expect significant additional benefits in any event.

- 129 counties nationwide were in nonattainment for PM_{2.5} standards in 2001.
 - In 2010, preliminary estimates project 53 additional counties nationwide would be brought into attainment with PM_{2.5} standards relative to the Base Case.
- 290 counties nationwide were in nonattainment for ozone standards in 2001.
 - In 2010, 3 additional counties nationwide would be brought into attainment with ozone standards relative to the Base Case.

National Benefits of CPA 2001 (\$1999):

***Notes on Methodology:** EPA derived benefits estimates of CPA 2001 from an analysis of the full set of seven analyses on multi-pollutant legislation that were produced between 2001 and 2003. Using national-level benefits and national-level emissions reductions for each of these previously-modeled control scenarios, EPA developed a simplified relationship between overall national emissions reductions and health and economic benefits. Because the spread of alternative NOx controls across the seven analyses was small, analysts calculated the benefits estimates in terms of the amount of SO₂ reductions. They used this estimate as a proxy for the benefits of total SO₂ and NOx reductions. More specifically, analysts determined the range for the value of benefits per ton SO₂ reduced in the seven previously-modeled control cases. The national benefits for CPA 2001 were then estimated using the projected tons of SO₂ reduced for CPA 2001 and the average of the range of benefits per ton SO₂ reduced from the previously-modeled control cases. The results of this approach were always within 5 to 30% of each of the cases actually modeled.*

EPA recognizes that this method is more uncertain than the more comprehensive and detailed modeling done for Clear Skies. However, the estimates from both methods are legitimately comparable.

- Annual health benefits for emissions reductions are estimated to include approximately 13,000 premature deaths avoided in 2010 and 18,000 premature deaths avoided in 2015 (the last year of the analysis).
- Annual monetized health and visibility benefits would be approximately \$90 billion in 2010 and would increase to approximately \$140 billion in 2015.
- As was the case for EPA's benefits analysis for Clear Skies Act, the economic benefits of projected mercury or carbon dioxide emission reductions were not estimated in the analysis.
- The vast majority of these benefits result from reduced concentrations of fine particles. We will be achieving significant reductions in fine particle concentrations with or without multi-pollutant legislation because EPA is committed to implementing the fine particle standards. This bill may affect the extent to which the power generation and other sectors will need to reduce emissions so that areas can attain the air quality standards, but will not affect the requirement that all areas must reduce pollution enough to bring them into attainment with the health-based standards. Thus, many of the projected benefits of this bill will accrue either if this bill were to pass or if EPA and the states were to continue to implement the fine particle standards under current law.

Clean Air Planning Act (CAPA) of 2003 (S.843)

Cost Information

NOTE: Under this modeling scenario certain costs of the CAPA will be understated.

- Modeling assumes full availability of cheap CO₂ offsets. Costs would be significantly higher if electric generators must directly reduce to meet carbon emissions targets.
 - Projections of the allowance prices are lower than would be expected to meet the aggregate caps because the allowance prices do not reflect the cost of installing Hg controls to comply with the facility-specific constraint, nor do they include the cost of installing facility-specific controls to meet the birthday provision of CAPA 2003.
 - 22% of facilities will face higher costs due to the CAPA Hg facility-specific requirement. These higher costs will mostly fall on the smaller electricity plants (less than 250 MW).
 - The Hg facility-specific requirement increases the net present value of costs by \$3 billion. More ACI is projected to be installed with a facility-specific requirement: without constraint, sources rely more on co-benefits from NO_x and SO₂ controls (e.g., more scrubbers in 2020 without the constraint).
 - The birthday provision of CAPA 2003 adds \$110 million and \$850 million in 2010 and 2020, respectively, to the total annual projected costs.
- Costs of CAPA 2003 for controlling SO₂, NO_x, and Hg (\$1999)
 - *Note: Analytical constraints for Cost and Other Impacts required several simplifying assumptions including:*
 - SO₂ was modeled for units greater than 25 MW, rather than the Acid Rain Program (ARP) units specified by CAPA 2003;
 - 271,000 ton WRAP cap in CAPA 2003 was not modeled;
 - Potential impacts of the allocation methodology were not included in the cost estimates; and
 - Only existing CAA control programs were included in the economic modeling.
 - \$6.6 and \$9.9 billion in incremental annual program costs in 2010 and 2020, respectively.

- Net Present Value of \$82.7 billion of cumulative costs for the years 2005 through 2025.
- In 2010, allowance costs of the aggregate caps are projected to be \$732 per ton of SO₂, \$1,204 per ton of NO_x, and \$31,800 per lb of Hg.
- In 2020, allowance costs of the aggregate caps are projected to be \$1,232 per ton of SO₂, \$352 per ton of NO_x, and \$53,500 per lb of Hg.
- CO₂ costs are expected to be similar to those resulting from EPA's analysis of CAPA 2002: annual program costs of up to \$180 million in 2010 and \$309 million in 2020.
- Retail electricity prices rise 4% and 3% relative to the Base Case in 2010 and 2020, respectively, under this modeling scenario. However, it could be significantly higher if electric generators had to directly reduce to meet carbon emissions targets.

Benefits Information

- NAAQS attainment under CAPA 2003:

Notes on Methodology: The estimates of additional counties attaining the PM_{2.5} and ozone air quality standards were derived by interpolating the results from the most recent analyses of the Clear Skies Act of 2003. For PM_{2.5}, analysts determined the relationship between the overall reductions in SO₂ and the change in fine particles in nonattaining counties. This relationship was applied to the SO₂ reductions projected for CAPA in 2010 or 2020 to estimate expected attainment benefits for PM_{2.5}.

A similar approach was examined for NO_x emissions and ozone, but in this case, the incremental summertime NO_x reductions for the alternative were quite small, suggesting there would be no incremental ozone attainment benefits over those projected for Clear Skies in 2010 or 2020.

- 129 counties nationwide were in nonattainment for PM_{2.5} standards in 2001.
 - In 2010, preliminary estimates project 48 additional counties nationwide would be brought into attainment with PM_{2.5} standards relative to the attainment under the Base Case.
 - In 2020, preliminary estimates project 38 additional counties nationwide would be brought into attainment with PM_{2.5} standards relative to the attainment under the Base Case.
- 290 counties nationwide were in nonattainment for ozone standards in 2001.

- In both 2010 and 2020, preliminary estimates project 3 additional counties nationwide would be brought into attainment with ozone standards relative to the attainment under the Base Case.

- Benefits of CAPA 2003 (\$1999):

Notes on Methodology: EPA derived benefits estimates of CAPA 2003 from an analysis of the full set of seven analyses on multi-pollutant legislation that were produced between 2001 and 2003. Using the state-level data from these seven analyses, EPA developed a statistical regression model that relates state-level benefits to changes in SO₂ emissions within the state, changes in SO₂ emissions in upwind states, changes in NO_x emissions within the state, and changes in NO_x emissions in upwind states. Due to the small variation in NO_x emissions reductions among the control scenarios, the regression approach cannot accurately capture the impact of NO_x controls. While the methodology controls for the prevailing wind direction and the distance of the state from upwind states, it cannot fully capture these factors or the complex atmospheric chemistry of the full air quality model. EPA therefore recognizes the uncertainty of this method relative to using a comprehensive model. Nevertheless, the approach provides a useful estimate for policy and legislative purposes. When the predictive power of the regression methodology was tested, the results from the regression model were usually within 5% and were always within 17% of the actual results of EPA's air quality and benefits modeling, suggesting that the regression model is valid for the range of scenarios examined and the results can legitimately be compared to the full model estimates for Clear Skies.

- Annual health benefits for emissions reductions under CAPA 2003 are estimated to include approximately 9,000 premature deaths avoided in 2010 and 17,000 premature deaths avoided in 2020.
- Annual monetary benefits are estimated to be approximately \$70 billion in 2010 and would increase to approximately \$140 billion in 2020.
- As was the case for EPA's benefits analysis for Clear Skies Act, the economic benefits of projected mercury or carbon dioxide emission reductions were not estimated in the analysis.
- The vast majority of these benefits result from reduced concentrations of fine particles. We will be achieving significant reductions in fine particle concentrations with or without multi-pollutant legislation because EPA is committed to implementing the fine particle standards. This bill may affect the extent to which the power generation and other sectors will need to reduce emissions so that areas can attain the air quality standards, but will not affect the requirement that all areas must reduce pollution enough to bring them into attainment with the health-based standards. Thus, many of the projected benefits

of this bill will accrue either if this bill were to pass or if EPA and the states were to continue to implement the fine particle standards under current law.

Other Impacts

- Emissions of CAPA 2003
 - 5.0 and 3.1 million tons of SO₂ emissions in 2010 and 2020, respectively.
 - 1.9 and 1.7 million tons of NO_x emissions in 2010 and 2020, respectively.
 - 20 and 11 tons of Hg emissions in 2010 and 2020, respectively.
 - 2.3 and 2.6 billion metric tons of CO₂ emissions in 2010 and 2020, respectively.
- Cumulative Pollution Controls Added for CAPA 2003
 - 71 and 112 GW of cumulative capacity retrofitted with scrubbers in 2010 and 2020, respectively.
 - 58 and 64 GW of cumulative capacity retrofitted with SCRs in 2010 and 2020, respectively.
 - 29 and 61 GW of cumulative capacity retrofitted with ACI in 2010 and 2020, respectively.
- Impact on Coal-fired units of CAPA 2003
 - 8 GW of capacity (about 93 units) is projected to retire relative to the Base Case (all retirements are in 2005) and is projected to be replaced by natural gas capacity.
- Fuel
 - Coal production continues to increase from 2000 levels under CAPA 2003 with a shift toward the interior production region.
 - Gas use by the power sector is projected to be 7% and 9% greater under CAPA 2003 than the Base Case in 2010 and 2020, respectively.
- Provisions for excess Hg emission penalties may effectively act as a “safety valve” set at \$10,000/lb. When the excess Hg emissions penalty is modeled as a “safety valve,” Hg emissions are 15 tons in 2020.

- Allocation impacts are expected to be similar to those resulting from EPA's analysis of CAPA 2002. Relative to a permanent allocation, the updating, output-based allocation system proposed by CAPA 2003 in 2010 would likely:
 - increase generation, in the range of 0.6%;
 - lower wholesale electricity prices by about 4%;
 - depress annual net revenues up to \$4 billion per year as a result of lower electricity prices, and
 - add less than \$10 million annually to the cost of emission reductions (or less 0.25% of the total costs).

CAIR Proposal

July 2004

Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Alabama	Baldwin	82	74	70	70	66
Alabama	Clay	82	65	63	60	59
Alabama	Elmore	80	68	67	64	63
Alabama	Jefferson	88	73	72	68	66
Alabama	Lawrence	78	65	65	62	60
Alabama	Madison	82	70	69	69	64
Alabama	Mobile	81	73	69	69	66
Alabama	Montgomery	81	69	68	65	64
Alabama	Morgan	85	73	72	69	68
Alabama	Shelby	92	76	75	70	68
Alabama	Sumter	76	64	63	61	60
Arkansas	Crittenden	94	85	86	85	83
Arkansas	Montgomery	69	60	59	59	54
Arkansas	Newton	78	68	68	65	62
Arkansas	Pulaski	86	76	73	72	67
Connecticut	Fairfield	98	94	94	94	93
Connecticut	Hartford	90	82	81	79	77
Connecticut	Middlesex	97	91	91	89	88
Connecticut	New Haven	98	92	92	90	89
Connecticut	New London	89	82	82	79	79
Connecticut	Tolland	94	84	84	80	80
Delaware	Kent	92	79	79	79	74
Delaware	New Castle	95	87	86	84	83
Delaware	Sussex	94	81	81	77	77
D.C.	Washington	95	88	88	84	85
Florida	Alachua	75	62	57	53	52
Florida	Baker	72	60	56	56	52
Florida	Bay	81	71	69	69	64
Florida	Brevard	76	63	59	60	55
Florida	Duval	69	58	53	56	49
Florida	Escambia	84	77	70	73	66
Florida	Hillsborough	79	69	67	66	64
Florida	Holmes	72	62	60	58	56
Florida	Lee	69	55	54	52	50
Florida	Leon	72	60	59	56	54
Florida	Manatee	76	65	63	62	60
Florida	Marion	75	63	57	50	52
Florida	Orange	78	67	69	63	58
Florida	Osceola	73	61	56	56	53
Florida	Palm Beach	68	58	56	56	52
Florida	Pasco	77	66	64	64	59
Florida	Pinellas	76	67	65	64	62
Florida	Polk	77	62	59	59	55
Florida	St Lucie	68	57	55	54	51

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Florida	Santa Rosa	84	74	72	70	66
Florida	Sarasota	81	67	65	63	61
Florida	Seminole	78	66	62	62	57
Florida	Volusia	72	60	56	56	52
Georgia	Bibb	92	65	69	51	60
Georgia	Chatham	70	59	58	55	55
Georgia	Cherokee	78	59	59	54	53
Georgia	Cobb	98	81	80	75	74
Georgia	Coweta	93	76	76	72	70
Georgia	Dawson	83	64	64	59	58
Georgia	De Kalb	95	82	82	79	77
Georgia	Douglas	95	79	79	74	73
Georgia	Fayette	90	75	75	70	69
Georgia	Fulton	99	86	85	81	80
Georgia	Glynn	73	61	58	58	55
Georgia	Gwinnet	89	74	74	68	67
Georgia	Henry	98	77	78	72	71
Georgia	Murray	87	68	67	63	62
Georgia	Muscogee	83	67	67	62	61
Georgia	Paulding	90	70	68	55	64
Georgia	Richmond	87	74	74	70	69
Georgia	Rockdale	96	80	80	74	73
Georgia	Sumter	81	65	65	61	60
Illinois	Adams	77	68	67	65	64
Illinois	Champaign	76	65	64	62	60
Illinois	Cook	88	84	84	85	84
Illinois	Du Page	71	68	67	68	67
Illinois	Effingham	77	65	65	63	61
Illinois	Hamilton	80	69	68	68	64
Illinois	Jersey	89	78	78	74	71
Illinois	Kane	77	73	72	72	71
Illinois	Lake	84	79	78	78	77
Illinois	McHenry	83	78	78	77	76
Illinois	Macon	77	65	64	63	60
Illinois	Macoupin	80	68	68	65	62
Illinois	Madison	84	75	73	72	69
Illinois	Peoria	79	69	69	58	65
Illinois	Randolph	79	66	66	58	60
Illinois	St Clair	85	77	78	75	72
Illinois	Sangamon	77	65	64	62	60
Illinois	Will	80	70	70	70	68
Illinois	Winnebago	75	67	66	64	63
Indiana	Allen	88	78	77	74	73
Indiana	Boone	88	79	78	76	74

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Indiana	Clark	90	79	78	76	74
Indiana	Floyd	83	75	74	73	71
Indiana	Gibson	71	62	61	60	52
Indiana	Greene	89	77	77	74	68
Indiana	Hamilton	93	83	83	80	78
Indiana	Hancock	92	82	82	79	77
Indiana	Hendricks	88	79	78	76	74
Indiana	Huntington	86	76	75	72	70
Indiana	Jackson	85	72	72	69	66
Indiana	Johnson	87	75	75	72	69
Indiana	Lake	92	87	86	87	86
Indiana	La Porte	92	84	83	82	81
Indiana	Madison	91	80	80	76	75
Indiana	Marion	90	81	81	78	77
Indiana	Morgan	88	78	78	75	73
Indiana	Porter	90	84	83	83	82
Indiana	Posey	87	75	75	73	69
Indiana	St. Joseph	90	78	78	75	74
Indiana	Shelby	93	83	82	79	78
Indiana	Vanderburgh	83	72	71	69	65
Indiana	Vigo	79	69	68	67	63
Indiana	Warrick	84	73	72	72	62
Iowa	Bremser	72	66	64	53	61
Iowa	Clinton	78	71	70	69	67
Iowa	Harrison	77	70	69	67	66
Iowa	Linn	71	65	64	62	61
Iowa	Palo Alto	66	59	58	57	55
Iowa	Polk	60	53	53	51	50
Iowa	Scott	79	72	71	69	68
Iowa	Story	64	57	56	54	53
Iowa	Van Buren	74	67	65	64	62
Iowa	Warren	63	56	55	53	52
Kansas	Linn	76	70	69	68	67
Kansas	Sedgwick	61	73	73	71	70
Kansas	Sumner	80	72	72	70	69
Kansas	Wyandotte	81	75	74	73	72
Kentucky	Bel	86	69	69	65	64
Kentucky	Boone	86	71	70	68	67
Kentucky	Boyd	88	76	75	73	72
Kentucky	Bullitt	85	75	73	73	69
Kentucky	Campbell	94	83	82	80	78
Kentucky	Carter	80	68	66	64	62
Kentucky	Christian	85	65	65	62	59
Kentucky	Daviess	77	67	66	66	57

CAIR Proposal

July 2004

Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Kentucky	Edmonson	84	69	68	66	63
Kentucky	Fayette	78	69	68	66	64
Kentucky	Graves	81	70	70	68	66
Kentucky	Greenup	83	71	70	68	67
Kentucky	Hancock	83	72	72	72	61
Kentucky	Hardin	81	69	68	66	63
Kentucky	Henderson	79	68	67	67	61
Kentucky	Jefferson	85	76	75	74	72
Kentucky	Jessamine	79	70	69	68	65
Kentucky	Kenton	88	77	77	75	73
Kentucky	Livingston	84	73	72	71	69
Kentucky	McCracken	82	72	72	70	68
Kentucky	McLean	84	72	71	70	63
Kentucky	Oliver	87	73	73	71	69
Kentucky	Perry	75	61	59	57	55
Kentucky	Pike	78	63	63	60	58
Kentucky	Pulaski	81	68	67	65	63
Kentucky	Scott	70	58	58	56	54
Kentucky	Simpson	83	67	66	64	61
Kentucky	Trigg	75	63	62	61	58
Kentucky	Warren	86	70	69	67	65
Louisiana	Ascension	82	76	75	74	73
Louisiana	Beauregard	74	68	67	66	65
Louisiana	Bossier	84	76	74	73	70
Louisiana	Caddo	79	71	69	69	66
Louisiana	Calcasieu	81	75	75	73	73
Louisiana	East Baton Rouge	86	79	79	77	75
Louisiana	Grant	78	70	69	68	65
Louisiana	Iberville	86	80	79	78	76
Louisiana	Jefferson	85	79	78	77	75
Louisiana	Lafayette	81	74	74	72	70
Louisiana	Lafourche	80	75	74	73	72
Louisiana	Livingston	84	78	77	76	74
Louisiana	Orleans	71	66	66	66	65
Louisiana	Ouachita	78	71	71	69	68
Louisiana	Pointe Coupee	71	64	64	62	59
Louisiana	St Bernard	79	74	73	73	71
Louisiana	St Charles	81	76	75	75	74
Louisiana	St James	76	71	71	69	68
Louisiana	St John The Baptist	81	75	75	73	72
Louisiana	St Mary	77	72	72	70	69
Louisiana	West Baton Rouge	85	78	77	76	73
Maine	Cumberland	86	78	78	75	75
Maine	Hancock	93	81	81	76	76

CAIR Proposal

July 2004

Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Maine	Kennebec	78	69	68	65	64
Maine	Knox	83	74	74	70	70
Maine	Oxford	60	55	55	53	53
Maine	York	90	82	82	80	79
Maryland	Anne Arundel	102	91	91	87	86
Maryland	Baltimore	93	85	85	83	82
Maryland	Carroll	92	82	81	78	78
Maryland	Cecil	104	90	90	86	85
Maryland	Charles	84	79	79	75	74
Maryland	Frederick	91	81	80	77	76
Maryland	Harford	104	93	93	89	88
Maryland	Kent	102	89	88	84	84
Maryland	Montgomery	89	82	81	79	78
Maryland	Prince Georges	95	86	85	82	81
Maryland	Washington	87	75	74	71	70
Massachusetts	Barnstable	93	81	81	77	77
Massachusetts	Bristol	90	80	80	76	75
Massachusetts	Essex	90	82	82	80	80
Massachusetts	Hampden	92	83	83	80	80
Massachusetts	Hampshire	88	80	80	78	77
Massachusetts	Middlesex	89	79	79	76	75
Massachusetts	Suffolk	89	79	78	75	74
Massachusetts	Worcester	85	76	76	73	72
Michigan	Allegan	92	82	82	79	78
Michigan	Benzie	86	78	77	75	73
Michigan	Berrien	87	77	77	74	73
Michigan	Cass	90	78	77	74	73
Michigan	Clinton	82	73	73	70	70
Michigan	Genesee	84	76	76	73	72
Michigan	Huron	82	74	74	71	71
Michigan	Ingham	82	74	73	71	70
Michigan	Kalamazoo	81	71	70	67	66
Michigan	Kent	82	72	72	69	68
Michigan	Lenawee	85	76	76	74	72
Michigan	Macomb	88	84	83	80	84
Michigan	Mason	87	78	77	74	73
Michigan	Missaukee	78	70	69	67	66
Michigan	Muskegon	89	80	79	77	76
Michigan	Oakland	86	81	81	82	81
Michigan	Ottawa	85	76	76	74	72
Michigan	St Clair	88	82	81	80	79
Michigan	Washtenaw	87	79	79	77	76
Michigan	Wayne	85	80	80	83	81
Mississippi	Adams	80	71	70	63	67

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Mississippi	Bolivar	77	65	64	62	61
Mississippi	De Soto	86	75	75	72	71
Mississippi	Hancock	82	74	72	72	69
Mississippi	Harrison	81	75	70	72	67
Mississippi	Hinds	76	66	66	63	62
Mississippi	Jefferson	82	76	72	74	69
Mississippi	Lauderdale	76	63	62	60	58
Mississippi	Lee	81	67	66	63	61
Mississippi	Madison	76	69	69	68	67
Mississippi	Warren	78	67	67	66	65
Missouri	Cass	79	73	72	71	70
Missouri	Cedar	83	76	75	72	72
Missouri	Clay	85	78	77	75	74
Missouri	Greene	76	64	64	61	59
Missouri	Jefferson	86	75	74	72	69
Missouri	Monroe	79	69	68	66	64
Missouri	Platte	84	78	77	76	75
Missouri	St Charles	90	81	79	78	76
Missouri	Ste Genevieve	84	73	72	71	69
Missouri	St Louis	89	81	80	76	76
Missouri	St Louis City	88	80	78	77	75
Nebraska	Douglas	68	62	61	60	58
Nebraska	Lancaster	54	49	49	47	47
New Hampshire	Carroll	67	62	62	60	60
New Hampshire	Cheshire	73	63	63	60	59
New Hampshire	Grafton	68	58	58	55	55
New Hampshire	Hillsborough	85	76	76	73	72
New Hampshire	Merrimack	74	66	66	63	63
New Hampshire	Rockingham	83	76	76	74	73
New Hampshire	Strafford	77	69	69	66	66
New Hampshire	Sullivan	73	63	62	59	59
New Jersey	Atlantic	91	80	79	76	76
New Jersey	Bergen	91	88	87	87	86
New Jersey	Camden	103	93	92	91	90
New Jersey	Cumberland	98	86	85	81	81
New Jersey	Gloucester	104	95	95	93	92
New Jersey	Hudson	87	85	84	84	83
New Jersey	Hunterdon	96	89	89	87	86
New Jersey	Mercer	104	96	98	96	95
New Jersey	Middlesex	101	95	95	92	92
New Jersey	Monmouth	97	89	89	87	86
New Jersey	Morris	98	88	87	85	83
New Jersey	Ocean	115	105	104	102	101
New Jersey	Passaic	88	82	81	80	79

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 8E parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
New York	Albany	83	73	72	69	68
New York	Bronx	81	81	81	83	83
New York	Chautauqua	92	83	83	81	79
New York	Chemung	81	71	71	67	66
New York	Dutchess	93	83	83	80	79
New York	Erie	97	90	89	88	86
New York	Essex	86	80	79	78	77
New York	Hamilton	79	72	71	69	69
New York	Herkimer	74	68	67	66	65
New York	Jefferson	91	82	82	80	79
New York	Madison	80	74	73	72	72
New York	Monroe	85	77	77	75	74
New York	Niagara	91	83	83	81	80
New York	Oneida	78	70	70	68	67
New York	Onondaga	83	74	73	70	70
New York	Orange	84	77	77	75	74
New York	Putnam	92	85	85	83	82
New York	Queens	74	74	74	76	76
New York	Richmond	96	90	89	87	87
New York	Schenectady	78	67	67	64	63
New York	Suffolk	97	90	90	89	89
New York	Ulster	81	72	72	69	69
New York	Wayne	83	75	75	72	72
New York	Westchester	90	86	85	86	85
North Carolina	Alexander	91	73	74	68	68
North Carolina	Avery	79	64	64	61	60
North Carolina	Buncombe	85	68	67	63	62
North Carolina	Caldwell	86	69	70	65	65
North Carolina	Caswell	91	75	75	71	69
North Carolina	Chatham	83	70	69	65	64
North Carolina	Cumberland	87	73	73	68	67
North Carolina	Davie	95	78	78	73	73
North Carolina	Duplin	81	68	68	64	63
North Carolina	Durham	91	77	77	72	70
North Carolina	Edgecombe	88	75	75	71	71
North Carolina	Forsyth	94	76	76	71	70
North Carolina	Franklin	91	77	76	72	70
North Carolina	Granville	94	79	79	75	73
North Carolina	Guilford	93	76	75	71	71
North Carolina	Haywood	87	69	69	65	64
North Carolina	Jackson	86	69	69	64	63
North Carolina	Johnston	85	72	72	67	66
North Carolina	Lenoir	81	66	68	65	64
North Carolina	Lincoln	94	77	78	72	72

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 84 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
North Carolina	Martin	81	70	70	67	68
North Carolina	Mecklenburg	102	85	86	79	80
North Carolina	New Hanover	79	67	66	63	64
North Carolina	Northampton	84	72	72	69	69
North Carolina	Person	90	74	74	71	69
North Carolina	Pitt	83	70	70	66	66
North Carolina	Rockingham	90	72	72	67	66
North Carolina	Rowan	101	82	84	77	78
North Carolina	Swain	74	60	59	56	55
North Carolina	Union	88	73	73	67	67
North Carolina	Wake	94	81	80	75	74
North Carolina	Yancey	87	70	71	66	65
Ohio	Allen	88	78	78	75	74
Ohio	Ashtabula	94	84	84	82	80
Ohio	Butler	69	77	76	74	72
Ohio	Clark	90	78	78	74	73
Ohio	Clermont	90	78	77	75	72
Ohio	Clinton	96	82	81	77	76
Ohio	Cuyahoga	86	78	77	75	74
Ohio	Delaware	89	79	78	75	73
Ohio	Franklin	84	76	76	73	72
Ohio	Geauga	99	88	88	85	83
Ohio	Greene	86	74	74	70	69
Ohio	Hamilton	89	79	78	76	75
Ohio	Jefferson	86	77	77	75	73
Ohio	Knox	90	80	80	77	75
Ohio	Lake	92	83	82	80	79
Ohio	Lawrence	86	74	73	71	69
Ohio	Licking	90	80	79	76	74
Ohio	Lorain	85	78	77	76	75
Ohio	Lucas	89	81	80	79	77
Ohio	Madison	89	78	78	75	73
Ohio	Mahoning	87	76	76	72	71
Ohio	Medina	87	77	77	73	72
Ohio	Miami	87	76	75	72	70
Ohio	Montgomery	86	75	75	71	70
Ohio	Portage	91	80	80	77	76
Ohio	Preble	82	70	70	66	65
Ohio	Stark	89	79	79	75	74
Ohio	Summit	95	85	84	81	80
Ohio	Trumbull	90	79	78	75	74
Ohio	Warren	89	77	77	74	72
Ohio	Washington	87	74	69	67	66
Ohio	Wood	86	77	77	74	73

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Oklahoma	Cleveland	77	68	68	66	65
Oklahoma	Mc Clair	79	70	70	67	66
Oklahoma	Oklahoma	82	73	73	70	69
Oklahoma	Tulsa	85	76	76	74	73
Pennsylvania	Allegheny	95	85	84	82	81
Pennsylvania	Armstrong	91	79	79	76	75
Pennsylvania	Beaver	90	82	81	79	78
Pennsylvania	Berks	92	81	80	77	75
Pennsylvania	Blair	84	71	70	68	67
Pennsylvania	Bucks	104	97	97	95	94
Pennsylvania	Cambria	88	76	75	73	71
Pennsylvania	Centre	85	74	73	70	69
Pennsylvania	Chester	95	84	83	80	79
Pennsylvania	Clearfield	87	75	74	72	70
Pennsylvania	Dauphin	91	80	79	76	74
Pennsylvania	Delaware	95	87	86	84	83
Pennsylvania	Erie	88	79	79	77	75
Pennsylvania	Franklin	94	80	79	76	74
Pennsylvania	Greene	90	78	75	73	72
Pennsylvania	Lackawanna	85	74	73	69	68
Pennsylvania	Lancaster	94	83	82	80	77
Pennsylvania	Lawrence	78	69	68	65	65
Pennsylvania	Lehigh	93	83	83	80	78
Pennsylvania	Luzerne	84	72	71	68	67
Pennsylvania	Lycoming	79	68	67	64	63
Pennsylvania	Mercer	92	80	80	75	75
Pennsylvania	Montgomery	97	90	89	89	88
Pennsylvania	Northampton	92	82	82	79	78
Pennsylvania	Perry	83	72	71	68	67
Pennsylvania	Philadelphia	98	92	92	91	90
Pennsylvania	Tioga	84	72	72	69	68
Pennsylvania	Washington	88	80	80	78	77
Pennsylvania	Westmoreland	86	76	76	73	72
Pennsylvania	York	92	81	80	78	75
Rhode Island	Kent	97	89	88	85	84
Rhode Island	Providence	91	82	82	78	78
Rhode Island	Washington	93	84	84	80	80
South Carolina	Abbeville	85	69	69	64	63
South Carolina	Aiken	88	75	74	71	70
South Carolina	Anderson	88	74	73	69	68
South Carolina	Barnwell	83	69	68	65	64
South Carolina	Charleston	74	59	58	56	55
South Carolina	Cherokee	87	71	72	67	66
South Carolina	Chester	84	70	71	66	65

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
South Carolina	Colleton	80	66	65	62	61
South Carolina	Darlington	86	73	72	69	68
South Carolina	Edgefield	83	68	68	64	63
South Carolina	Pickens	85	69	69	64	63
South Carolina	Richland	93	77	77	72	71
South Carolina	Spartanburg	90	74	74	69	69
South Carolina	Union	81	66	67	62	61
South Carolina	Williamsburg	73	58	58	55	54
South Carolina	York	84	70	71	66	66
Tennessee	Anderson	92	72	72	67	66
Tennessee	Blount	94	77	77	72	71
Tennessee	Davidson	80	69	69	66	64
Tennessee	Hamilton	93	75	75	70	69
Tennessee	Haywood	86	74	74	71	70
Tennessee	Jefferson	95	78	78	73	72
Tennessee	Knox	96	77	77	72	71
Tennessee	Lawrence	78	64	63	61	59
Tennessee	Meigs	93	73	73	68	67
Tennessee	Putnam	86	72	71	68	65
Tennessee	Rutherford	84	72	71	68	65
Tennessee	Sevier	98	79	79	74	73
Tennessee	Shelby	90	80	79	78	77
Tennessee	Sullivan	92	74	74	70	69
Tennessee	Sumner	88	76	76	73	70
Tennessee	Williamson	87	72	72	69	66
Tennessee	Wilson	85	74	73	70	64
Texas	Bexar	86	72	71	69	67
Texas	Brazoria	86	80	79	78	77
Texas	Collin	93	83	82	79	77
Texas	Dallas	91	82	82	79	78
Texas	Denton	99	87	87	83	82
Texas	Ellis	86	75	75	71	69
Texas	Galveston	89	83	83	82	81
Texas	Gregg	88	74	74	71	70
Texas	Harris	107	100	100	99	98
Texas	Hood	84	73	73	69	68
Texas	Jefferson	84	79	78	77	77
Texas	Johnson	89	78	78	74	73
Texas	Kaufman	70	61	61	59	57
Texas	Montgomery	97	82	81	79	78
Texas	Orange	81	75	75	74	73
Texas	Parker	86	75	75	71	70
Texas	Rockwell	83	74	73	71	69
Texas	Smith	84	71	71	68	66

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Texas	Tarrant	98	88	87	84	82
Texas	Travis	85	75	75	72	71
Texas	Victoria	76	67	67	65	64
Vermont	Bennington	80	70	70	66	65
Virginia	Arlington	98	88	88	87	86
Virginia	Caroline	83	71	71	68	67
Virginia	Charles City	90	77	77	74	74
Virginia	Chesterfield	86	74	74	71	70
Virginia	Fairfax	97	87	87	85	84
Virginia	Fauquier	81	70	69	66	65
Virginia	Frederick	85	73	73	70	68
Virginia	Henrico	90	77	77	74	73
Virginia	Loudoun	90	81	80	78	77
Virginia	Madison	85	71	70	67	65
Virginia	Page	80	65	64	61	60
Virginia	Prince William	85	75	75	72	71
Virginia	Roanoke	87	73	73	69	68
Virginia	Rockbridge	79	66	65	62	61
Virginia	Stafford	88	74	73	70	69
Virginia	Wythe	81	64	63	60	59
Virginia	Alexandria Cit	90	83	83	81	80
Virginia	Hampton City	89	80	79	77	77
Virginia	Suffolk City	88	79	79	77	76
West Virginia	Cabell	88	75	74	72	71
West Virginia	Greenbrier	82	65	63	61	60
West Virginia	Hancock	85	76	76	74	72
West Virginia	Kanawha	85	69	68	66	65
West Virginia	Monongalia	81	69	68	67	64
West Virginia	Ohio	85	74	72	70	69
West Virginia	Wood	88	72	68	66	65
Wisconsin	Brown	81	74	73	72	69
Wisconsin	Columbia	76	68	67	64	63
Wisconsin	Dane	78	69	67	65	63
Wisconsin	Dodge	79	71	70	67	66
Wisconsin	Door	91	83	81	79	77
Wisconsin	Fond Du Lac	77	70	69	66	65
Wisconsin	Green	74	66	65	63	61
Wisconsin	Kenosha	100	94	93	92	91
Wisconsin	Kewaunee	88	80	78	77	74
Wisconsin	Marion	88	80	78	77	74
Wisconsin	Marathon	72	66	64	63	61
Wisconsin	Milwaukee	91	83	83	81	80
Wisconsin	Outagamie	75	69	67	65	64
Wisconsin	Ozaukee	93	84	83	81	79

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Modeled Ozone Design Values for Counties in the Eastern US with Monitors

Notes: A design value of 85 parts per billion or higher is a violation of the 8-hour ozone standard.

State	County	Current* 8-Hr Ozone Air Quality (ppb)	2010 Ozone Projections parts per billion (ppb)		2015 Ozone Projections (ppb)	
			2010 Base Case	2010 CAIR Control Case	2015 Base Case	2015 CAIR Control Case
Wisconsin	Racine	93	86	85	84	83
Wisconsin	Rock	84	75	74	71	70
Wisconsin	St Croix	72	65	62	63	59
Wisconsin	Sauk	73	66	64	64	60
Wisconsin	Sheboygan	99	90	89	86	84
Wisconsin	Vernon	71	64	63	61	59
Wisconsin	Walworth	82	74	73	70	69
Wisconsin	Washington	81	75	74	72	71
Wisconsin	Waukesha	81	75	74	72	71
Wisconsin	Winnebago	78	72	69	69	65

* 2000-02 ozone air quality data was used in modeling for the CAIR proposal

In its analysis for the proposed CAIR, EPA modeled the southeastern portions of North Dakota, eastern portions of South Dakota, Nebraska, Kansas, Oklahoma and Texas, and all states to the east.

The first two columns list the 494 counties over the eastern U.S. modeling domain that have ambient 8-hour ozone design values for the period 2000-2002 based on monitoring data. The third column contains the 2000-2002, 8-hour ozone design values for each county. The fourth and fifth columns list the projected 8-hour ozone design values in 2010, with and without the proposed CAIR controls, as modeled in the CAIR proposal. The last two columns list the same projections for 2015. Both the base case and the CAIR control case include control programs that have already been adopted (e.g., the NOx SIP Call, motor vehicle rules). Neither case includes programs that states will need to meet the ozone standards but that have not yet been adopted.

In the CAIR proposal, EPA projected future eight-hour ozone concentrations by using an air quality model to estimate the change in ozone between the base year scenario and future scenarios. EPA estimated future ozone design values by applying the relative change in model-predicted ozone from the base year (2001) and the future years (2010, 2015) to representative eight-hour ozone design values (2000-2002) on a site-by-site basis. As an example, if the modeling indicated a 20 percent reduction in ozone at a given location between 2001 and 2010, then a 0.80 factor is applied to the 2000-2002 design value at that location. Projected design values are calculated for each monitoring location with data and the values are aggregated to the county.

Question 4a. EPA's Office of Research and Development released a white paper on February 27, 2004 stating that mercury removal of 70–90 percent is possible on 96 percent of the nation's coal-fired power generation capacity by 2010. In contrast, the alternatives proposed in EPA's Utility Mercury Reductions Rule aim to achieve only a 29 percent reduction from current emissions levels by 2008 or 2010. This "co-benefits" level would require no installation of mercury control technology. Why is the 2008/2010 emissions target in the Utility Mercury Reductions Rule set at 34 tons?

Response. The white paper cited states:

"[a]ssuming sufficient development and demonstrations are carried out, by 2010, [activated carbon injection] ACI with an [electrostatic precipitator] ESP has the potential to achieve 70 percent Hg control."

Further, it states that "ACI with an ESP and a retrofit fabric filter, or a fabric filter alone, has the potential to achieve 90 percent Hg reduction." The paper goes on to indicate that 2010 is "the date by which the demonstration of the most difficult case (e.g., lignite) for the particular technology would be completed."

Demonstrations on easier situations could be completed "somewhat earlier." Further, the paper states that:

"it is important to note that completion of such demonstrations would represent only the potential initiation of the retrofit program which would take a number of years to fully implement, assuming of course, both successful demonstrations and a regulatory driving force."

The paper then goes on to caveat the length of time necessary to fully deploy such technologies and to indicate that the issues related to residues need to be addressed.

Thus, we do not believe that the white paper states that ACI technology, or any other, will be fully deployed by 2010. Rather, it may only be ready for commercial application on boilers at that time. The prerequisite full-scale ACI tests are either just underway or not yet begun. Short-term tests of ACI technology on full-scale bituminous- and sub-bituminous-fired units have been completed. A long-term test on a bituminous-fired unit is underway. To our knowledge, short-term tests on a full-scale Texas lignite-fired unit have not begun nor have full-scale, long-term tests on either sub-bituminous- or lignite-fired units. Full-scale tests on wet scrubber-equipped units have begun and are expected to last 5 years or more. In addition, full-scale testing of more cost-effective sorbents (e.g., brominated powdered activated carbon) has just started and the potential for re-release of mercury from residues (e.g., spent sorbents and scrubber sludge) is under investigation.

The Agency also received public comment on the topic of mercury control technology availability. The utility industry and related stakeholders (e.g., mining groups, unions) are in general agreement that mercury-specific control technology will not be demonstrated within the timeframe that EPA has suggested. However, the environmental community and many of the State, local, and tribal organizations believe that such technology will be available much sooner than the Agency has projected.

Based on this information, we are not certain that the necessary demonstrations will have even been completed by 2010, delaying the schedule provided in the white paper. We believe that the proposed section 111 regulatory approach will provide the necessary regulatory driver to "speed up" demonstration of these advanced technologies. The basis for the MACT continues to be that level of mercury control achievable through the installation of existing controls for other pollutants (i.e., the "co-benefits" level).

Question 4b. Is EPA considering lower emissions targets for 2008 (Section 112 proposal) or 2010 (Section 111 proposal) in its further analyses of the Utility Mercury Reductions Rule? If so, what are those target levels?

Response. EPA will ensure that we have all the analysis necessary to make the decision about how to address mercury emissions from power plants. A central part of this work is to understand the exposure pathway better so that we will have confidence that the final rule will protect the environment and public health.

Question 5. For some time now, representatives of the pollution control technology industry have stated that existing commercially available technologies can achieve 90 percent mercury removal when combined with NO_x and SO₂ control technologies. For example, control technology industry representatives claim that Activated Carbon Injection requires minimal capital costs, can be retrofitted with little or no downtime, is suitable for use with most existing emissions control technologies, and can achieve 70–90 percent mercury removal from various types of coal. In testimony before the Environment and Public Works Committee on April 1, 2004, Adminis-

trator Leavitt, you stated your expectation that Activated Carbon Injection technology should be adequately tested and widely deployable by 2010.

Why, then, do the rule's proposed alternatives call for only a 70 percent reduction in mercury emissions by 2008 or 2010, depending upon the proposed alternative, and delay implementation of the phase 2 cap until 2018?

Response. As stated in our response to question 4, we believe that implementation of activated carbon injection (ACI) and other advanced mercury control technologies will not be possible until 2010 or after. We have had several meetings with, and heard presentations from, many of the same equipment vendors from whom you have heard. We do not believe that recent statements by the pollution control industry contradict our view that advanced mercury control technologies are not yet commercially proven. EPA agrees with the equipment vendors that these new technologies show great promise. In addition, we recognize that various segments of the utility industry state that these mercury-specific control technologies are not, and will not be, available within a 3- to 4-year time-frame or, even, by 2010. The 2018 cap when combined with an earlier less stringent cap in 2010 provides strong incentive for companies to develop and implement advanced mercury controls as soon as the program begins.

Question 6a. Administrator Leavitt, you recently committed EPA to undertake analyses of alternatives in addition to those proposed in the Utility Mercury Reductions Rule. Is EPA analyzing options that would propose a tighter Section 112 MACT standard? Or, are EPA's new analyses focusing solely on the Section 111 cap-and-trade program proposal?

Response. The Agency has determined that some types of MACT analyses are not appropriate because IPM is not currently configured to analyze the type of near-term scenarios that would be required under MACT. However, the Agency has not ruled out performing more analysis of a Section 112 MACT approach.

Question 6b. If the focus is on Section 111 alternatives only, why is this the case given the EPA Office of Research and Development white paper released on February 27, 2004 showing that existing NO_x and SO₂ control technologies, as well as mercury control technologies that soon will be available, enable mercury control well beyond the Section 112 proposal level?

Response. EPA's Office of Research and Development (ORD) study builds on and contributes to extensive work that ORD and others have been doing to understand the state of mercury-specific control technologies. This study is one of the primary sources of information that we have used to inform our current understanding of the state of technology. The study concludes that, based on current information, it is projected that ACI technology will be available for commercial application after 2010 and that removal levels in the 70 percent to 90 percent range could be achievable. This assumes the funding and successful implementation of an aggressive, comprehensive R&D program at both EPA and DOE. Such applications represent only the initiation of a potential national retrofit program which would take a number of years to fully implement.

The Section 112 Maximum Achievable Control Technology (MACT) approach has a clear timeline for compliance. Under MACT, reductions are required prior to the projected timeframe for when mercury-specific technologies will be broadly available.

The Agency has determined that some types of MACT analyses are not appropriate because IPM is not currently configured to analyze the type of near-term scenarios that would be required under MACT. However, the Agency has not ruled out performing more analysis of a Section 112 MACT approach.

Question 7. In its analysis of additional alternatives to those proposed in the Utility Mercury Reductions Rule, is EPA completing the Section 112 options analyses that were requested by the Federal Advisory Committee that EPA convened in conjunction with development of the Utility Mercury Reductions Rule? If not, why not?

Response. The Agency conducted preliminary Integrated Planning Model (IPM) analyses in Spring 2002. The results of these analyses, which included a range of potential regulatory outcomes, were discussed with the Working Group. These discussions led to the members of the Working Group making a number of suggestions on modifications that should be made to the IPM input and assumption files. These changes were discussed with the Working Group during Summer 2002 and were incorporated into the Agency's modeling for Clear Skies 2003 and the regulatory work done prior to proposal of the alternative approaches in January 2004. As the Working Group prepared its final report to the Clean Air Act Advisory Committee in fall 2002, it became clear that the Working Group would not achieve consensus on the

issues. The Agency then moved forward on its own to prepare the analyses necessary to develop the proposed rulemaking.

Individual stakeholders of the Working Group made suggestions regarding additional analyses that the Agency should consider and, possibly, conduct. However, the Working Group's final report demonstrates that there was no consensus on this issue. We will continue to consider the input of the Working Group as we move ahead to finalize the mercury rule.

Question 8a. EPA's Office of Research and Development released a white paper on February 27, 2004 stating that mercury removal of 70–90 percent is possible on 96 percent of the nation's coal-fired power generation capacity by 2010. According to the white paper, the reduction targets "assume sufficient research and development and demonstrations" of technology. Yet, the President's FY2005 budget cuts EPA's science and technology budget by \$93 million. Does EPA's FY2005 science and technology budget proposal cut research funding necessary to develop and demonstrate the technologies discussed and described in EPA's February 27 white paper?

Response. The President's Budget request in FY2005 for science and technology does not reduce the Agency's research efforts to evaluate mercury control technologies for coal-fired power plants. Research planned for fiscal year 2005 includes activities to understand and evaluate, at a fundamental level, the factors that influence mercury capture; determine, at bench and small pilot-scale, the performance of different control options; and determine the leaching characteristics of residues generated by key mercury control technologies. EPA also plans to keep abreast of all technology development, evaluation, and demonstration activities in order to ensure the Agency is up to date on the state-of-the art of control technology to help guide future regulatory and enforcement programs. Finally, the Agency will continue to conduct research to evaluate and field test continuous emission monitors for coal fired power plants.

Question 8b. Does EPA's FY2005 science and technology budget proposal include sufficient funding necessary to develop and demonstrate the technologies discussed and described in EPA's February 27 white paper?

Response. The projected timeframe for mercury control technology availability discussed in the referenced white paper is based on "best engineering judgment and the assumption that a focused Research, Development & Demonstration program is carried out in an effective and expeditious manner." The funding included in the fiscal year 2005 President's budget is adequate for the three components of the EPA part of the program described above. However, it should be noted that the total research effort is much broader than the scope of the Agency's research program, and is comprised of both Federal (DOE and EPA) and private (Electric Power Research Institute, several large utilities) projects. In fact, by far the largest component of this comprehensive effort, and the bulk of the large-scale testing and demonstration, is being funded by the Department of Energy.

Question 8c. If not, how much additional funding would be necessary to fund the research and development effort so that mercury control technologies would be adequately tested and widely deployable by 2010?

Response. As indicated in the response above, EPA believes the funding included in the fiscal year 2005 President's budget is adequate for the three components of the EPA part of the program described above.

RESPONSES BY MICHEAL O. LEAVITT TO ADDITIONAL QUESTIONS FROM
SENATOR LIEBERMAN

Question 1. Concerning the NOx and SOx rules, where you justified a two stage approach on the basis of an insufficient labor force to install the pollution control equipment. Have you reviewed the October report of the EPA which states that the labor force is sufficient? Will you make the reductions tighter for 2010?

Response. The October report you mention in your question was published in 2002: *Engineering and Economic Factors Affecting the Installation of Control Technologies For Multi-Pollutant Strategies*, US EPA, October 2002. This analysis was performed in support of the Clear Skies legislative proposal. The report examined the resources required for the construction and operation of control technologies for multi-pollutant control strategies. This report made no conclusions with respect to the proposed Clean Air Interstate Rule (CAIR).

Based on the analysis in the report, EPA concluded that the Clear Skies proposal was projected to have sufficient resources to meet the Phase I caps in 2010, although some resources were projected to be put under more pressure than others.

Boilermaker labor was one of the resources that was projected to be under pressure in the early part of Phase I due to the simultaneous installation of NOx controls for the NOx SIP call. For the proposed Clear Skies Act, EPA also concluded that it would be difficult to predict the market supply of resources beyond Phase I but that the 2018 Phase II caps should allow ample time for the market to meet the resource demands.

Concerning EPA's proposed CAIR, EPA used the October 2002 report as its basis for the conclusions it made for emissions caps and timing of those emission caps. However, the assumptions EPA made about resources and timing under Clear Skies would not necessarily apply under CAIR. EPA assumed legislation would have been enacted in the late 2003 or early 2004 timeframe, allowing over 6 years for sources to plan and install pollution control devices under Phase I. Under CAIR, this time would be shorter given that EPA intends to finalize the rule the latter half of 2004; states would have a year and a half to submit SIPs outlining their control strategies for sources; and sources would have about 3 and a half years for the planning and installation of controls before the start of Phase I in 2010. Therefore, EPA reached different conclusions about the timing and level of control under the CAIR rule-making when compared to Clear Skies.

EPA believes its proposed emissions caps and timing under CAIR are appropriate given our understanding of resource availability to install pollution control equipment. As part of the proposed rule, EPA has taken comment on these conclusions.

Question 2. I am concerned about the number of our national parks that are in non-attainment areas. Can you assure this Congress that the boundaries for non-attainment areas for the 8-hour Ozone rule have been drawn to include the sources of ozone in the areas of nonattainment?

Response. When we designated areas as attaining or not attaining the 8-hour ozone standard, we took into account whether a nearby area was significantly contributing to ozone non-attainment problems on National Park lands. Our designation decisions reflect the best information available and we are confident that air quality in parks will improve due to the combination of local and regional programs to reduce emissions of ozone precursors.

EPA is taking action to improve air quality across the nation, including in national parks and wilderness areas. Our proposed Clean Air Interstate Rule, Non-Road Diesel Rule, and the NOx SIP call are just a few of the programs that will dramatically reduce regional transport of ozone, a key component of improving air quality in national parks.

Question 3. Will you allow the BART rules to come into force on schedule, and assure this Congress that you will not delay their implementation?

Response. We fully intend to allow the Best Available Retrofit Technology (BART) rules to come into force and be implemented on schedule, without delay. We are under consent decree to finalize the BART rules by April 15, 2005, and we intend to meet that deadline. We have already met the consent decree deadline for issuing the proposal on April 15, 2004.

We expect States to include BART determinations for all sources subject to BART in their regional haze State Implementation Plans (SIPs), due in January, 2008. Consistent with the 1999 regional haze rule, all States must meet their BART requirements either through source-specific control requirements or through an approved trading program that achieves greater visibility improvement than would source-specific control requirements. EPA has proposed to find that the proposed Clean Air Interstate Rule (CAIR) would be an approvable trading program under BART for the electric generation sector in the states that the CAIR would cover. Such a program would achieve a greater visibility improvement than the source-specific BART, cover a larger number of electric generating units in those states, create greater emissions reductions, and, unlike BART, cap emissions from this sector.

RESPONSES BY MICHAEL O. LEAVITT TO ADDITIONAL QUESTIONS FROM

Senator Jeffords

1. **Does the final 8-hour ozone implementation strategy permit areas that have not yet attained the 1-hour standard to extend any deadlines for achieving emissions reductions required under that standard beyond 2007, the latest 1-hour ozone standard attainment deadline? If so, why?**

For areas that have not yet attained the 1-hour ozone standard, the 8-hour ozone implementation strategy does not generally provide additional time for such areas to implement control measures that were required for purposes of the 1-hour standard. However, the rule does not retain all obligations that applied for purposes of the 1-hour standard. When EPA promulgated the 8-hour ozone standard, EPA also determined that the 1-hour standard was not needed to protect human health and the environment, and that the 8-hour standard would replace the 1-hour standard. Thus, in the 8-hour implementation rule, EPA considered how areas should transition from the 1-hour standard to the 8-hour standard.

EPA determined that the 1-hour standard would no longer apply (i.e., be "revoked") one year following designation for the 8-hour standard. But EPA also concluded that, even after revocation of the 1-hour standard, areas that were nonattainment for the 1-hour standard would remain subject to most of the planning obligations that applied to such areas for purposes of the 1-hour standard. Areas would need to continue to implement control measures mandated under the CAA for their classification, and would need to achieve the rate of progress reductions provided for their 1-hour classification. However, EPA also concluded that areas would not remain subject to the new source review offset ratios and major source thresholds that applied for the area's 1-hour classification upon approval of a SIP meeting the 8-hour new source review requirements for the area. In addition, EPA provided that areas with outstanding 1-hour attainment demonstrations could either submit those demonstrations or submit a SIP providing for early emission reductions for the 8-hour NAAQS or submit an early 8-hour attainment demonstration SIP that achieved the first reasonable further progress reductions by the end of 2007, rather than by the end of 2008.

Most areas that were designated nonattainment for the 1-hour standard will have an 8-hour ozone attainment date beyond 2007. Thus, these areas will not reach attainment of the 8-hour ozone standard on the same schedule that applied for purposes of attaining the 1-hour standard. We note that during the litigation regarding EPA's promulgation of the 8-hour NAAQS, both the Court of Appeals and the Supreme Court noted in rejecting EPA's implementation strategy that the strategy would require some areas to attain the more stringent 8-hour standard as quick as or more quickly than the area was required to attain the 1-hour standard. Because the 8-hour standard is more stringent and will require additional emission reductions, it is appropriate that areas will have longer than their 1-hour attainment date to meet the 8-hour standard.

Finally, we note that States remain free to request SIP revisions consistent with section 110(l) of the Clean Air Act. As noted above, under EPA's implementation rule, areas will remain subject to mandated control obligations under the Act and will be unable to relax those controls or delay reductions beyond any statutorily-mandated timeframe. However, SIPs also include measures that are not mandated by the Act, but that a State chooses to adopt as part of its strategy to attain the NAAQS (i.e., "discretionary measures"). If a State wishes to modify or remove a discretionary measure, the State will need to demonstrate that the modification will not interfere with attainment of or progress toward the 8-hour NAAQS.

2. Please provide a list of each 8-hour ozone nonattainment area with its required attainment deadline under that standard and, where applicable, its required attainment deadline under the 1-hour ozone standard, organized by state.

State	Area Name and State	8-hour		1-hour	
		Category	Maximum Attainment	Classification	Attainment
		Classification	Date	Nonattainment	Date Nov 15
AL	Birmingham, AL	Subpart 1	June 2009		
AZ	Phoenix-Mesa, AZ	Subpart 1	June 2009	Serious	1999
CA	Amador and Calaveras Cos (Central Mtn), CA	Subpart 1	June 2009		
CA	Chico, CA	Subpart 1	June 2009	Sec 185A	
CA	Imperial Co, CA	Marginal	June 2007	Sec 185A	
CA	Kern Co (Eastern Kern), CA	Subpart 1	June 2009	Serious	2001
CA	Los Angeles South Coast Air Basin, CA	Severe 17	June 2021	Extreme	2010
CA	Los Angeles-San Bernardino Cos(W Mojave), CA	Moderate	June 2010	Severe 17	2007
CA	Mariposa and Tuolumne Cos (Southern Mtn), CA	Subpart 1	June 2009		
CA	Nevada Co (Western Portion), CA	Subpart 1	June 2009		
CA	Riverside Co, (Coachella Valley), CA	Serious	June 2013	Severe 17	2007
CA	Sacramento Metro, CA	Serious	June 2013	Severe 15	2005
CA	San Diego, CA	Subpart 1	June 2009		
CA	San Francisco Bay Area, CA	Marginal	June 2007	Other (Mod)	1996
CA	San Joaquin Valley, CA	Serious	June 2013	Extreme	2010
CA	Sutter Co (Sutter Buttes), CA	Subpart 1	June 2009	Sec 185A	

CA	Ventura Co, CA	Moderate	June 2010	Severe 15	2005
CO	Denver-Boulder-Greeley-Ft Collins-Love., CO	EAC Subpart 1	Dec 2007		
CT	Greater Connecticut, CT	Moderate	June 2010	Severe17/Serious	2007
GA	Atlanta, GA	Marginal	June 2007	Severe	2005
GA	Macon, GA	Subpart 1	June 2009		
GA	Murray Co (Chattahoochee Nat Forest), GA	Subpart 1	June 2009		
IN	Evansville, IN	Subpart 1	June 2009		
IN	Fort Wayne, IN	Subpart 1	June 2009		
IN	Greene Co, IN	Subpart 1	June 2009		
IN	Indianapolis, IN	Subpart 1	June 2009		
IN	Jackson Co, IN	Subpart 1	June 2009		
IN	La Porte Co, IN	Moderate	June 2010		
IN	Muncie, IN	Subpart 1	June 2009		
IN	South Bend-Elkhart, IN	Subpart 1	June 2009		
IN	Terre Haute, IN	Subpart 1	June 2009		
LA	Baton Rouge, LA	Marginal	June 2007	Severe 15	2005
MA	Boston-Lawrence-Worcester (E. MA), MA	Moderate	June 2010	Serious	1999
MA	Springfield (Western MA), MA	Moderate	June 2010	Serious	2003
MD	Baltimore, MD	Moderate	June 2010	Severe 15	2005
MD	Kent and Queen Anne's Cos, MD	Moderate	June 2010	Marginal	1993
MD	Washington Co (Hagerstown), MD	EAC Subpart 1	Dec 2007		
ME	Hancock, Knox, Lincoln and Waldo Cos, ME	Subpart 1	June 2009	Moderate	1996

ME	Portland, ME	Marginal	June 2007	Moderate	1996
MI	Allegan Co, MI	Subpart 1	June 2009		
MI	Benton Harbor, MI	Subpart 1	June 2009		
MI	Benzie Co, MI	Subpart 1	June 2009		
MI	Cass Co, MI	Moderate	June 2010		
MI	Detroit-Ann Arbor, MI	Moderate	June 2010		
MI	Flint, MI	Subpart 1	June 2009		
MI	Grand Rapids, MI	Subpart 1	June 2009		
MI	Huron Co, MI	Subpart 1	June 2009		
MI	Kalamazoo-Battle Creek, MI	Subpart 1	June 2009		
MI	Lansing-East Lansing, MI	Subpart 1	June 2009		
MI	Mason Co, MI	Subpart 1	June 2009		
MI	Muskegon, MI	Moderate	June 2010		
NC	Fayetteville, NC	EAC Subpart 1	Dec 2007		
NC	Greensboro-Winston Salem-High Point, NC	EAC Moderate	Dec 2007		
NC	Haywood and Swain Cos (Great Smoky NP), NC	Subpart 1	June 2009		
NC	Hickory-Morganton-Lenoir, NC	EAC Subpart 1	Dec 2007		
NC	Raleigh-Durham-Chapel Hill, NC	Subpart 1	June 2009		
NC	Rocky Mount, NC	Subpart 1	June 2009		
NH	Boston-Manchester-Portsmouth(SE),NH	Moderate	June 2010	Serious/Mar	2007
NV	Las Vegas, NV	Subpart 1	June 2009		
NY	Albany-Schenectady-Troy, NY	Subpart 1	June 2009	Marginal	1993

NY	Buffalo-Niagara Falls, NY	Subpart 1	June 2009	Marginal	1993
NY	Essex Co (Whiteface Mtn) NY	Subpart 1	June 2009	Marginal RT	1993
NY	Jamestown, NY	Subpart 1	June 2009		
NY	Jefferson Co, NY	Moderate	June 2010	Marginal	1993
NY	Poughkeepsie, NY	Moderate	June 2010	Severe 17/Moderate	1996
NY	Rochester, NY	Subpart 1	June 2009		
OH	Canton-Massillon, OH	Subpart 1	June 2009		
OH	Cleveland-Akron-Lorain, OH	Moderate	June 2010		
OH	Columbus, OH	Subpart 1	June 2009		
OH	Dayton-Springfield, OH	Subpart 1	June 2009		
OH	Lima, OH	Subpart 1	June 2009		
OH	Toledo, OH	Subpart 1	June 2009		
PA	Allentown-Bethlehem- Easton, PA	Subpart 1	June 2009	Marginal	1993
PA	Altoona, PA	Subpart 1	June 2009	Marginal	1993
PA	Clearfield and Indiana Cos, PA	Subpart 1	June 2009		
PA	Erie, PA	Subpart 1	June 2009	Marginal	1993
PA	Franklin Co, PA	Subpart 1	June 2009	Inc Data	
PA	Greene Co, PA	Subpart 1	June 2009	Inc Data	
PA	Harrisburg-Lebanon- Carlisle, PA	Subpart 1	June 2009	Marginal	1993
PA	Johnstown, PA	Subpart 1	June 2009	Marginal	1993
PA	Lancaster, PA	Moderate	June 2010	Marginal	1993
PA	Pittsburgh-Beaver Valley, PA	Subpart 1	June 2009		

PA	Reading, PA	Subpart 1	June 2009		
PA	Scranton-Wilkes-Barre, PA	Subpart 1	June 2009	Marginal	1993
PA	State College, PA	Subpart 1	June 2009		
PA	Tioga Co, PA	Subpart 1	June 2009		
PA	York, PA	Subpart 1	June 2009	Marginal	1993
RI	Providence (All RI), RI	Moderate	June 2010	Serious	2007
SC	Columbia, SC	EAC Subpart 1	Dec 2007		
SC	Greenville-Spartanburg-Anderson, SC	EAC Subpart 1	Dec 2007		
TN	Johnson City-Kingsport-Bristol, TN	EAC Subpart 1	Dec 2007		
TN	Knoxville, TN	Subpart 1	June 2009		
TN	Nashville, TN	EAC Subpart 1	Dec 2007		
TX	Beaumont-Port Arthur, TX	Marginal	June 2007	Serious	2005
TX	Dallas-Fort Worth, TX	Moderate	June 2010	Serious	1999
TX	Houston-Galveston-Brazoria, TX	Moderate	June 2010	Severe 17	2007
TX	San Antonio, TX	EAC Subpart 1	Dec 2007		
VA	Frederick Co, VA	EAC Subpart 1	Dec 2007		
VA	Fredericksburg, VA	Moderate	June 2010	Severe 15	2005
VA	Madison and Page Cos (Shenandoah NP), VA	Subpart 1	June 2009		
VA	Norfolk-Virginia Beach-Newport News (HR), VA	Marginal	June 2007		
VA	Richmond-Petersburg, VA	Moderate	June 2010		
VA	Roanoke, VA	EAC Subpart 1	Dec 2007		
WI	Door Co, WI	Subpart 1	June 2009		

WI	Kewaunee Co, WI	Subpart 1	June 2009		
WI	Manitowoc Co, WI	Subpart 1	June 2009		
WI	Milwaukee-Racine, WI	Moderate	June 2010	Severe 17	2007
WI	Sheboygan, WI	Moderate	June 2010		
WV	Berkeley and Jefferson Counties, WV	EAC Subpart 1	Dec 2007		
WV	Charleston, WV	Subpart 1	June 2009		
Multi state Ozone Nonattainment Areas					
DC-MD-VA	Washington, DC-MD-VA	Moderate	June 2010	Severe 15	2005
IL-IN	Chicago-Gary-Lake County, IL-IN	Moderate	June 2010	Severe 17	2007
KY-IN	Louisville, KY-IN	Subpart 1	June 2009		
MO-IL	St Louis, MO-IL	Moderate	June 2010		
NC-SC	Charlotte-Gastonia-Rock Hill, NC-SC	Moderate	June 2010		
NY-NJ-CT	New York-N. New Jersey-Long Island, NY-NJ-CT	Moderate	June 2010	Severe 17/Serious/Mar	2007
OH-KY-IN	Cincinnati-Hamilton, OH-KY-IN	Subpart 1	June 2009	Moderate/Sec 185A	1996
OH-PA	Youngstown-Warren-Sharon, OH-PA	Subpart 1	June 2009	Marginal	1993
OH-WV	Steubenville-Weirton, OH-WV	Subpart 1	June 2009		
PA-NJ-MD-DE	Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE	Moderate	June 2010	Severe 17/15/Moderate/Mar	2005
TN-AR	Memphis, TN-AR	Moderate	June 2010		
TN-GA	Chattanooga, TN-GA	Subpart 1	June 2009		
TN-KY	Clarksville-Hopkinsville, TN-KY	Subpart 1	June 2009		
WV-KY	Huntington-Ashland, WV-KY	Subpart 1	June 2009		
WV-OH	Parkersburg-Marietta, WV-OH	Subpart 1	June 2009		
WV-OH	Wheeling, WV-OH	Subpart 1	June 2009		
				There are cases when more than one 1-hr ozone area is in an 8-hour nonattainment area	Some areas have attainment date extensions and others have been "bumped up"

3. Please provide a list of those areas that have not attained the 1-hour or the 8-hour ozone standard sorted by the subpart under which they will be regulated, pursuant to the final ozone implementation strategy, and, within each of those subgroups, by the severity of measured ozone concentrations in that area.

Table 3-1 lists areas that are currently designated nonattainment for the 1-hour ozone standards (regardless of whether they violate the standards) and areas that are designated attainment but are currently violating the 1-hour standards. An area's design value for the 1-hour standard is a measure of the severity of the ozone concentration in the area; it is not the basis for determining whether an area is violating the 1-hour standard.

Table 3-2 lists the areas designated nonattainment for the 8-hour ozone standards. Those areas with design values 85 or higher are violating the 8-hour standards. Please see answer to question 2 for additional information on subpart for the 8-hour standard.

TABLE 3-1: 1-Hour Ozone Areas Listed by Category/Classification

Preliminary 1-hour Ozone Air Quality Data 2001-2003	Design Value (ppb)	Status
Nonattainment Areas		
EXTREME		
Los Angeles South Coast Air Basin, CA	180	Violating
SEVERE		
Chicago-Gary-Lake County, IL-IN	134	Violating
Houston-Galveston-Brazoria, TX	175	Violating
Milwaukee-Racine, WI	134	Violating
New York-N. New Jersey-Long Island, NY-NJ-CT	145	Violating
Southeast Desert Modified AQMA, CA	138	Violating
SEVERE		
Atlanta, GA	125	Violating
Baltimore, MD	143	Violating
Baton Rouge, LA	131	Violating
Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD	133	Violating
Sacramento Metro, CA	143	Violating
San Joaquin Valley, CA	151	Violating

Ventura Co, CA	124	Clean
Washington, DC-MD-VA	140	Violating
SERIOUS		
Boston-Lawrence-Worcester (E. MA), MA-NH	124	Violating
Dallas-Fort Worth, TX	135	Violating
East Kern Co, CA	118	Clean
El Paso, TX*	117	Clean
Greater Connecticut, CT	146	Violating
Phoenix, AZ	111	Clean
Portsmouth-Dover-Rochester, NH	123	Clean
Providence (All RI), RI	130	Violating
Springfield (Western MA), MA	132	Violating
MODERATE		
Atlantic City, NJ	107	Clean
Beaumont-Port Arthur, TX	129	Violating
Cincinnati-Hamilton, OH-KY (OH Portion)	117	Clean
Knox & Lincoln Co.s, ME	110	Clean
Lewiston-Auburn, ME*	104	Clean
Portland, ME	126	Violating
Poughkeepsie, NY	126	Violating
MARGINAL		
Albany-Schenectady-Troy, NY	115	Clean
Allentown-Bethlehem-Easton, PA-NJ	114	Clean
Altoona, PA	107	Clean
Buffalo-Niagara Falls, NY	116	Clean
Erie, PA	114	Clean
Essex Co, NY	113	Clean

Harrisburg-Lebanon-Carlisle, PA	111	Clean
Jefferson Co, NY	121	Clean
Johnstown, PA*	106	Clean
Kent & Queen Anne's Co.s, MD	122	Clean
Lancaster, PA	124	Clean
Manchester, NH	116	Clean
Reno, NV*	93	Clean
Scranton-Wilkes-Barre, PA*	108	Clean
Smyth Co, VA (White Top Mtn)*	ND	
Sunland Park, NM (New Area 1995)*	103	Clean
Sussex Co, DE	119	Clean
York, PA	114	Clean
Youngstown-Warren-Sharon, PA portion	118	Clean
OTHER		
San Francisco Bay Area, CA	123	Clean
SECTION 185A		
Chico, CA	102	Clean
Imperial Co, CA	142	Violating
Yuba City, CA	113	Clean
INCOMPLETE DATA		
Cheshire Co, NH*	92	Clean
Salem, OR	95	Clean
Crawford Co, PA*	ND	
Franklin Co, PA	114	Clean
Greene Co, PA	107	Clean
Juniata Co, PA*	ND	
Lawrence Co, PA*	103	Clean

Northumberland Co, PA*	ND	
Pike Co, PA*	ND	
Schuylkill Co, PA*	ND	
Snyder Co, PA*	ND	
Susquehanna Co, PA*	ND	
Warren Co, PA*	ND	
Wayne Co, PA*	ND	
Maintenance (Attainment) Areas		
Moderate		
Charlotte-Gastonia, NC (Mecklenburg Co.)	128	Violating
Cleveland-Akron-Lorain, OH (Geauga Co.)	128	Violating
Detroit-Ann Arbor, MI (Macomb & St. Clair Cos)	127	Violating
Richmond, VA (Charles City Co.)	131	Violating
Sheboygan, WI	124	Violating
Attainment Areas (Not Maintenance)		
Rowan Co (Charlotte MSA)	129	Violating
Crittenden Co, AR (Memphis MSA)	126	Violating
La Porte Co, IN (Adjacent to Chicago)	135	Violating
Cass Co, MI (Adjacent to Benton Harbor)	124	Violating

Notes:

ND = No Data

Monitoring sites in Kenosha County Wisconsin are used, by previous agreement, to calculate the design value in both Chicago, IL-IN and Milwaukee, WI.

Cass Co, MI - On February 14, 1996 Federal Register (61 FR 5707) Cass Co was corrected from nonattainment incomplete/no data area to attainment/unclassifiable.

Gaston and Mecklenburg counties, NC, are in the Charlotte-Gastonia, NC (Moderate) maintenance area.

Mecklenburg county is violating the 1-hour ozone standard. Rowan County is not in the 1-hour ozone nonattainment area, but is in the Charlotte-Gastonia-Rock Hill, NC-SC 8-hour ozone nonattainment area.

Crittenden County, AR is not in the Memphis, TN 1-hour ozone nonattainment area, but is in the Memphis, TN-AR, 8-hour ozone nonattainment area.

The areas listed below have different design values or average expected exceedance rate than 8-hour ozone nonattainment areas with similar area names. The difference is due to the fact that a county is in a certain 1-hour nonattainment area, but in a different 8-hour nonattainment area. Or a county may be in 1-hour attainment area and in a 8-hour nonattainment area.

New York-N. New Jersey-Long Island, NY-NJ-CT
Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD
Greater Connecticut, CT
Cincinnati-Hamilton, OH-KY (OH Portion)
Charlotte-Gastonia, NC (Mecklenburg Co.)

* These areas are designated unclassifiable/attainment for the 8-hour ozone standard. Portions of the Lewiston-Auburn, ME, Johnstown, PA, and Scranton-Wilkes-Barre, PA areas are nonattainment for the 8-hour standard.

The 1-hour ozone standard is 0.12 parts per million (ppm) daily maximum 1-hour average concentration not to be exceeded more than once per year on average. If the daily maximum is equal to or greater than 125 parts per billion (ppb), there is an exceedance. See 40 CFR PART 50--National Primary And Secondary Ambient Air Quality Standards <http://www.epa.gov/ttn/naaqs/ozone/ozonetech/40cfr50.htm>

The 1-hour ozone standard is not met at a monitoring site if the average number of estimated exceedances of the ozone standard is greater than 1.0 (1.05 rounds up). This is also called the average expected exceedance rate (AEER).

The average expected exceedance rate (average estimated number of exceedances) is the number of days the 0.12 ppm 1-hour ozone standard was exceeded on average at the site recording the highest updated air quality value. This computation is performed after adjustment for any missing sampling days during the 3-year period.

Compliance with the 1-hour ozone standard is judged on the basis of the most recent three years of ambient air quality monitoring data.

The computation procedures follow EPA guidance for calculating design values (Laxton Memorandum, June 18, 1990). For sites with three complete years of monitoring data, the 1-hour ozone air quality design value is the fourth highest daily maximum 1-hour ozone concentration, because the standard allows one exceedance per year on average.

It is important to note that the 1990 Clean Air Act Amendments required that nonattainment areas be classified on the basis of the design value at the time the Amendments were passed, generally the 1987-89 period was used.

The design value and the average expected exceedance rate may be from different monitors. The highest design value and the AEER from all the monitors are used to determine the design value and the AEER for the area.

TABLE 3-2: 8-hour Ozone Nonattainment Areas
Listed by Classification then Design Value (2001-03 data)

<i>Classification/Area Name</i>	<i>Design Value (ppb)</i>
Severe 17	
Los Angeles South Coast Air Basin, CA	131
Serious	
San Joaquin Valley, CA	115
Riverside Co, (Coachella Valley), CA	108
Sacramento Metro, CA	107
Moderate	
Philadelphia-Wilmin-Atlantic Ci, PA-NJ-MD-DE	106
Los Angeles-San Bernardino Cos(W Mojave), CA	106
Baltimore, MD	103
Cleveland-Akron-Lorain, OH	103
New York-N. New Jersey-Long Island, NY-NJ-CT	102
Houston-Galveston-Brazoria, TX	102
Chicago-Gary-Lake County, IL-IN	101
Milwaukee-Racine, WI	101
Charlotte-Gastonia-Rock Hill, NC-SC	100
Sheboygan, WI	100
Dallas-Fort Worth, TX	100
Fredericksburg, VA	99
Washington, DC-MD-VA	99
Jefferson Co, NY	97
Boston-Lawrence-Worcester (E. MA), MA	95
Boston-Manchester-Portsmouth(SE), NH	95
Greater Connecticut, CT	95
Providence (All RI), RI	95
Ventura Co, CA	95
Springfield (Western MA), MA	94
Poughkeepsie, NY	94
St Louis, MO-IL	92
Marginal	
Portland, ME	91
Atlanta, GA	91
Beaumont-Port Arthur, TX	91
Norfolk-Virginia Beach-Newport News (HR), VA	90
Imperial Co, CA	87
Baton Rouge, LA	86
San Francisco Bay Area, CA	86

Areas reclassified from Moderate to Marginal-Effective Nov. 2004

Detroit-Ann Arbor, MI	97
Kent and Queen Anne's Cos, MD	95
Muskegon, MI	95
Richmond-Petersburg, VA	94
Cass Co, MI	93
La Porte Co, IN	93
Lancaster, PA	92
Memphis, TN-AR	92

Subpart 1

Buffalo-Niagara Falls, NY	99
Kern Co (Eastern Kern), CA	98
Nevada Co (Western Portion), CA	98
Allegheny Co, MI	97
Indianapolis, IN	96
Cincinnati-Hamilton, OH-KY-IN	96
Columbus, OH	95
Youngstown-Warren-Sharon, OH-PA	95
Hancock, Knox, Lincoln and Waldo Cos, ME	94
Jamestown, NY	94
Pittsburgh-Beaver Valley, PA	94
Raleigh-Durham-Chapel Hill, NC	94
Door Co, WI	94
Franklin Co, PA	93
Kewaunee Co, WI	93
South Bend-Elkhart, IN	93
Toledo, OH	93
San Diego, CA	93
Erie, PA	92
Knoxville, TN	92
Louisville, KY-IN	92
Essex Co (Whiteface Mtn) NY	91
Allentown-Bethlehem-Easton, PA	91
Reading, PA	91
Huntington-Ashland, WV-KY	91
Benton Harbor, MI	91
Amador and Calaveras Cos (Central Mtn), CA	91
Mariposa and Tuolumne Cos (Southern Mtn), CA	91
Clearfield and Indiana Cos, PA	90
Canton-Massillon, OH	90
Dayton-Springfield, OH	90
Flint, MI	90
Manitowoc Co, WI	90
Greene Co, PA	89
York, PA	89
Rocky Mount, NC	89

Grand Rapids, MI	89
Lima, OH	89
Mason Co, MI	89
Chico, CA	89
Rochester, NY	88
Harrisburg-Lebanon-Carlisle, PA	88
State College, PA	88
Chattanooga, TN-GA	88
Benzie Co, MI	88
Fort Wayne, IN	88
Greene Co, IN	88
Muncie, IN	88
Sutter Co (Sutter Buttes), CA	88
Albany-Schenectady-Troy, NY	87
Johnstown, PA	87
Madison and Page Cos (Shenandoah NP), VA	87
Parkersburg-Marietta, WV-OH	87
Wheeling, WV-OH	87
Birmingham, AL	87
Huron Co, MI	87
Terre Haute, IN	87
Phoenix-Mesa, AZ	87
Charleston, WV	86
Scranton-Wilkes-Barre, PA	86
Tioga Co, PA	86
Macon, GA	86
Kalamazoo-Battle Creek, MI	86
Lansing-East Lansing, MI	86
Steubenville-Weirton, OH-WV	86
Las Vegas, NV	86
Altoona, PA	85
Clarksville-Hopkinsville, TN-KY	85
Haywood and Swain Cos (Great Smoky NP), NC	85
Murray Co (Chattahoochee Nat Forest), GA	85
Evansville, IN	85
Jackson Co, IN	85
Early Action Compact - Marginal - Effective Nov. 2004	
Greensboro-Winston Salem-High Point, NC	93
Early Action Compact - Subpart 1.	
Columbia, SC	89
San Antonio, TX	89
Hickory-Morganton-Lenoir, NC	88
Fayetteville, NC	87
Greenville-Spartanburg-Anderson, SC	87
Denver-Boulder-Greeley-Ft Collins-Love., CO	87
Berkeley and Jefferson Counties, WV	86
Washington Co (Hagerstown), MD	86
Johnson City-Kingsport-Bristol, TN	86
Nashville, TN	86
Frederick Co, VA	85
Roanoke, VA	85
126 Areas	

4. **Please provide a list of the areas that have failed to adopt adequate plans to achieve attainment of the 1-hour ozone standard by that area's attainment deadline.**

The following areas did not have adequate plans to achieve attainment of the 1-hour standard and/or were subsequently bumped up to a higher classification and have a new obligation to submit a 1-hour SIP:

- San Joaquin, CA (requested voluntary bump up to extreme) had until November 15, 2004 to submit a 1-hour ozone attainment demonstration.
- Washington, DC, VA, MD (bumped up to severe) submitted their 1-hour ozone attainment demonstration by the deadline of March 1, 2004 which was established when the area was bump up.
- Baton Rouge, LA (bumped up to severe) has not yet submitted a 1-hour ozone attainment demonstration because it is waiting for resolution by EPA of the reformulated gasoline issue.
- Atlanta, GA (bumped up to severe) submitted a 1-hour ozone attainment demonstration. EPA does not expect to take action on the submittal since it is anticipated that Atlanta will be redesignated to attainment in the Spring.
- Beaumont, TX (bumped up to serious) has until April 29, 2005 to submit a 1-hour ozone attainment demonstration.
- Dallas, TX, has submitted a 1-hour ozone attainment demonstration; EPA has not yet taken final action on it.
- Portland, ME, is required to submit a 1-hour ozone attainment demonstration.

The areas listed above as being "bumped up" now have new schedules to submit attainment demonstration SIPs for their new attainment dates (and to adopt the control measures required for the higher classification). As noted above in response to question 1, the 8-hour implementation rule provides three options for a State to fulfill its obligations to submit the outstanding attainment demonstration: a) submit the attainment demonstration for the 1-hour standard; b) submit a 5 percent early increment of progress toward meeting the 8-hour standard; or c) submit an early 8-hour attainment demonstration.

5. **Under the final ozone implementation strategy, why will areas that have failed to adopt adequate plans to achieve the 1-hour ozone standard by that area's attainment deadline be permitted to wait until 2007 to adopt plans to meet the 8-hour ozone standard?**

We have not made a final decision on when states must submit plans to attain the

8-hour standard. The final implementation rule (Phase 1) does not address the timing for submission of plans to attain the 8-hour standard. In the June 2003 proposal, we proposed consistent with the timeframes specified in the Act, that areas designated nonattainment for the 8-hour standard would have three years to submit attainment demonstrations for that standard. We plan to take final action on that aspect of the proposal in our Phase 2 of the final implementation rule, which we plan to issue in the near future.

The Phase 1 implementation rule, issued on April 30, 2004, addresses states' continuing obligation with respect to requirements that applied for purposes of the 1-hour standard. For areas with outstanding 1-hour attainment demonstrations, the rule requires states to meet one of three options no later than June 15, 2005: (1) Submit a 1-hour attainment demonstration; (2) Submit an early five percent increment of progress plan toward the 8-hour standard; or (3) Submit an 8-hour ozone attainment demonstration that also ensures that the first segment of RFP is achieved early. If the state elects one of the first two options to meet its outstanding 1-hour attainment demonstration obligation, it will still be required to submit an attainment demonstration for the 8-hour standard in accordance with the time frame specified in the final Phase 2 implementation rule.

6. How many areas that have not attained the 1-hour ozone standard have been designated as attaining the 8-hour standard? For these areas, if there are any, please describe:

A) the New Source Review requirements that will apply and how, if at all, they will change from the area's requirements under the 1-hour standard, according to the final ozone implementation strategy rule; and,

B) the conformity requirements that will continue to apply in that area before the 1-hour standard is revoked, and after the 1-hour standard is revoked, if it is revoked.

There are no areas designated attainment for the 8-hour standards for which the current monitored air quality data shows that the area is not attaining the 1-hour standards. In other words, all 8-hour attainment areas either have monitored air quality data showing that they are meeting the 1-hour standards or have insufficient data for EPA to determine whether they meet the 1-hour standards.

Table 6-1 lists the 16 areas that are currently *designated* nonattainment for the 1-hour standard and that are designated attainment for the 8-hour standard. (Areas can have air quality meeting the standard but still be designated "nonattainment" if they do not go through the redesignation process.) Of the 16 areas, twelve were "incomplete data areas" when they were designated nonattainment. Three of the "incomplete data" 1-hour nonattainment areas, two marginal areas and the one serious area are currently monitoring attainment for the 1-hour ozone standards. For the remaining nine "incomplete data" 1-hour nonattainment areas and one marginal 1-hour nonattainment area, we do not have current monitoring data.

If an area is designated nonattainment for the 1-hour standards and attainment for the 8-hour standards, nonattainment NSR under the 1-hour standards will apply in that area until June 14, 2005. On June 15, 2005 and following, the 1-hour NAAQS is revoked and nonattainment NSR under the 1-hour standard is no longer an applicable requirement. However, the SIP containing the 1-hour NSR program applies until the SIP is revised, submitted, and approved by EPA. The eleven areas in Table 6-1 that are in the Ozone Transport Region must have an 8-hour nonattainment NSR program that meets the requirements for moderate nonattainment areas. Areas no longer required to have a nonattainment NSR program for ozone will be required to have a PSD NSR program that applies to major stationary sources of ozone precursors. (Such areas might also be required to have nonattainment NSR programs for other pollutants, depending on their attainment status for those other pollutants.)

Areas designated nonattainment for the 1-hour ozone standard must continue to demonstrate conformity to the 1-hour ozone standard during the one-year period from the effective date of the 8-hour-ozone designations to the effective date of the revocation of the 1-hour ozone standard (i.e., June 15, 2004 through June 15, 2005). After the effective date of the revocation of the 1-hour ozone standard (i.e., June 15, 2005), these 8-hour ozone attainment areas will no longer be required to demonstrate conformity for ozone. If any such areas are designated nonattainment or maintenance for carbon monoxide and/or PM_{10} , they are required to continue to determine conformity for those pollutants. Similarly, if any such areas are designated nonattainment for $PM_{2.5}$ in the future, they will be required to demonstrate conformity for that pollutant one year after the effective date of the $PM_{2.5}$ nonattainment designation.

As of May 07, 2004

TABLE 6-1: 8 HOUR DESIGNATED ATTAINMENT AREAS THAT ARE 1 HOUR DESIGNATED NONATTAINMENT AREAS

State(s)	Area Name	8-HR OZONE Attainment Areas	1-HR OZONE Nonattainment Areas		Ozone Design Value
		Category/Class	Classification Upon Designation	Area Name	
NH	Cheshire County	Attain	Incomplete data area	Cheshire C	92
PA	Crawford County	Attain	Incomplete data area	Crawford C	ND
PA	Juniata County	Attain	Incomplete data area	Juniata Co	ND
PA	Lawrence County	Attain	Incomplete data area	Lawrence C	103
PA	Pike County	Attain	Incomplete data area	Pike Co, P	ND
OR	Salem	Attain	Incomplete data area	Salem, OR	95
PA	Schuylkill County	Attain	Incomplete data area	Schuylkill	ND
PA	Snyder County	Attain	Incomplete data area	Snyder Co.	ND
PA	Susquehanna County	Attain	Incomplete data area	Susquehanna	ND
PA	Warren County	Attain	Incomplete data area	Warren Co.	ND
PA	Wayne County	Attain	Incomplete data area	Wayne Co.	ND
PA	Northumberland County	Attain	Incomplete data area	Northumberland Co	ND
NV	Reno	Attain	Marginal	Reno, NV	93
VA	Smyth County; White Top Mountain	Attain	Marginal	Smyth County; White Top Mountain	ND
NM	Sunland Park	Attain	Marginal	Sunland Pa	103
TX	El Paso	Attain	Serious	El Paso, T	117

* Design values for 2001-2003 period. ND means no data.

Last updated on Friday, May 7th, 2004

URL: <http://www.epa.gov/oar/oaqps/greenbk/gncl3.html>

7. What increase in NSR offset requirements will occur for areas that are designated as 8-hour nonattainment and never attained the 1-hour standard?

The specific offset requirements for a source are determined by the approved NSR program in the State Implementation Plan (SIP) at the time of permit issuance. An area's designation and classification (not its current air quality) determine type of NSR program that is required. (For example, an area designated nonattainment for the 1-hour standard must have an NSR program meeting the 1-hour ozone nonattainment NSR program requirements even if the area's air quality meets the 1-hour ozone standard.) Approved 1-hour NSR programs remain in the SIP until EPA has approved a SIP revision removing the program.

Pursuant to 40 CFR 50.9(b), EPA will revoke the 1-hour NAAQS on June 15, 2005. NSR under the 8-hour NAAQS applies in 8-hour nonattainment areas beginning on June 15, 2004. Thus, there is a period of time when major NSR requirements for both the 1-hour and 8-hour NAAQS could apply in an area or parts of an area.

During the time period when both 1-hour and 8-hour nonattainment NSR apply, sources must meet the requirements of the more stringent applicable program. If the area's 1-hour classification is higher than its 8-hour classification, the NSR program already in that area's SIP under the 1-hour NAAQS would satisfy the requirements of both programs. If the 8-hour classification is higher (which is true for one area), then the NSR program under the 8-hour classification would determine the NSR requirements. For example, if a source were to locate in a nonattainment area now classified as moderate under the 8-hour ozone NAAQS and serious under the 1-hour NAAQS, then the permit would be based on the NSR requirements that apply to serious ozone nonattainment areas under the 1-hour ozone NAAQS (i.e., 50 tpy major stationary source threshold and at least 1.2:1 offset ratio).

Once EPA revokes the 1-hour ozone NAAQS, the NSR program required to be in the SIP for that area will depend on that area's 8-hour designation and classification. The 8-hour program will apply once EPA has approved it. The changes in offset requirements for any particular area can be determined by looking at the classifications listed in the answer to question 2 and using Tables 7-1 and 7-2.

The offset requirements based on the 1-hour classifications are:

TABLE 7-1: NSR OFFSET REQUIREMENTS FOR 1-HOUR OZONE NONATTAINMENT AREAS	
CLASSIFICATION	OFFSET RATIO
Marginal	At least 1.1:1
Moderate	At least 1.15:1
Serious	At least 1.2:1
Severe	At least 1.3:1
Extreme	At least 1.5:1

The offset requirements based on the 8-hour classifications are:

TABLE 7-2: NSR OFFSET REQUIREMENTS FOR 8-HOUR OZONE NONATTAINMENT AREAS	
CLASSIFICATION	OFFSET RATIO
Subpart 1	At least 1:1
Marginal	At least 1.1:1
Moderate	At least 1.15:1
Serious	At least 1.2:1
Severe 15/17	At least 1.3:1
Extreme (if there ever are any)	At least 1.5:1

8. **The draft final ozone implementation strategy places great emphasis on prohibiting backsliding in areas that have not attained the 1-hour standard or are close to violating the 8-hour standard. Please identify any areas that have not attained the 1-hour standard but will be classified under the final 8-hour ozone implementation strategy/scheme in a category which carries fewer mandatory emissions reduction requirements than that area was obligated to comply with under the 1-hour standard.**

This table lists all of the areas that meet the following four criteria: (1) currently designated nonattainment for the 1-hour ozone standards, (2) violated the 1-hour standards based on 2001-03 data, (3) designated nonattainment for the 8-hour standards, and (4) have a lower classification for the 8-hour standards than for the 1-hour standards.

	8-hour		1-hour	
	Category	Latest Possible Attainment Date	1-hour Classification	1-hour Attainment Date
Area Name and State	Classification	Date	Nonattainment	Date: Nov 15
Los Angeles South Coast Air Basin, CA	Severe 17	June 2021	Extreme	2010
Riverside Co. (Coachella Valley), CA	Serious	June 2013	Severe 17	2007
Sacramento Metro, CA	Serious	June 2013	Severe 15	2005
San Joaquin Valley, CA	Serious	June 2013	Extreme	2010
Boston-Lawrence-Worcester (E. MA), MA	Moderate	June 2010	Serious	1999
Boston-Manchester-Portsmouth(SE),NH	Moderate	June 2010	Serious/Mar	2007
Greater Connecticut, CT	Moderate	June 2010	Severe17/Serious	2007
Providence (All RI), Ri	Moderate	June 2010	Serious	2007
Springfield (Western MA), MA	Moderate	June 2010	Serious	2003
Poughkeepsie, NY	Moderate	June 2010	Severe 17/Moderate	1996
New York-N. New Jersey-Long Island,NY-NJ-CT	Moderate	June 2010	Severe17/Serious/Mar	2007
Baltimore, MD	Moderate	June 2010	Severe 15	2005
Fredericksburg, VA	Moderate	June 2010	Severe 15	2005
Washington, DC-MD-VA	Moderate	June 2010	Severe 15	2005
Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE	Moderate	June 2010	Severe17/15/Mod/Mar	2005
Chicago-Gary-Lake County, IL-IN	Moderate	June 2010	Severe 17	2007
Milwaukee-Racine, WI	Moderate	June 2010	Severe 17	2007
Dallas-Fort Worth, TX	Moderate	June 2010	Serious	1999
Houston-Galveston-Brazoria, TX	Moderate	June 2010	Severe 17	2007
Los Angeles-San Bernardino Cos(W Mojave),CA	Moderate	June 2010	Severe 17	2007
Portland, ME	Marginal	June 2007	Moderate	1996
Atlanta, GA	Marginal	June 2007	Severe	2005
Baton Rouge, LA	Marginal	June 2007	Severe 15	2005

9. Please identify explicitly the mandatory control requirements that EPA will impose on each category of area that is not attaining the 8-hour standard.

Table 9-1 lists the statutorily-specified control requirements that apply for each classification of area designated nonattainment for the 8-hour standard under subpart 1 and subpart 2 of the Clean Air Act. (Note that the NSR-related requirements are considered growth requirements and are not included in the attached table.) In our June 2003 proposal, we proposed how these requirements would be interpreted for areas for purposes of the 8-hour ozone NAAQS. We will take final action on that aspect of the proposal in our Phase 2 rule.

**Table 9-1
FROM 6/2/03 FEDERAL REGISTER; PROPOSED RULE FOR IMPLEMENTATION OF THE
8-HOUR OZONE NAAQS**

**COMPARISON OF SUBPART 1 & 2 REQUIREMENTS--CONTROL REQUIREMENTS ONLY
(NOT INCLUDING PLANNING OR GROWTH REQUIREMENTS)**

This is only an outline of the general requirements of subparts 1 and 2 and should not be relied on for regulatory purposes.

ELEMENT	SUBPART 1	SUBPART 2	
		Classification	Requirement
NO _x control for RACT	No specificity	Moderate & above; all areas in OTC	Requirements under this subpart for major stationary VOC sources (NSR & RACT) also apply to all major NO _x sources, unless EPA approves NO _x waiver
NO _x control for NSR	No specificity	Marginal & above	
RACM/RACT	General requirement for RACM including RACT	Marginal & above	Pre-1990 RACT fix-up
		Moderate & above	RACT for all CTG sources and all other major sources

ELEMENT	SUBPART 1	SUBPART 2	
		Classification	Requirement
I/M	Nothing specified	Marginal	Pre-1990 corrections to previously required I&M programs immediately upon CAA Amendments enactment
		Moderate	Basic I&M
		Serious & above	Enhanced I&M within 2 years of CAA Amendments enactment
Stage II vapor recovery (VOC)	Not specified	Moderate & above	Stage II for gas stations within 2 years
VMT demonstration and transportation control measures (TCMs) if needed	Not specified	Marginal and moderate	Not specified
		Serious & above	Demonstration of whether current aggregate vehicle mileage, emissions, congestion levels are consistent with attainment demo
Clean fuels program	Not specified	Marginal and moderate	Not specified
		Classification	Requirement
		Serious & above	Certain percentage of fleet vehicles for 1998 and higher to be clean vehicles and use alternative fuels (if needed)

ELEMENT	SUBPART 1	SUBPART 2	
		Classification	Requirement
Reformulated Gas*	Not specified	Marginal, moderate & serious	Not specified
*required under section 211(k)(10)(D), which requires the use of reformulated gasoline in 9 covered areas, and areas that are bumped-up to Severe under section 181(d)		Severe & above	Prohibition of sale of gas that has not been reformulated to be less polluting
TCMs to offset growth in VMT emissions	Not specified	Marginal, moderate & serious	Not specified
		Severe & above	Enforceable transportation control strategies and TCMs to offset any emissions growth due to VMT growth

ELEMENT	SUBPART 1	SUBPART 2	
		Classification	Requirement
Clean Fuels for Boilers	Not specified	Marginal, moderate, serious & severe	Not specified
		Extreme areas	Use of clean fuels or advanced technology for certain boilers that emit more than 25 TPY of NO _x
TCMs during heavy traffic hours	Not specified	Marginal, moderate, serious & severe	Not specified
		Extreme areas	Option to have TCMs during periods of heavy traffic that reduce use of high polluting or heavy-duty vehicles

10. **Please identify explicitly those control requirements which EPA considered mandatory under the 1-hour ozone standard but will now be considered discretionary for purposes of implementation of the 8-hour standard, if any.**

In our June 2003 proposal, we proposed that the control requirements specified in the Clean Air Act for each classification would be mandatory for each area that falls within the classification for the 8-hour standard. We have not yet finalized that aspect of the implementation rule. In Phase I of the final implementation rule issued April 30, we did not provide that any mandatory control requirements for the 1-hour standard be considered discretionary upon revocation of the 1-hour standard. Rather, as described in response to question 1, in Phase I the implementation rule provides that mandatory control requirements that applied to an area for purposes of the 1-hour standard would continue to apply to the area until the area attains the 8-hour standard.

Once the area attains the 8-hour standard, States could move any such measure to the contingency measures portion of the SIP upon a demonstration consistent with section 110(l) that such a revision would not interfere with maintenance of the 8-hour standard or any other applicable requirement of the Act. Thus, after the 1-hour standard is revoked, areas that were designated nonattainment for the 1-hour standard and designated attainment for the 8-hour standard in our April 15, 2004 designation rule, could request that control requirements that applied for purposes of the 1-hour standard become contingency measures [consistent with section 110(l)]. Phase I of the implementation rule provides that before such a revision can be approved, the area must first adopt a maintenance plan for the 8-hour standard.

An area that was designated nonattainment for the 1-hour standard that was designated nonattainment for the 8-hour standard in our April 15, 2004 designations rule would be obligated to adopt (if it had not done so already) and continue to implement control requirements mandated for the area's 1-hour classification until the area attains and is redesignated to attainment for the 8-hour standard.

11. Under the final ozone implementation strategy, which nonattainment areas will no longer be required to achieve reasonable further progress in reducing smog-forming emissions?

All 8-hour ozone nonattainment areas that were subject to Reasonable Further Progress (RFP) under the 1-hour standard (also referred to as Rate of Progress (ROP) as required under subpart 2), remain subject to the obligation to meet the RFP reductions provided under the statute for the area's 1-hour classification at the time the area was designated for the 8-hour NAAQS. If those areas have not completed their 1-hour ROP requirement, they remain obligated to do so until they achieve the 8-hour standard.

12. Under the final ozone implementation strategy, which nonattainment areas now categorized under subpart 1 will not be required to implement reformulated gasoline, but would have been so required had they been categorized under subpart 2?

None. Under section 211(k)(10)(D), any area reclassified under section 181(b) of subpart 2 as "severe" ozone nonattainment would become a reformulated gasoline covered area effective one year after the reclassification. Based on the subpart 2 classification scheme EPA is using for the 8-hour ozone standard, none of the areas that EPA classified under subpart 1 has an 8-hour ozone design value high enough to be classified as "severe". Thus, no area classified under subpart 1 for the 8-hour ozone standard would have been required to implement a reformulated gasoline program if the area had been classified under subpart 2.

13. In the draft final ozone implementation strategy, the Agency appears to believe that it can continue to mandate control measures that are now in place to assure maintenance of the 1-hour standard, and enforce the required 1-hour budgets for

the NOx SIP Call, even after the 1-hour standard is completely revoked for an area. Given that the Agency's definition of revocation is that the 1-hour standard would not continue to apply in an area, why does EPA believe this is consistent?

As EPA explained in its proposed and final Phase 1 rule regarding implementation of the 8-hour ozone standard, EPA believed that it is consistent with the no-backsliding principles it was applying to the implementation of the 8-hour standard and the transition to such implementation to continue requiring the implementation of the NOx SIP Call. As a consequence, EPA explicitly required in the final rule that states continue to comply with their NOx SIP Call budgets. EPA notes that it received no adverse comments on its proposal to do so. EPA also notes that even if it had not done so, states seeking to modify their SIPs would need to demonstrate that the revisions complied with section 110(l) of the Clean Air Act, which would mean that a state would have to demonstrate that relaxing its NOx SIP Call controls would not interfere with that state's legal obligation not to contribute significantly to downwind states' 8-hour nonattainment or maintenance problems. In light of the greater number of 8-hour nonattainment areas compared with 1-hour nonattainment areas, such a showing would be extremely difficult for an upwind state to make. With respect to maintenance plans, they are similarly subject to the requirements of section 110(l), which prevents modifications to existing SIP provisions that would interfere with obligations of areas under the 8-hour standard, such as the obligation to attain as expeditiously as practicable.

14. **Does the final ozone implementation strategy waive any fees that would have been imposed on major stationary sources in areas that would have missed 2005 or 2007 attainment deadlines under the 1-hour standard?**

Since the obligations to reclassify areas and impose fees are based on EPA's determining that an area has failed to meet the NAAQS by the appropriate attainment date, these obligations no longer apply once the 1-hour standard is revoked. Phase I of the final implementation rule provides that upon the effective date of revocation of the 1-hour standard we will no longer make findings that areas failed to attain the 1-hour standard. Consequently, we will not reclassify (bump up) areas to a higher classification for the 1-hour standard nor will the section 185 fee provisions be triggered. As stated in the final phase 1 implementation rule, we believe that areas should focus their resources on attaining the 8-hour standard. Additionally, we do not believe that there is a basis to determine whether an area has met the 1-hour NAAQS once the 1-hour standard is revoked.

- 15a. **As you indicated, the Clear Skies proposal or the Interstate Air Quality Transport Rule, combined with various other ongoing and soon-to-be-proposed Federal control requirements, does not help all areas in every state achieve attainment by the deadlines. Which of those areas that will not reach attainment by their respective deadlines will be in that status primarily due to transport or emissions that could be controlled by additional Federal/national action?**

Based on EPA's modeling for the proposed Clean Air Interstate Rule (CAIR), we have identified the areas listed in tables 15-1 and 15-2 below as not attaining the annual PM_{2.5}

NAAQS or the 8-hour ozone NAAQS in 2010 and 2015 after imposition of the CAIR and other ongoing or soon-to-be final Federal control programs.¹ CAIR and other ongoing or soon-to-be final Federal control programs improve air quality in these areas, resulting in the need for fewer local controls.

In CAIR, we have proposed that emissions of sulfur dioxide be reduced by 3.75 million tons in 2010 and 3.8 million tons in 2015. Further, the proposed CAIR would reduce emissions of nitrogen oxides by 1.38 million tons by 2010 and 1.7 million tons by 2015. These dramatic reductions are cost-effective and essential to helping communities in the East to improve air quality.

EPA's approach for establishing these caps and reductions in the CAIR proposal follows the approach adopted in the previously promulgated NOx SIP Call. EPA uses air quality data and modeling forecasts to identify states that would continue to make a significant contribution to non-attainment of the ozone and/or PM2.5 NAAQS in downwind states. EPA then identifies and analyzes a set of highly cost-effective controls that could be applied to key sources in upwind states to address the significant contribution. The result determines the caps and reductions. These programs are not designed to eliminate all contributions to transport, but rather to balance the cost burden for achieving attainment between regional-scale and local-scale control programs. A more thorough review of each area's residual PM2.5 concentrations would be necessary to identify which areas will be in that status primarily due to transport or emissions that could be controlled by additional Federal/national action. EPA has not conducted such a review for these areas.

EPA's evaluation of emissions and emission control possibilities suggest that if states follow EPA's recommended approach to applying highly cost effective controls, then these regulations would affect electric generation units in upwind states. However, states would have discretion to achieve the required reductions from whatever mix of sources they choose. There is extensive information showing that highly cost-effective controls are available to reduce significantly NOx and SO2 emissions from the power generation sector.

Table 15-1. Counties with monitors projected to be nonattainment for PM2.5 in 2010 and 2015 after implementation of proposed CAIR.

State	2010 Proposed CAIR Case: Projected PM2.5 Nonattainment Counties	2015 Proposed CAIR Case: Projected PM2.5 Nonattainment Counties
AL	Jefferson, Russell, Talladaga	Jefferson, Russell
GA	Clarke, Clayton, Cobb, DeKalb, Floyd, Fulton, Muscogee, Wilkinson	Clayton, DeKalb, Fulton
IL	Cook, Madison, St. Clair	Cook
MI	Wayne	Wayne

¹ Tables 15-1 and 15-2 are based on modeling done for the proposed CAIR. When EPA issues the final rule, it will use updated information and modeling.

NY	New York (Manhattan)	–
OH	Cuyahoga, Hamilton, Jefferson, Scioto, Stark	Cuyahoga, Hamilton, Jefferson, Scioto
PA	Allegheny	Allegheny
TN	Knox	Knox

Table 15-2. Counties with monitors projected to be nonattainment for 8-hour ozone in 2010 and 2015 after implementation of proposed CAIR.

State	2010 Proposed CAIR Case: Projected 8-Hour Ozone Nonattainment Counties	2015 Proposed CAIR Case: Projected 8-Hour Ozone Nonattainment Counties
AR	Crittenden	–
CT	Fairfield, Middlesex, New Haven	Fairfield, Middlesex, New Haven
DC	Washington D.C.	Washington D.C.
DE	New Castle	–
GA	Fulton	–
IN	Lake	Lake
MD	Anne Arundel, Baltimore, Cecil, Harford, Kent, Prince Georges	Anne Arundel, Cecil, Harford
NJ	Bergen, Camden, Cumberland, Gloucester, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean	Bergen, Camden, Gloucester, Hunterdon, Mercer, Middlesex, Monmouth, Ocean
NY	Erie, Putnam, Richmond, Suffolk, Westchester	Erie, Richmond, Suffolk, Westchester
NC	Mecklenburg	–
OH	Geauga	–
PA	Bucks, Delaware, Montgomery, Philadelphia	Bucks, Montgomery, Philadelphia
RI	Kent	–
TX	Denton, Harris, Tarrant	Harris
VA	Arlington, Fairfax	Arlington
WI	Kenosha, Racine, Sheboygan	Kenosha

- 15b. **Please describe those Federal controls that would be the most cost-effective in achieving attainment in the areas identified in the Agency's answer to this question.**

The EPA's proposed CAIR and the previously promulgated NOx SIP Call require SO₂ and NO_x reductions that the Agency has determined to be highly cost-effective in reducing upwind States' significant contribution to transport. These programs are not designed to eliminate all contributions to transport, but rather to balance the cost burden for achieving attainment between regional-scale and local-scale control programs.

16. **Based on information that EPA has today, please describe the approximate cost-effectiveness of the various range of control options which states have authority to adopt and may utilize for reducing ozone-forming and PM-2.5 emissions by their respective attainment deadlines.**

A variety of control options are available for States to adopt for reducing ozone-forming NO_x and VOC emissions, for reducing emissions of direct PM_{2.5} emissions, and for reducing emissions of PM-forming emissions of sulfur dioxide and NO_x. Control options are available for all sectors of the emission inventory, including measures for industrial point sources, on-road and non-road mobile sources, and "area sources" such as woodstoves and backyard refuse burning.

We note that States have the principal responsibility to identify and adopt measures for reducing ozone and PM-forming emissions by the attainment deadlines. There is much work to be done by States in identifying and evaluating control strategies needed for attainment. Accordingly, it is somewhat difficult to characterize the measures that will be ultimately selected through this process.

For some measures, EPA has reliable cost effectiveness (\$/ton) estimates. For example, EPA has calculation techniques for the cost of retrofitting school buses and other diesel engines with control devices such as oxidation catalysts and particulate traps. Cost-effectiveness is less certain for other measures. It is difficult, for example, to describe expected emissions reductions from programs such as ride-sharing, programs to reduce VMT, and measures to increase the efficiency of existing industrial PM_{2.5} control devices. EPA has funded a grant to STAPPA/ALAPCO to develop a document called the "menu of options" document for PM_{2.5}. This document should serve to improve the available information on control measures. Moreover, as States develop their implementation plans, much more detailed information, tailored to the specific sources in their jurisdictions, will be developed.

For the proposed Clean Air Interstate Rule, EPA conducted a preliminary analysis of potential local measures for addressing PM_{2.5} nonattainment in the East. This analysis is described in a document entitled "Technical Support Document for the Interstate Air Quality Rule Air Quality Modeling Analysis." This document is available online at <http://www.epa.gov/interstateairquality/tsd0162.pdf>. This document summarizes EPA's approximations of costs, where available, for a number of control measures across a variety of source types, beginning on page 46.

17. **As I mentioned in the hearing, the Ozone Transport Commission has indicated that the proposed rule on interstate transport of pm-2.5 and ozone is inadequate to assist the states represented by the Commission in achieving attainment on time, given continued transported pollution from power plants. Their analysis was filed in the EPA Docket OAR-2003-0053 on March 30, 2004. They suggest the following caps are necessary to achieve timely attainment for all OTC areas - (no trading of mercury is included)**

	2008	2012	2015
Sulfur Dioxide	3.0 million tons	2.0 million tons	
Nitrogen Oxides	1.87 million tons	1.28 million tons	
Mercury	15 tons	10 tons	5 tons

Does EPA disagree with the modeling presented in the OTC comments and its conclusions? If so, why?

Since the Ozone Transport Commission did not provide details of their ozone air quality modeling, including all model set-up parameters and inputs, we can not evaluate the technical approach used in their modeling analysis. Therefore, EPA is not at this time able to render a fully-informed opinion about the conclusions drawn by the OTC from the modeling discussed in their comments.

18. Will the soon-to-be proposed PM2.5 implementation rule require timely attainment by 2010 as required by the Clean Air Act or will it allow an automatic delay of 5 years, as built into the proposed IAQR/Transport Rule?

When proposed, the PM2.5 implementation rule will describe a regulatory framework following the basic requirements of section 172 of the Clean Air Act. Under these requirements, States are required to attain the standards "as expeditiously as practicable" in order to address the serious health effects of PM2.5. The presumptive attainment date is no later than five years from the date the area is designated. However, EPA may extend the attainment date for up to an additional five years to the extent the Administrator determines appropriate, considering the severity of nonattainment and the availability and feasibility of pollution control measures.

Consistent with the Clean Air Act, the proposed CAIR does not include an automatic five-year attainment date extension.

19. Please describe in clear and explicit terms the process, pursuant to the final ozone implementation strategy, by which rural transport areas and overwhelming transport areas will obtain deferral of nonattainment designations or any other designation which does not impose emissions control requirements on such areas.

Phase I of the final implementation rule does not provide that rural transport areas or areas affected by overwhelming transport will receive a deferral of the nonattainment designation.

The provisions for "rural transport areas" are covered under subpart 2 of the CAA, and our classification for "overwhelming transport areas" was set up under subpart 1 of the CAA as noted below.

For nonattainment areas classified under *subpart 2*, section 182(h) provides the criteria for treatment as rural nonattainment areas, which means that these areas would be treated similar to marginal nonattainment areas for control requirements (i.e., only have to correct any RACT or I/M requirements that applied prior to 1990) and for new source review and conformity.

In addition, for areas subject to *subpart 1*, the implementation rule provides an overwhelming transport classification that is available to subpart 1 ozone nonattainment areas. We proposed that such areas would be treated similar to marginal areas, but have not finalized that part of the requirement (we only set up the classification in the phase 1 rule). No such areas have been classified yet, although under the phase 1 rule, only 7 8-hour nonattainment areas are potentially eligible for this classification:

1. Hancock, Knox, Lincoln & Waldo Counties, ME
2. Essex County, NY (Whiteface Mt.)
3. Murray County, GA (Chattahoochee Natl Forest)
4. Benzie County, MI
5. Door County, WI
6. Huron County, MI
7. Mason County, MI

Areas will be classified as "overwhelming transport areas" at the time we approve an attainment demonstration SIP. To receive the classification, the attainment demonstration SIP must demonstrate, using EPA-approved modeling, that the nonattainment problem in the area is due to "overwhelming transport" and the area must meet the part of the definition of a rural transport area in Clean Air Act section 182(h). To meet that definition, an area cannot be in or adjacent to a Consolidated Metropolitan Statistical Area.

We plan to issue shortly a revised guidance document on the criteria for determining if an area is affected by overwhelming transport.

20. **Under the final ozone implementation strategy or other EPA guidance, how will rural transport areas and overwhelming transport areas demonstrate that they are not significantly contributing to nonattainment in a downwind area?**

EPA is developing guidance for how to determine whether an area is impacted by overwhelming transport, including review of the area's impact on downwind areas. The guidance is scheduled to be completed by December 2004.

21. **Power plants are a significant part of the PM-2.5 and ozone nonattainment problems that many areas face. While many other sources, especially mobile sources, are on a firm schedule to reduce emissions beginning in 2007, power plants and non-road sources are not on a similarly expedited schedule. Most 8-hour ozone and most PM-2.5 nonattainment areas will need three years of clean data for the years 2011 through 2013 in order to attain the standards by 2014, the**

latest possible date under supart 1. Please provide data for each nonattainment area demonstrating the reductions in transported pollution (in annual micrograms per cubic meter) that will occur in each of the years 2010-2012 due to implementation of the proposed interstate air quality transport rule, and the current concentrations of PM-2.5 in the area.

The EPA conducted air quality modeling to support the proposed CAIR using emissions projections for the years 2010 and 2015. The table below shows the projected change in annual average air quality (in micrograms per cubic meter) from implementation of the proposed CAIR, as well as annual average air quality from the two most recent 3-year averaging periods for which quality assured monitoring data are available.² The EPA did not model the years 2011 or 2012.

State	County	Current* PM2.5 Air Quality (ug/m ³)	2010 PM2.5 Projections (ug/m ³)		2015 PM2.5 Projections (ug/m ³)	
			2010 Base Case	Impact in 2010 from CAIR Control Case	2015 Base Case	Impact in 2015 from CAIR Control Case
Alabama	DeKalb County	16.76	15.22	-1.30	14.75	-1.68
Alabama	Jefferson County	21.57	20.03	-1.18	19.57	-1.46
Alabama	Montgomery County	16.79	15.69	-1.09	15.35	-1.30
Alabama	Russell County	18.39	17.07	-1.30	16.68	-1.63
Alabama	Talladega County	17.75	16.44	-1.18	15.97	-1.40
Connecticut	New Haven County	16.80	15.43	-0.93	15.13	-1.00
Delaware	New Castle County	16.61	15.43	-1.31	15.01	-1.43
District of Columbia	District of Columbia	16.55	15.48	-1.78	14.98	-1.91
Georgia	Clarke County	18.61	17.04	-1.48	16.46	-1.88
Georgia	Clayton County	19.16	17.73	-1.30	17.26	-1.77
Georgia	Cobb County	18.56	16.80	-1.24	16.28	-1.91
Georgia	DeKalb County	19.56	18.26	-1.34	17.93	-1.71
Georgia	Floyd County	18.45	16.99	-1.34	16.51	-1.80

² Table 21-1 is based on modeling done for the proposed CAIR. When EPA issues the final rule, it will use updated information and modeling.

State	County	Current* PM2.5 Air Quality (ug/m ³)	2010 Base Case	Impact in 2010 from CAIR Control Case	2015 Base Case	Impact in 2015 from CAIR Control Case
Georgia	Fulton County	21.20	19.79	-1.42	19.44	-1.82
Georgia	Hall County	17.24	15.62	-1.38	15.05	-1.89
Georgia	Muscogee County	17.97	16.68	-1.27	16.31	-1.60
Georgia	Paulding County	16.76	15.40	-1.23	14.93	-1.58
Georgia	Richmond County	17.36	15.99	-1.34	15.51	-1.69
Georgia	Wilkinson County	17.75	16.68	-1.17	16.4	-1.52
Illinois	Cook County	18.79	17.90	-1.00	17.52	-1.12
Illinois	DuPage County	15.44	14.74	-0.92	14.34	-1.00
Illinois	Madison County	17.45	16.41	-1.08	16.03	-1.15
Illinois	St. Clair County	17.42	16.31	-1.20	15.91	-1.24
Illinois	Will County	15.87	15.21	-0.96	14.86	-1.04
Indiana	Clark County	17.34	15.86	-1.52	15.4	-1.71
Indiana	Delaware County	15.07	13.93	-1.25	13.41	-1.36
Indiana	Elkhart County	15.45	14.34	-1.02	13.83	-1.09
Indiana	Floyd County	15.60	14.26	-1.39	13.84	-1.56
Indiana	Howard County	15.10	14.05	-1.26	13.48	-1.32
Indiana	Lake County	15.62	14.83	-0.91	14.44	-0.99
Indiana	Marion County	17.00	15.89	-1.50	15.31	-1.52
Indiana	Vanderburgh County	15.70	14.25	-1.43	13.78	-1.52
Indiana	Vigo County	15.15	14.00	-1.55	13.38	-1.60
Kentucky	Boyd County	15.67	14.56	-1.73	13.99	-1.78
Kentucky	Bullitt County	16.03	14.31	-1.52	13.79	-1.75
Kentucky	Campbell County	15.45	14.21	-1.49	13.65	-1.58
Kentucky	Fayette County	16.81	15.21	-1.66	14.66	-1.85
Kentucky	Hardin County	15.10	13.48	-1.45	12.99	-1.66
Kentucky	Jefferson County	17.28	15.79	-1.56	15.32	-1.75
Kentucky	Kenton County	15.86	14.52	-1.56	14.01	-1.69
Maryland	Anne Arundel County	15.81	14.72	-1.67	14.3	-1.79

State	County	Current* PM2.5 Air Quality (ug/m ³)	2010 Base Case	Impact in 2010 from CAIR Control Case	2015 Base Case	Impact in 2015 from CAIR Control Case
Maryland	Baltimore County	15.10	13.81	-1.27	13.38	-1.39
Maryland	Baltimore city	17.82	16.58	-1.76	16.11	-1.91
Michigan	Monroe County	15.57	14.68	-0.96	14.26	-1.04
Michigan	Wayne County	19.85	18.78	-1.13	18.28	-1.22
Missouri	St. Louis city	16.28	15.25	-1.11	14.89	-1.15
New Jersey	Hudson County	15.88	13.49	-0.86	13.2	-0.94
New Jersey	Union County	16.26	14.11	-0.63	13.93	-0.71
New York	Bronx County	16.13	14.56	-0.95	14.12	-1.01
New York	New York County	18.04	16.30	-1.05	15.82	-1.13
North Carolina	Cabarrus County	15.67	13.68	-1.09	13.13	-1.31
North Carolina	Catawba County	17.10	15.26	-1.39	14.62	-1.63
North Carolina	Davidson County	17.27	15.52	-1.30	14.92	-1.56
North Carolina	Forsyth County	16.23	14.44	-1.30	13.82	-1.51
North Carolina	McDowell County	16.16	14.54	-1.34	14	-1.57
North Carolina	Mecklenburg County	16.77	15.18	-1.26	14.61	-1.51
Ohio	Butler County	17.40	16.01	-1.48	15.39	-1.62
Ohio	Cuyahoga County	20.25	19.13	-1.45	18.58	-1.53
Ohio	Franklin County	18.13	16.69	-1.65	16.18	-1.72
Ohio	Hamilton County	19.29	17.75	-1.79	17.07	-1.92
Ohio	Jefferson County	18.90	18.04	-1.98	17.49	-1.98
Ohio	Lawrence County	16.65	15.48	-1.81	14.88	-1.86
Ohio	Mahoning County	16.42	15.39	-1.63	14.82	-1.63
Ohio	Montgomery County	15.89	14.71	-1.35	14.15	-1.45
Ohio	Portage County	15.29	14.41	-1.45	13.9	-1.44
Ohio	Scioto County	20.03	18.40	-2.07	17.62	-2.13
Ohio	Stark County	18.28	17.09	-1.90	16.42	-1.90
Ohio	Summit	17.34	16.35	-1.64	15.78	-1.64

State	County	Current* PM2.5 Air Quality (ug/m ³)	2010 Base Case	Impact in 2010 from CAIR Control Case	2015 Base Case	Impact in 2015 from CAIR Control Case
	County					
Ohio	Trumbull County	16.15	15.13	-1.57	14.58	-1.59
Pennsylvania	Allegheny County	21.42	19.52	-2.60	18.64	-2.55
Pennsylvania	Beaver County	15.99	14.89	-1.78	14.37	-1.79
Pennsylvania	Berks County	16.67	15.39	-1.55	14.95	-1.69
Pennsylvania	Cambria County	15.76	14.52	-2.00	13.89	-2.02
Pennsylvania	Dauphin County	15.64	14.36	-1.83	13.9	-1.97
Pennsylvania	Delaware County	15.74	14.85	-1.12	14.57	-1.24
Pennsylvania	Lancaster County	17.08	15.46	-1.75	14.87	-1.88
Pennsylvania	Philadelphia County	15.29	14.43	-1.07	14.15	-1.18
Pennsylvania	Washington County	15.69	14.32	-2.02	13.65	-1.96
Pennsylvania	Westmorelan d County	15.61	14.19	-1.90	13.53	-1.86
Pennsylvania	York County	17.05	15.68	-1.75	15.13	-1.87
South Carolina	Greenville County	16.50	15.06	-1.31	14.53	-1.62
Tennessee	Davidson County	17.04	15.36	-1.44	14.9	-1.66
Tennessee	Hamilton County	17.62	16.14	-1.40	15.63	-1.72
Tennessee	Knox County	20.41	18.36	-1.76	17.73	-2.14
Tennessee	McMinn County	16.07	14.45	-1.43	13.95	-1.74
Tennessee	Roane County	17.02	15.18	-1.49	14.63	-1.81
Tennessee	Sullivan County	16.97	15.24	-1.47	14.69	-1.72
Virginia	Bristol city	16.01	14.20	-1.34	13.64	-1.55
Virginia	Roanoke city	15.23	13.93	-1.59	13.41	-1.71
Virginia	Salem city	15.31	13.96	-1.55	13.38	-1.69
West Virginia	Berkeley County	16.24	14.96	-1.99	14.38	-2.07
West Virginia	Brooke County	17.40	16.60	-1.83	16.1	-1.84
West Virginia	Cabell County	17.84	16.39	-1.98	15.7	-1.99
West Virginia	Hancock County	17.49	16.69	-1.84	16.18	-1.85

State	County	Current* PM2.5 Air Quality (ug/m ³)	2010 Base Case	Impact in 2010 from CAIR Control Case	2015 Base Case	Impact in 2015 from CAIR Control Case
West Virginia	Kanawha County	18.39	17.11	-2.30	16.45	-2.35
West Virginia	Marion County	15.74	14.50	-2.10	13.82	-2.03
West Virginia	Marshall County	16.52	15.53	-2.28	14.78	-2.17
West Virginia	Ohio County	15.65	14.64	-2.13	13.96	-2.07
West Virginia	Wood County	17.61	16.30	-2.15	15.58	-2.09

22. Which currently projected PM-2.5 nonattainment areas are expected to be brought into attainment primarily due to the interstate air quality transport rule by 2012?

The following tables are based on the modeling for 2010 and 2015 conducted for the proposed Clean Air Interstate Rule.³ We did not model 2012. The counties listed are counties with monitors that were projected to be out of attainment in the base case (i.e., assuming implementation of only existing control programs) and in attainment when the proposed CAIR was combined with existing control programs.

Table 22-1. Potential PM2.5 Nonattainment counties with monitors that are expected to be brought into attainment due to the proposed Clean Air Interstate Rule in 2010

State	Counties with Monitors
CT	New Haven
DC	Washington D.C.
DE	New Castle
GA	Hall, Paulding
IL	Will
IN	Clark, Marion
KY	Fayette, Jefferson
MD	Baltimore City
MO	St. Louis

³ Tables 22-1 and 22-2 are based on modeling done for the proposed CAIR. When EPA issues the final rule, it will use updated information and modeling.

NC	Catawba, Davidson
OH	Butler, Franklin, Lawrence, Mahoning, Summit, Trumbull
PA	Berks, Lancaster, York
TN	Hamilton, Roane
WV	Brooke, Cabell, Hancock, Kanawha, Marshall, Wood

EPA has recommended DeKalb County, AL and Greenville, SC as "unclassifiable"

Table 22-2. PM_{2.5} Nonattainment counties with monitors that are expected to be brought into attainment due to the Clean Air Interstate Rule in 2015 (28 counties)

State	Counties
CT	New Haven
GA	Clarke, Cobb, Floyd, Hall, Muscogee,
IL	Madison, St. Clair
IN	Clark, Marion
KY	Jefferson
MD	Baltimore City
NY	New York County (Manhattan)
OH	Butler, Franklin, Stark, Summit
PA	York
TN	Hamilton
WV	Brooke, Cabell, Hancock, Kanawha, Wood

23. **What are likely to be the lowest cost sources of reductions in ozone precursors that areas will be using to achieve attainment?**

Control measures are available for States to reduce ozone-forming NO_x and VOC emissions from all sectors of the emission inventory, including measures for industrial point sources, on-road and non-road mobile sources, and small "area sources."

Numerous measures are catalogued in an Office of Air Quality Planning and Standards document titled, "Serious and Severe Nonattainment Areas: Information on Emissions, Control Measures Adopted or Planned and Other Available Control Measures," November 24, 1999. This document is on the EPA web site at <http://www.epa.gov/ttn/naaqs/ozone/eac/measures.pdf>.

Cost effectiveness information on control measures is available in a report titled, "AircontrolNET Documentation Report, Version 3.2, September 2003," prepared for EPA by E.H. Pechan & Associates. The report is available on EPA's web site at

http://www.epa.gov/ttnecas1/models/AirControlNET_Documentation.pdf.

States have the principal responsibility to identify and adopt measures for reducing ozone-forming emissions by the attainment deadlines. There is much work to be done by States in identifying and evaluating what control strategies are needed for attainment. Accordingly, it is somewhat difficult to characterize the measures that will ultimately be selected through this process. As States develop their implementation plans, much more detailed information, tailored to the specific sources in their jurisdictions, will be developed.

EPA is currently developing phase 2 of the 8-hour ozone implementation rule. The economic analysis accompanying that rule will shed light on the relative cost effectiveness of ozone control measures that states could employ in plans for meeting the 8-hour standard.

For purposes of proposing regional NOx emissions reductions, EPA proposed as part of CAIR in January 2004 to determine that certain NOx reductions from electric generating units are highly cost effective. This rule, once finalized, will require states to cut NOx and sulfur dioxide emissions to reduce interstate transport of ozone and fine particles in the eastern U.S. As part of the same rulemaking (the Clean Air Interstate Rule, formerly Interstate Air Quality Rule), EPA conducted a preliminary analysis of potential local measures for addressing PM2.5 nonattainment in the East, including certain measures to reduce NOx and VOCs, which are ozone precursors. This analysis is described in a technical support document entitled "Technical Support Document for the Interstate Air Quality Rule Air Quality Modeling Analysis." This document is available online at <http://www.epa.gov/interstateairquality/tsd0162.pdf>. This document summarizes EPA's approximations of costs, where available, for a number of control measures across a variety of source types, beginning on page 46.

In the NOx SIP Call Rule, issued in 1998 to reduce interstate ozone transport in the East, EPA determined that reducing NOx emissions from large industrial boilers and turbines, cement kilns, and stationary combustion engines, as well as electrical generating units, was highly cost effective. Emissions reductions to comply with this rule were required by May 2004. This rule, along with motor vehicle emissions standards, is projected to bring many 8-hour nonattainment areas into attainment within a few years.

24. **The 1990 Clean Air Act Amendments requires EPA to ensure that every single State SIP includes provisions prohibiting any source in that state from contributing significantly to nonattainment or interfering with the maintenance of the NAAQS in any other state. Obviously, EPA has not done this very well, because there is a very serious transported air pollution problem. What will EPA do in the final ozone implementation strategy or elsewhere to ensure that new 8-hour and PM-2.5 SIPs continually meet this test? How will that be done?**

EPA is evaluating the pollution transport problem for both 8-hour ozone and PM2.5. In January 2004, EPA proposed the Clean Air Interstate Rule (formerly known as the Interstate Air Quality Rule). The EPA's proposed CAIR and the previously promulgated NOx SIP Call require SO2 and NOx reductions that the Agency has determined to be highly cost-effective in reducing upwind States' significant contribution to transport. These regional-scale emissions reduction regulations are not designed to eliminate all contributions to transport, but rather to balance the cost of regional scale and local scale control programs. Compliance with the NOx SIP Call began at the start of this year's ozone season, and compliance with the proposed CAIR would begin by January 1, 2010. EPA expects that these programs, together with mobile source emissions reductions rules, as they are implemented will dramatically improve PM2.5 and ozone air quality. EPA, in partnership with state governments, will continue to monitor air quality and work closely with the states to plan for and ensure healthy air quality for all Americans.

25. **According to a recent National Academy of Sciences report ("Air Quality Management in the United States"), "there is growing evidence that the current forms of the NAAQS are not providing adequate protection to sensitive ecosystems and crops." How does EPA plan to address this deficiency?**

In the report "Air Quality Management in the United States," the National Academy of Sciences (NAS) developed a set of unanimous findings and recommendations to improve the scientific and technical capacity of the nation's air quality management system, including enhancing the protection of sensitive ecosystems and crops. The NAS found that the protection of ecosystems and other aspects of public welfare may be enhanced by building an improved scientific basis for establishing and implementing secondary or alternative standards and through better tracking of ecosystem effects (i.e., accountability).

As part of our past periodic reviews of the national ambient air quality standards (NAAQS), EPA has reviewed the available scientific information and data relevant to considering the establishment of a secondary NAAQS that provides adequate protection of welfare effects, including adverse effects on sensitive ecosystems and crops. EPA considered alternative standards based on such information; for example, during the last ozone NAAQS review, EPA proposed for consideration alternative secondary ozone standards with a cumulative, seasonal form directly related to effects on vegetation. However, our final decision to make secondary standards identical to primary, health-based standards (with the exception of SO2, for which a distinct secondary standard has been set) generally reflect inherent limitations in the available science linking ambient air quality with specific adverse effects on vegetation and sensitive ecosystems. We also recognize that the primary standards provide some degree of protection against welfare effects.

To create more accountability for programmatic results, long-term air quality and

atmospheric deposition monitoring networks have been used by EPA to demonstrate how changes in emissions affected under the Clean Air Act have resulted in changes in air quality and atmospheric deposition over time and space. For instance, the Clean Air Status and Trends Network (CASTNET) and the National Atmospheric Deposition Program (NADP) have documented reductions in rural ambient sulfur concentration and sulfate deposition throughout the Eastern U.S. resulting from sulfur emissions reductions under Title IV. The NAS acknowledges the importance of long-term monitoring, particularly as a tool for assessing the effectiveness of emission reduction programs and measuring progress in meeting air quality management objectives. The NAS recommends that EPA augment the current suite of ecological indicators or measures for tracking status and trends in ecosystem exposure and condition. As requested by EPA, the Clean Air Act Advisory Committee (CAAAC) is examining these and other NAS recommendations and will consider appropriate ways for the Agency to address the issues raised by the NAS. EPA expects to receive recommendations from CAAAC in January, 2005.

26. **In 1990, Congress instructed EPA to undertake a comprehensive review of the need for and use of air quality standards to protect public welfare. However, such a study was never undertaken. When does EPA expect to request funds for and conduct such a study?**

At EPA's request, the National Academy of Sciences (NAS) addressed issues about air quality standards to protect public welfare in its recent report, "Air Quality Management in the United States." EPA has formed a workgroup to review this report. Following our full consideration of the views already expressed by the NAS, EPA will determine whether further consultation with NAS or other scientific advisory groups on this subject is warranted.

27. **A recent study by Fiore and Jacobs convincingly suggests that the level of ozone concentrations assumed by the Agency in the process of setting a health-based standard as naturally occurring background is too high. What are EPA's views on this information? (See Fiore, A.M., D.J. Jacob, H. Liu, R.M. Yantosca, T.D. Fairlie, and Q.B. Li, *Variability in surface ozone background over the United States: Implications for air quality policy*, J. Geophys. Res., 108, 4787, 2003.)**

As part of EPA's ongoing periodic review of the criteria and standards for ozone, the Agency is assessing different methods for estimating ozone background concentrations, including the method of Fiore et al. (Note that the EPA definition of background also includes contributions to ozone from outside North America.) Methods proposed by Fiore et al. appear at this time to have merit; however, there are still some remaining questions about details of the methodology and the concentrations it predicts that will be more fully considered during our ongoing review.

28. **Recent studies suggest that a small portion of fine particulate matter in our**

air may be transported from outside the United States. How is this being monitored and what steps is the Administration taking to reduce this external influence? (See Park, R. J., D. J. Jacob, M. Chin and R. V. Martin, Sources of carbonaceous aerosols over the United States and implications for natural visibility, *J. Geophys. Res.*, 108(D12), 4355; and, Park, R. J., D. J. Jacob, B. D. Field, R. M. Yantosca, and M. Chin, Natural and transboundary pollution influences on sulfate-nitrate-ammonium aerosols in the United States: implications for policy, *J. Geophys. Res.*, submitted.)

During transport over the ocean, dust clouds are tracked by NOAA and NASA satellites. Within the United States, PM from outside North America mixes with domestic PM, such that it must be estimated by mathematical analyses of concentration data obtained by the IMPROVE monitoring network and, in the near future, by the EPA speciation network. Research projects at universities (e.g., U. of Miami, U. of Washington) also measure the transport of PM into the U.S., but not on a routine basis.

The United States addresses international transboundary issues regarding ozone and particulate matter in the following contexts: a bilateral agreement with Canada, a bilateral agreement with Mexico, and a multilateral agreement within the Convention on Long-Range Transboundary Air Pollution (LRTAP or the Convention) under the auspices of the United Nations Economic Commission for Europe. EPA is also investigating the technical aspects of intercontinental transboundary air pollution.

The United States and Canada are currently engaged in joint U.S.-Canada modeling and data analysis concerning PM_{2.5}. This effort is national in scope, covering the entire US/Canada border. Currently, the United States and Mexico operate coordinated and sometimes integrated air monitoring networks, compile emission inventories, and conduct modeling analyses designed to support reasonable pollution control strategies to achieve our respective national air quality standards within our national territories. The Convention on Long-Range Transboundary Air Pollution establishes a broad framework throughout North American and European regions covered by the United Nations Economic Commission for Europe for cooperative action on air pollution and sets up a process for negotiating concrete measures to control specific pollutants through legally binding protocols. Particulate matter is a topic that LRTAP will be addressing in the near future.

EPA has helped sponsor three workshops focused on the intercontinental transport of air pollutants. The first workshop focused on trans-Pacific transboundary air pollution (First International Conference on Trans-Pacific Transport of Atmospheric Contaminants, Seattle, July 2002; see Wilkening, K.E., L.A. Barri, and M. Engle. *Science*, 290:65-67 (2000)). The second workshop focused on trans-Atlantic transboundary air pollution (Photo-oxidants, Fine Particles, and Haze Across the Arctic and North Atlantic: Transport Observations and Models, Palisades, New York, June 2001; see http://www.cep.unc.edu/empd/projects/ICAP/workshops_ITAP.shtml) The third workshop brought together experts from across the Northern hemisphere to

explore the hemispheric nature of air pollutant transport and the source-receptor relationships between North America, Europe, and Asia (Hemispheric Air Pollution: Trends and Intercontinental Transport of Photo-Oxidants, Particles and their Precursors across the Northern Hemisphere, Bad Breisig, Germany, October 2002; The final report is available at <http://www.unece.org/env/emep>). EPA has taken an active role in these workshops.

EPA also has efforts underway that will allow us to better understand the linkages between air pollution sources in other countries and their impacts on public health and environmental quality in the United States. In 2000, the EPA first hosted a workshop to gather latest scientific knowledge on the intercontinental transport of air pollutants and their impact on U.S. air quality (http://www.cep.unc.edu/emdp/projects/ICAP/workshops_2001recap.shtml). Currently, the EPA is working with a group of leading research scientists to conduct global and regional modeling of ozone, particulate matter and mercury to assess the impact of planned emission reductions in the U.S. and other countries and potential emission increases in developing Asian countries.⁴ Information from this study should be available by the end of 2004. The two papers are part of this joint effort with Harvard

⁴Global and regional modeling of ozone and particulate matter will help to assess the impact that these countries' emissions and domestic emissions regulations have on U.S. air quality. K.E. Wilkening, L.A. Barrie, and M. Engle. Trans-Pacific Air Pollution. Science Magazine 290, 5489 (2000).

Other References: Fiore A.M., D.J. Jacob, I. Bey, R.M. Yantosca, B.D. Field, A.C. Fusco, "Background ozone over the United States in summer: origin, trend, and contribution to pollution episodes", 107(D15), *J. Geophys. Res.*, 2002.

Husar, R., et al. (28 authors), "Asian dust events of April 1998", *J. Geophys. Res.* 106, 18,317-18,330, 2001.

Jacob, D.J., J.A. Logan, and P.P. Murti., "Effect of Rising Asian Emissions on Surface Ozone in the United States", *Geophys. Res. Lett.*, 26, 2175-2178, 1999.

Jaffe, D.A., I. McKendry, T. Anderson, H. Price, "Six new episodes of trans-Pacific transport of air pollutants", *Atmos. Environ.*, 37, 391-404, 2003.

Jaffe D.A., Anderson T., Covert D., Kotchenruther R., Trost B., Danielson J., Simpson W., Berntsen T., Karlsdottir S. Blake D., Harris J., Carmichael G. and Uno I. Transport of Asian Air Pollution to North America. *Geophys.Res.Letts.* 26, 711-714, 1999.

Prospero, J.M., "Long-term measurements of the transport of African mineral dust to the southeastern United States: Implications for regional air quality, ", *J. Geophys. Res.* 104, 15,917-15,927, 1999.

University.

EPA has also initiated a joint effort with research scientists at NASA and NOAA to focus on integrated analysis on observations (e.g., surface-based and aircraft field studies, satellite data, etc.) and model simulations to better quantify the impacts of international pollutant transport and their impact on U.S. air quality.

29. **As you know, the Clean Air Act requires non-attainment areas that fail to achieve a NAAQS by the attainment date to be "bumped-up" to a higher or more stringent classification. Congress intended this system to encourage the attainment of the standards, by imposition of increasingly more stringent control measures triggered by the reclassification. What is the appropriate action for EPA to take if an area fails to meet its attainment date?**

When an 8-hour ozone nonattainment area classified under subpart 2 misses its attainment date, the appropriate action under current law is for EPA to publish a Federal Register notice that includes a determination that the area has not attained its attainment date, and provides public notice that the area is reclassified to a higher classification by operation of law. As a result of the reclassification, additional and/or more stringent control and permitting requirements apply in the nonattainment area.

30. **Do you believe that EPA should be automatically required, as in the Barton provision (section 1443) in the Senate energy bill (S.2095), to ignore air quality and not "bump-up" areas to the next highest level of classification to take greater actions to control emissions, if those areas do not attain the relevant air quality standard by the attainment deadline?**

In implementing the 1-hour ozone standard, EPA adopted a policy that enabled downwind nonattainment areas that are significantly affected by pollution transport to qualify for an attainment date extension (without a "bump-up" to a higher classification) if they met certain requirements for addressing the local component of the nonattainment problem. This policy applied when upwind pollution sources affected the downwind area's ability to attain and had a control deadline later than the downwind area's attainment date. However, federal courts ruled that EPA lacked legal authority for this attainment date extension policy.

EPA continues to support the concept underlying the former attainment date extension policy. Because of differences between 1-hour ozone standard implementation and 8-hour ozone standard implementation, the policy would need to be refined for purposes of 8-hour implementation.

31. **What is the system in place to review and reject, as per the EAC protocol/guidance, the EAC areas that have not submitted a good faith plan to reduce emissions? Which areas have complied thus far with the March**

31st requirement in the Agency's guidance? By what date does EPA or the states plan to advise these areas whether they are in or out of the program?

EAC areas were required to submit local plans by March 31, 2004 that identified the control measures to be adopted and implemented for attainment of the 8-hour ozone standard by December 31, 2007. We developed a set of criteria that we used to evaluate the local plans in terms of the control strategies and the demonstration of attainment. These criteria are consistent with the EAC protocol and Agency guidance. Based on our review and evaluation of these plans, and considering supplemental information from the Chattanooga area, we determined that 31 of the 33 plans were acceptable. Plans for two areas in Tennessee, Knoxville and Memphis were not acceptable because the technical demonstrations of attainment were not consistent with our modeling guidance for the 8-hour standard. Although these two areas are not eligible for a deferred effective date of nonattainment designation, they may continue their voluntary efforts toward implementing their local control strategy.

On April 15, 2004, we designated all areas of the country either unclassifiable/attainment or nonattainment for the 8-hour ozone NAAQS. In that Federal Register notice we also identified the EAC areas and their attainment status. These areas are listed below, including those EAC areas that were designated attainment or nonattainment, effective June 15, 2004, and EAC areas that were designated nonattainment with a deferred effective date of September 30, 2005.

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
EPA Region 3				
VA	Northern Shenandoah Valley Region (Frederick County, VA), adjacent to Washington, DC- MD-VA	Winchester City	Nonattainment- deferred	9/30/2005
		Frederick County	Nonattainment- deferred	9/30/2005
VA	Roanoke Area (Roanoke, VA)	Roanoke County	Nonattainment- deferred	9/30/2005
		Botetourt County	Nonattainment- deferred	9/30/2005
		Roanoke City	Nonattainment- deferred	9/30/2005
		Salem City	Nonattainment- deferred	9/30/2005

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
MD	Washington County (Washington County (Hagerstown), MD), adjacent to Washington, DC- MD-VA	Washington County	Nonattainment- deferred	9/30/2005
WV	The Eastern Pan Handle Region (Berkeley & Jefferson Counties, WV), Martinsburg area	Berkeley County	Nonattainment- deferred	9/30/2005
		Jefferson County	Nonattainment- deferred	9/30/2005
EPA Region 4				
NC	Mountain Area of Western NC includes Asheville	Buncombe County	Unclassifiable /Attainment	6/15/2004
		Haywood County (part)	Unclassifiable /Attainment	6/15/2004
		Henderson County (opt out) ¹	Unclassifiable /Attainment	6/15/2004
		Madison County	Unclassifiable /Attainment	6/15/2004
		Transylvania County (opt out) ¹	Unclassifiable /Attainment	6/15/2004
NC	Unifour (Hickory- Morganton-Lenoir, NC)	Catawba County	Nonattainment- deferred	9/30/2005
		Alexander County	Nonattainment- deferred	9/30/2005
		Burke County (part)	Nonattainment- deferred	9/30/2005
		Caldwell County (part)	Nonattainment- deferred	9/30/2005
NC	Triad (Greensboro- Winston-Salem- High Point, NC)	Surry County	Unclassifiable /Attainment	6/15/2004
		Yadkin County	Unclassifiable /Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
		Randolph County	Nonattainment- deferred	9/30/2005
		Forsyth County	Nonattainment- deferred	9/30/2005
		Davie County	Nonattainment- deferred	9/30/2005
		Alamance County	Nonattainment- deferred	9/30/2005
		Caswell County	Nonattainment- deferred	9/30/2005
		Davidson County	Nonattainment- deferred	9/30/2005
		Stokes County	Unclassifiable /Attainment	6/15/2004
		Guilford County	Nonattainment- deferred	9/30/2005
		Rockingham County	Nonattainment- deferred	9/30/2005
NC	Fayetteville (Fayetteville, NC)	Cumberland County	Nonattainment- deferred	9/30/2005
SC	Appalachian - A (Greenville- Spartanburg- Anderson, SC)	Cherokee County	Unclassifiable /Attainment	6/15/2004
		Spartanburg County	Nonattainment- deferred	9/30/2005
		Greenville County	Nonattainment- deferred	9/30/2005
		Pickens County	Unclassifiable / Attainment	6/15/2004
		Anderson County	Nonattainment- deferred	9/30/2005
		Oconee County	Unclassifiable /Attainment	6/15/2004
SC	Catawba - B Part of York County, SC is in the Charlotte- Gastonia-Rock Hill NC-SC nonattainment area	York County (part) ²	Nonattainment	6/15/2004
		Chester County	Unclassifiable /Attainment	6/15/2004
		Lancaster County	Unclassifiable /Attainment	6/15/2004
		Union County	Unclassifiable /Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
SC	Pee Dee - C Florence area	Florence County	Unclassifiable /Attainment	6/15/2004
		Chesterfield County	Unclassifiable /Attainment	6/15/2004
		Darlington County	Unclassifiable /Attainment	6/15/2004
		Dillon County	Unclassifiable /Attainment	6/15/2004
		Marion County	Unclassifiable /Attainment	6/15/2004
		Marlboro County	Unclassifiable /Attainment	6/15/2004
SC	Waccamaw - D Myrtle Beach area	Williamsburg County	Unclassifiable /Attainment	6/15/2004
		Georgetown County	Unclassifiable /Attainment	6/15/2004
		Horry County	Unclassifiable /Attainment	6/15/2004
SC	Santee Lynches - E Sumter area	Clarendon County	Unclassifiable /Attainment	6/15/2004
		Lee County	Unclassifiable /Attainment	6/15/2004
		Sumter County	Unclassifiable /Attainment	6/15/2004
		Kershaw County	Unclassifiable /Attainment	6/15/2004
SC	Berkeley- Charleston- Dorchester - F Charleston-North Charleston area	Dorchester County	Unclassifiable /Attainment	6/15/2004
		Berkeley County	Unclassifiable /Attainment	6/15/2004
		Charleston County	Unclassifiable /Attainment	6/15/2004
SC	Low Country - G Beaufort area	Beaufort County	Unclassifiable /Attainment	6/15/2004
		Colleton County	Unclassifiable /Attainment	6/15/2004
		Hampton County	Unclassifiable /Attainment	6/15/2004
		Jasper County	Unclassifiable /Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
SC/GA	Lower Savannah- Augusta part of Augusta- Aiken, GA-SC area	Aiken County, SC	Unclassifiable /Attainment	6/15/2004
		Orangeburg County, SC	Unclassifiable /Attainment	6/15/2004
		Barnwell County, SC	Unclassifiable /Attainment	6/15/2004
		Calhoun County, SC	Unclassifiable /Attainment	6/15/2004
		Allendale County, SC	Unclassifiable /Attainment	6/15/2004
		Bamberg County, SC	Unclassifiable /Attainment	6/15/2004
		Richmond County, GA	Unclassifiable /Attainment	6/15/2004
		Columbia County, GA	Unclassifiable /Attainment	6/15/2004
SC	Central Midlands - I Columbia area	Richland County (part)	Nonattainment- deferred	9/30/2005
		Lexington County (part)	Nonattainment- deferred	9/30/2005
		Newberry County	Unclassifiable /Attainment	6/15/2004
		Fairfield County	Unclassifiable / Attainment	6/15/2004
SC	Upper Savannah Abbeville- Greenwood area	Abbeville County	Unclassifiable / Attainment	6/15/2004
		Edgefield County	Unclassifiable / Attainment	6/15/2004
		Laurens County	Unclassifiable / Attainment	6/15/2004
		Saluda County	Unclassifiable / Attainment	6/15/2004
		Greenwood County	Unclassifiable / Attainment	6/15/2004
TN/GA	Chattanooga (Chattanooga, TN- GA)	Hamilton County, TN	Nonattainment- deferred	9/30/2005
		Meigs County, TN	Nonattainment- deferred	9/30/2005
		Marion County, TN	Unclassifiable / Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
		Walker County, GA	Unclassifiable / Attainment	6/15/2004
		Catoosa County, GA	Nonattainment- deferred	9/30/2005
TN	Knoxville (Knoxville, TN)	Knox County	Nonattainment	6/15/2004
		Anderson County	Nonattainment	6/15/2004
		Union County	Unclassifiable / Attainment	6/15/2004
		Loudon County	Nonattainment	6/15/2004
		Blount County	Nonattainment	6/15/2004
		Sevier County	Nonattainment	6/15/2004
		Jefferson County	Nonattainment	6/15/2004
		NOT ELIGIBLE FOR DEFERRAL; DID NOT DEMONSTRATE ATTAINMENT IN 2007 PER EAC PROTOCOL AND EPA GUIDANCE		
TN	Nashville (Nashville, TN)	Davidson County	Nonattainment- deferred	9/30/2005
		Rutherford County	Nonattainment- deferred	9/30/2005
		Williamson County	Nonattainment- deferred	9/30/2005
		Wilson County	Nonattainment- deferred	9/30/2005
		Sumner County	Nonattainment- deferred	9/30/2005
		Robertson County	Attainment	6/15/2004
		Cheatham County	Attainment	6/15/2004
		Dickson County	Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
TN/AR / MS	Memphis (Memphis, TN-AR- MS) NOT ELIGIBLE FOR DEFERRAL; DID NOT DEMONSTRATE ATTAINMENT IN 2007 PER EAC PROTOCOL AND EPA GUIDANCE	Shelby County, TN	Nonattainment	6/15/2004
		Tipton County, TN	Unclassifiable / Attainment	6/15/2004
		Fayette County, TN	Unclassifiable / Attainment	6/15/2004
		DeSoto County, MS	Unclassifiable /Attainment	6/15/2004
		Crittenden County, AR	Nonattainment	6/15/2004
TN	Haywood County adjacent to Memphis & Jackson areas	Haywood County	Unclassifiable /Attainment	6/15/2004
TN	Putnam County central TN, between Nashville and Knoxville	Putnam County	Unclassifiable /Attainment	6/15/2004
TN	Johnson City- Kingsport-Bristol Area (TN portion only)	Sullivan Co, TN	Nonattainment- deferred	9/30/2005
		Hawkins County, TN	Nonattainment- deferred	9/30/2005
		Washington Co, TN	Unclassifiable /Attainment	6/15/2004
		Unicoi County, TN	Unclassifiable /Attainment	6/15/2004
		Carter County, TN	Unclassifiable /Attainment	6/15/2004
		Johnson County, TN	Unclassifiable /Attainment	6/15/2004
EPA Region 6				
TX	Austin/San Marcos	Travis County	Unclassifiable /Attainment	6/15/2004
		Williamson County	Unclassifiable /Attainment	6/15/2004
		Hays County	Unclassifiable /Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
		Bastrop County	Unclassifiable /Attainment	6/15/2004
		Caldwell County	Unclassifiable /Attainment	6/15/2004
TX	Northeast Texas Longview- Marshall-Tyler area	Gregg County	Unclassifiable /Attainment	6/15/2004
		Harrison County	Unclassifiable /Attainment	6/15/2004
		Rusk County	Unclassifiable /Attainment	6/15/2004
		Smith County	Unclassifiable /Attainment	6/15/2004
		Upshur County	Unclassifiable /Attainment	6/15/2004
TX	San Antonio	Bexar County	Nonattainment- deferred	9/30/2005
		Wilson County	Unclassifiable /Attainment	6/15/2004
		Comal County	Nonattainment- deferred	9/30/2005
		Guadalupe County	Nonattainment- deferred	9/30/2005
OK	Oklahoma City	Canadian County	Unclassifiable /Attainment	6/15/2004
		Cleveland County	Unclassifiable /Attainment	6/15/2004
		Logan County	Unclassifiable /Attainment	6/15/2004
		McClain County	Unclassifiable /Attainment	6/15/2004
		Oklahoma County	Unclassifiable /Attainment	6/15/2004
		Pottawatomie Co	Unclassifiable /Attainment	6/15/2004
OK	Tulsa	Tulsa County	Unclassifiable /Attainment	6/15/2004
		Creek County	Unclassifiable /Attainment	6/15/2004
		Osage County	Unclassifiable /Attainment	6/15/2004
		Rogers County	Unclassifiable /Attainment	6/15/2004

TABLE 31-1: EARLY ACTION COMPACT AREAS				
State	Compact Area (Designated Area)	County	Designation	Effective Date
		Wagoner County	Unclassifiable /Attainment	6/15/2004
LA	Shreveport- Bossier City	Bossier Parish	Unclassifiable /Attainment	6/15/2004
		Caddo Parish	Unclassifiable /Attainment	6/15/2004
		Webster Parish	Unclassifiable /Attainment	6/15/2004
NM	San Juan County Farmington area	San Juan County	Unclassifiable /Attainment	6/15/2004
EPA Region 8				
CO	Denver (Denver-Boulder- Greeley-Ft. Collins-Love, CO)	Denver County	Nonattainment- deferred	9/30/2005
		Boulder County (includes part of Rocky Mtn National Park)	Nonattainment- deferred	9/30/2005
		Jefferson County	Nonattainment- deferred	9/30/2005
		Douglas County	Nonattainment- deferred	9/30/2005
		Broomfield	Nonattainment- deferred	9/30/2005
		Adams County	Nonattainment- deferred	9/30/2005
		Arapahoe County	Nonattainment- deferred	9/30/2005
		Larimer County (part)	Nonattainment- deferred	9/30/2005
		Weld County (part)	Nonattainment- deferred	9/30/2005

32. **Please provide the Committee with a list of any counties in the United States that contribute to ambient air quality in a nearby National Park, Monument, Refuge or Wilderness area that does not meet the national primary or secondary 8-hour ozone standard, and which EPA has recently designated attainment for those standards. If there are any, please explain why they have not been designated nonattainment, pursuant to section 107(d)(1)(A)(i) of the Clean Air Act.**

Below is a list of National Park Service properties that are part of 8-hour ozone nonattainment areas. EPA is taking action to improve air quality across the nation, including in national parks and wilderness areas. Our proposed Clean Air Interstate Rule, Non-Road Diesel Rule, and the NOx SIP call are just a few of the programs that will dramatically reduce regional transport of ozone, a key component of improving air quality in national parks. When we designated areas as attaining or not attaining the 8-hour ozone standard, we took into account whether an area was significantly contributing to ozone nonattainment problems on National Park lands. Our designation decisions reflect the best information available and we are confident that air quality in parks will improve due to the combination of local and regional programs to reduce emissions of ozone precursors.

National Park Service Property in or a part of the 8-hour Ozone Nonattainment Areas

List of NPS Property in 8-hour Ozone Nonattainment Areas

1	ST	PROPERTY NAME	DESCRIPTION
		CLASS	
	CA	Cabrillo NM	National Monument
		2	
	CA	Devils Postpile NM	National Monument
		2	
	CA	Eugene O Neill NHS	National Historic Si
		2	
	CA	Fort Point NHS	National Historic Si
		2	
	CA	Golden Gate NRA	National Recreation
		2	
	CA	John Muir NHS	National Historic Si
		2	
	CA	Joshua Tree NP	National Park
		1	
	CA	Mojave NPres	National Preserve
		2	

CA	Muir Woods NM	National Monument
	2	
CA	Kings Canyon / Sequoia NP	National Park
	1	
CA	Point Reyes NS	National Seashore
	1	
CA	Presidio	
	2	
CA	Rosie the Riveter WWII Home Front NHP	National Historical
	2	
CA	San Francisco Maritime NHP	National Historical
	2	
CA	Santa Monica Mountains NRA	National Recreation
	2	
CA	Yosemite NP	National Park
	1	
CO	Rocky Mountain NP	National Park
	1	
CT	Weir Farm NHS	National Historic Si
	2	
DC	National Capital Parks - Central	
	2	
GA	Ocmulgee NM	National Monument
	2	
GA	Chattahoochee River NRA	National Recreation
	2	
GA	Martin Luther King, Jr. NHS	National Historical
	2	
GA	Kennesaw Mountain NBP	National Battlefield
	2	
IL	Illinois & Michigan Canal NHC	National Heritage Co
	2	
IN	Indiana Dunes NL	National Lakeshore
	2	
MA	Springfield Armory NHS	National Historic Si
	2	
MA	Saugus Iron Works NHS	National Historic Si
	2	
MA	Adams NHS	National Historical
	2	
MA	Boston NHP	National Historical
	2	
MA	Boston African American NHS	National Historic Si
	2	
MA	Boston Harbor Islands NRA	National Recreation

2			
MA	Cape Cod NS	National Seashore	
2			
MA	John Fitzgerald Kennedy NHS	National Historic Si	
2			
MA	Salem Maritime NHS	National Historic Si	
2			
MA	Lowell NHP	National Historical	
1	ST PROPERTY NAME	DESCRIPTION	
	CLASS		
MA	Minute Man NHP	National Historical	2
MA	New Bedford Whaling NHP	National Historical	2
MA	Longfellow NHS	National Historic Si	2
MD	Catoctin Mountain Park		
2			
MD	Greenbelt Park		
2			
MD	Fort McHenry NM & Hist Shrine	National Monument	2
MD	Hampton NHS	National Historic Si	
2			
MD	Thomas Stone NHS	National Historic Si	
2			
MD	Monocacy NB	National Battlefield	
2			
MD	Rock Creek Park		
2			
MD	Antietam NB	National Battlefield	
2			
MD	National Capital Parks - East		
2			
ME	Acadia NP	National Park	
1			
MI	Sleeping Bear Dunes NL	National Lakeshore	
2			
MO	Ulysses S. Grant NHS	National Historic Si	
2			
MO	Jefferson National Expansion Mem NHS	National Expansion M	
2			
NC	Guilford Courthouse NMP	National Military Pa	
2			
NJ	Edison NHS	National Historic Si	
2			
NJ	Morristown NHP	National Historical	
2			
NJ	Statue of Liberty NM	National Monument	

NV	2 Lake Mead NRA	National Recreation
NY	2 Saratoga NHP	National Historical
NY	2 Saint Pauls Church NHS	National Historic Si
NY	2 Sagamore Hill NHS	National Historic Si
NY	2 Home of Franklin D. Roosevelt NHS	National Historic Si
NY	2 Gateway NRA	National Recreation
NY	2 Fire Island NS	National Seashore
NY	2 Eleanor Roosevelt NHS	National Historic Si
NY	2 Upper Delaware Scenic and Recreational R	Scenic & Recreational
NY	2 Castle Clinton NM	National Monument
NY	2 Vanderbilt Mansion NHS	National Historic Si
OH	2 James A. Garfield NHS	National Historic Si
OH	2 Dayton Aviation Heritage NHP	National Historical
OH	2 Cuyahoga Valley NRA	National Recreation
OH	2 William Howard Taft NHS	National Historic Si
PA	2 Valley Forge NHP	National Historical
PA	2 Thaddeus Kosciuszko NMem	National Memorial
PA	2 Steamtown NHS	National Historic Si
PA	2 Johnstown Flood NMem	National Memorial
	ST PROPERTY NAME	DESCRIPTION
	CLASS	
PA	2 Independence NHP	National Historical
PA	2 Allegheny Portage Railroad NHS	National Historic Si

2		
PA	Ben Franklin NMem	National Memorial
2		
PA	Delaware Water Gap NRA	National Recreation
2		
PA	Eisenhower NHS	National Historic Si
2		
PA	Hopewell Furnace NHS	National Historic Si
2		
PA	Gloria Dei (Old Swedes) Church NHS	National Historic Si
2		
PA	Gettysburg NMP	National Military Pa
2		
PA	Friendship Hill NHS	National Historic Si
2		
PA	Fort Necessity NB	National Battlefield
2		
RI	Roger Williams NMem	National Memorial
2		
TN	Great Smoky Mountains NP	National Park
1		
TN	Chickamauga and Chattanooga NMP	National Military Pa
2		
TN	Natchez Trace Parkway	National Scenic Trai
2		
TN	Stones River NB	National Battlefield
2		
TX	Big Thicket NPres	National Preserve
2		
TX	San Antonio Missions NHP	National Historic Pa
2		
VA	Prince William Forest Park	Forest Park
2		
VA	Manassas NBP	National Battlefield
2		
VA	Petersburg NB	National Battlefield
2		
VA	Wolf Trap Farm Park	
2		
VA	Fredericksburg & Spotsylvania NMP	National Military Pa
2		
VA	Fredericksburg NC	National Cemetery
2		
VA	Colonial NHP	National Historical
2		

VA	Richmond NEP	National Battlefield
	2	
VA	Arlington House Robert E. Lee	
	2	
VA	Maggie L. Walker NHS	National Historic
Sit	2	
VA	George Washington Memorial PKWY	Memorial Parkway
	2	
VA	Shenandoah NP	National Park
	1	
VA	Blue Ridge Parkway	National Parkway
	2	
WV	Harpers Ferry NHP	National Historical
	2	
WV	Chesapeake and Ohio Canal NHP	National Historical
	2	

National Park Service Property in or a part of the 8-hour Ozone Nonattainment Areas

Listed by EPA Region, State then 8-hour Designated Nonattainment Area

Nonattainment Areas

<http://www.epa.gov/oar/oaqps/greenbk/index.html>

National Park Property

<http://data2.itc.nps.gov/parksearch/geosearch.cfm>

<http://data2.itc.nps.gov/parksearch/atoz.cfm>

Class - Class 1 or 2 area

<http://www2.nature.nps.gov/air/maps/index.htm>

<http://www2.nature.nps.gov/air/maps/class1areas.jpg>

Region	State	Area	County	Park	Class	EAC	Classification	8hr/1hr
Region 1								
Connecticut								
				New York-N. New Jersey-Long Island,NY-NJ-CT			Moderate	
			Fairfield Co	Weir Farm NHS		2	NAA Severe-17	
Maine								
				Hancock, Knox, Lincoln and Waldo Cos, ME			Subpart 1	
			Hancock Co	Acadia NP		1	Maint Marginal	
			Knox Co	Acadia NP		1	NAA Moderate	
Massachusetts								
				Boston-Lawrence-Worcester (E. MA), MA			Moderate	
			Barnstable Co	Cape Cod NS		2	NAA Serious	
			Bristol Co	New Bedford Whaling NHP		2	NAA Serious	
			Essex Co	Salem Maritime NHS		2	NAA Serious	
				Saugus Iron Works NHS		2		
			Middlesex Co	Longfellow NHS		2	NAA Serious	
				Lowell NHP		2		
				Minute Man NHP		2		
			Norfolk Co	Adams NHS		2	NAA Serious	
				John Fitzgerald Kennedy NHS		2		
			Plymouth Co	Boston Harbor Islands NRA		2	NAA Serious	
			Suffolk Co	Boston African American NHS		2	NAA Serious	
				Boston Harbor Islands NRA		2		
				Boston NHP		2		
				Springfield (Western MA), MA			Moderate	
			Hampden Co	Springfield Armory NHS		2	NAA Serious	
Rhode Island								
				Providence (All RI), RI			Moderate	
			Providence Co	Roger Williams NMem		2	NAA Serious	
Region 2								
New Jersey								
				New York-N. New Jersey-Long Island,NY-NJ-CT			Moderate	
			Essex Co				NAA Severe-17	

Region	State	Area	County	Park	Class	EAC	Classification	8hr/1hr
				Edison NHS		2		
				Hudson Co			NAA Severe-17	
				Statue of Liberty NM		2		
				Monmouth Co			NAA Severe-17	
				Gateway NRA		2		
				Morris Co			NAA Severe-17	
				Morristown NHP		2		
				Somerset Co			NAA Severe-17	
				Morristown NHP		2		
				Sussex Co			NAA Severe-17	
				Delaware Water Gap NRA		2		
				Warren Co			NAA Marginal	
				Delaware Water Gap NRA		2		
				New York				
				Albany-Schenectady-Troy, NY			Subpart 1	
				Saratoga Co			NAA Marginal	
				Saratoga NHP		2		
				New York-N. New Jersey-Long Island,NY-NJ-CT			Moderate	
				Kings Co			NAA Severe-17	
				Gateway NRA		2		
				Nassau Co			NAA Severe-17	
				Sagamore Hill NHS		2		
				New York Co			NAA Severe-17	
				Castle Clinton NM		2		
				Queens Co			NAA Severe-17	
				Gateway NRA		2		
				Richmond Co			NAA Severe-17	
				Gateway NRA		2		
				Suffolk Co			NAA Severe-17	
				Fire Island NS		2		
				Westchester Co			NAA Severe-17	
				Saint Pauls Church NHS		2		
				Poughkeepsie, NY			Moderate	
				Dutchess Co			NAA Moderate	
				Eleanor Roosevelt NHS		2		
				Home of Franklin D. Roosevelt NHS		2		
				Vanderbilt Mansion NHS		2		
				Orange Co			NAA Severe-17	
				Upper Delaware Scenic and Recreational R		2		
				Region 3				
				Dist. Columbia				
				Washington, DC-MD-VA			Moderate	
				Washington			NAA Severe-15	
				Chesapeake and Ohio Canal NHP		2		
				George Washington Memorial PKWY		2		
				National Capital Parks - Central		2		
				National Capital Parks - East		2		
				Rock Creek Park		2		
				Maryland				
				Baltimore, MD			Moderate	

Region State Area County Park	Class	EAC	Classification 8hr/1hr
Baltimore Co			NAA Severe-15
Fort McHenry NM & Hist Shrine		2	
Hampton NHS		2	
Washington, DC-MD-VA			Moderate
Charles Co			NAA Severe-15
National Capital Parks - East		2	
Thomas Stone NHS		2	
Frederick Co			NAA Severe-15
Catoctin Mountain Park		2	
Chesapeake and Ohio Canal NHP		2	
Monocacy NB		2	
Montgomery Co			NAA Severe-15
Chesapeake and Ohio Canal NHP		2	
George Washington Memorial PKWY		2	
Rock Creek Park		2	
Prince George's Co			NAA Severe-15
George Washington Memorial PKWY		2	
Greenbelt Park		2	
National Capital Parks - East		2	
Rock Creek Park		2	
Washington Co (Hagerstown), MD			EAC Subpart 1
Washington Co			EAC
Antietam NB		2	
Catoctin Mountain Park		2	
Chesapeake and Ohio Canal NHP		2	
Harpers Ferry NHP		2	
Pennsylvania			
Allentown-Bethlehem-Easton, PA			Subpart 1
Northampton Co			NAA Marginal
Delaware Water Gap NRA		2	
Altoona, PA			Subpart 1
Blair Co			NAA Marginal
Allegheny Portage Railroad NHS		2	
Johnstown, PA			Subpart 1
Cambria Co			NAA Marginal
Allegheny Portage Railroad NHS		2	
Johnstown Flood NMem		2	
Philadelphia-Wilmin-Atlantic Ci, PA-NJ-MD-DE			Moderate
Chester Co			NAA Severe-15
Hopewell Furnace NHS		2	
Valley Forge NHP		2	
Montgomery Co			NAA Severe-15
Valley Forge NHP		2	
Philadelphia Co			NAA Severe-15
Ben Franklin NMem		2	
Gloria Dei (Old Swedes) Church NHS		2	
Independence NHP		2	
Thaddeus Kosciuszko NMem		2	

Region State Area County Park	Class	EAC	Classification 8hr/1hr
Pittsburgh-Beaver Valley, PA			Subpart 1
Fayette Co			Maint Moderate
Fort Necessity NB		2	
Friendship Hill NHS		2	
Reading, PA			Subpart 1
Berks Co			Maint Moderate
Hopewell Furnace NHS		2	
Scranton-Wilkes-Barre, PA			Subpart 1
Lackawanna Co			NAA Marginal
Steamtown NHS		2	
Monroe Co			NAA Marginal
Delaware Water Gap NRA		2	
York, PA			Subpart 1
Adams Co			NAA Marginal
Eisenhower NHS		2	
Gettysburg NMP		2	
Virginia			
Fredericksburg, VA			Moderate
Spotsylvania Co			
Fredericksburg & Spotsylvania NMP		2	
Stafford Co			NAA Severe-15
Fredericksburg & Spotsylvania NMP		2	
Fredericksburg city			
Fredericksburg & Spotsylvania NMP		2	
Fredericksburg NC		2	
Madison and Page Cos (Shenandoah NP), VA			Subpart 1
Madison Co			
Shenandoah NP		1	
Page Co			
Shenandoah NP		1	
Norfolk-Virginia Beach-Newport News (HR),VA			Marginal
James City Co			Maint Marginal
Colonial NHP		2	
York Co			Maint Marginal
Colonial NHP		2	
Williamsburg city			Maint Marginal
Colonial NHP		2	
Richmond-Petersburg, VA			Moderate
Chesterfield Co			Maint Moderate
Richmond NBP		2	
Hanover Co			Maint Moderate
Richmond NBP		2	
Henrico Co			Maint Moderate
Richmond NBP		2	
Prince George Co			
Petersburg NB		2	
Hopewell city			Maint Moderate
Petersburg NB		2	

Region	State	Area	County	Park	Class	EAC	Classification	8hr/1hr
				Petersburg city				
				Petersburg NB		2		
				Richmond city			Maint Moderate	
				Maggie L. Walker NHS		2		
				Roanoke, VA			EAC Subpart 1	
				Botetourt Co			EAC	
				Blue Ridge Parkway		2		
				Roanoke Co			EAC	
				Blue Ridge Parkway		2		
				Roanoke city			EAC	
				Blue Ridge Parkway		2		
				Washington, DC-MD-VA			Moderate	
				Arlington Co			NAA Severe-15	
				Arlington House Robert E. Lee		2		
				Chesapeake and Ohio Canal NHP		2		
				Chesapeake and Ohio Canal NHP		2		
				George Washington Memorial PKWY		2		
				Fairfax Co			NAA Severe-15	
				Chesapeake and Ohio Canal NHP		2		
				George Washington Memorial PKWY		2		
				Manassas NBP		2		
				Wolf Trap Farm Park		2		
				Loudoun Co			NAA Severe-15	
				Chesapeake and Ohio Canal NHP		2		
				Harpers Ferry NHP		2		
				Prince William Co			NAA Severe-15	
				Manassas NBP		2		
				Prince William Forest Park		2		
				Alexandria city			NAA Severe-15	
				George Washington Memorial PKWY		2		
				West Virginia			EAC Subpart 1	
				Berkeley and Jefferson Counties, WV			EAC	
				Berkeley Co			EAC	
				Chesapeake and Ohio Canal NHP		2		
				Jefferson Co			EAC	
				Chesapeake and Ohio Canal NHP		2		
				Harpers Ferry NHP		2		
				Region 4				
				Georgia				
				Atlanta, GA			Marginal	
				Cobb Co			NAA Severe-15	
				Chattahoochee River NRA		2		
				Kennesaw Mountain NBP		2		
				Forsyth Co			NAA Severe-15	
				Chattahoochee River NRA		2		
				Fulton Co			NAA Severe-15	
				Chattahoochee River NRA		2		
				Martin Luther King, Jr. NHS		2		
				Gwinnett Co			NAA Severe-15	
				Chattahoochee River NRA		2		

Region	State	Area	County	Park	Class	EAC	Classification	8hr/1hr
				Chattanooga, TN-GA			Subpart 1	
				Catoosa Co				
				Chickamauga and Chattanooga NMP	2			
				Macon, GA			Subpart 1	
				Bibb Co				
				Ocmulgee NM	2			
				North Carolina				
				Greensboro-Winston Salem-High Point, NC			EAC Moderate	
				Guilford Co			EAC Maint Moderate	
				Guilford Courthouse NMP	2			
				Guilford Courthouse NMP	2			
				Haywood and Swain Cos (Great Smoky NP), NC			Subpart 1	
				Haywood Co				
				Great Smoky Mountains NP	1			
				Swain Co				
				Great Smoky Mountains NP	1			
				Tennessee				
				Chattanooga, TN-GA			Subpart 1	
				Hamilton Co				
				Chickamauga and Chattanooga NMP	2			
				Knoxville, TN			Subpart 1	
				Blount Co				
				Great Smoky Mountains NP	1			
				Cocke Co				
				Great Smoky Mountains NP	1			
				Sevier Co				
				Great Smoky Mountains NP	1			
				Nashville, TN			EAC Subpart 1	
				Davidson Co			EAC Maint Moderate	
				Natchez Trace Parkway	2			
				Rutherford Co			EAC Maint Moderate	
				Stones River NB	2			
				Williamson Co			EAC Maint Moderate	
				Natchez Trace Parkway	2			
				Region 5				
				Illinois				
				Chicago-Gary-Lake County, IL-IN			Moderate	
				Cook Co			NAA Severe-17	
				Illinois & Michigan Canal NHC	2			
				Du Page Co			NAA Severe-17	
				Illinois & Michigan Canal NHC	2			
				Grundy Co			NAA Severe-17	
				Illinois & Michigan Canal NHC	2			
				Will Co			NAA Severe-17	
				Illinois & Michigan Canal NHC	2			

Region	State	Area	County	Park	Class	EAC	Classification	8hr/1hr
Indiana								
Chicago-Gary-Lake County, IL-IN							Moderate	
Lake Co							NAA Severe-17	
Indiana Dunes NL							2	
Porter Co							NAA Severe-17	
Indiana Dunes NL							2	
La Porte Co, IN								
La Porte Co							Moderate	
Indiana Dunes NL							2	
Michigan								
Benzie Co, MI							Subpart 1	
Benzie Co								
Sleeping Bear Dunes NL							2	
Ohio								
Cincinnati-Hamilton, OH-KY-IN							Subpart 1	
Hamilton Co							NAA Moderate	
William Howard Taft NHS							2	
Cleveland-Akron-Lorain, OH								
Cuyahoga Co							Moderate	
Cuyahoga Valley NRA							Maint Moderate	
Lake Co							2	
James A. Garfield NHS							2	
Summit Co							Maint Moderate	
Cuyahoga Valley NRA							2	
Dayton-Springfield, OH								
Greene Co							Subpart 1	
Dayton Aviation Heritage NHP							Maint Moderate	
Montgomery Co							2	
Dayton Aviation Heritage NHP							2	
Region 6								
Texas								
Beaumont-Port Arthur, TX							Marginal	
Hardin Co							NAA Serious	
Big Thicket NPres							2	
Jefferson Co							NAA Serious	
Big Thicket NPres							2	
Orange Co							NAA Serious	
Big Thicket NPres							2	
Houston-Galveston-Brazoria, TX								
Liberty Co							Moderate	
Big Thicket NPres							NAA Severe-17	
2								
San Antonio, TX								
Bexar Co							EAC	EAC Subpart 1
San Antonio Missions NHP							2	
Region 7								
Missouri								

Region State Area County Park	Class	EAC	Classification 8hr/1hr
St Louis, MO-IL			Moderate
St. Louis Co			Maint Serious
Ulysses S. Grant NHS	2		
St. Louis city			Maint Serious
Jefferson National Expansion Mem NHS	2		
Region 8			
Colorado			
Denver-Boulder-Greeley-Ft Collins-Love., CO			EAC Subpart 1
Boulder Co			EAC Maint Section 185A
Rocky Mountain NP	1		
Larimer Co			
Rocky Mountain NP	1		
Region 9			
California			
Los Angeles-San Bernardino Cos(W Mojave), CA			Moderate
San Bernardino Co			NAA Extreme
Joshua Tree NP	1		
Mojave NP	2		
Los Angeles South Coast Air Basin, CA			Severe 17
Los Angeles Co			NAA Extreme
Santa Monica Mountains NRA	2		
Mariposa and Tuolumne Cos (Southern Mtn), CA			Subpart 1
Mariposa Co			
Yosemite NP	1		
Tuolumne Co			
Yosemite NP	1		
Riverside Co, (Coachella Valley), CA			Serious
Riverside Co			NAA Extreme
Joshua Tree NP	1		
San Diego, CA			Subpart 1
San Diego Co			Maint Serious
Cabrillo NM	2		
San Francisco Bay Area, CA			Marginal
Contra Costa Co			NAA Other
Eugene O Neill NHS	2		
John Muir NHS	2		
Rosie the Riveter WWII Home Front NHP	2		
Marin Co			NAA Other
Golden Gate NRA	2		
Muir Woods NM	2		
Point Reyes NS	1		
San Francisco Co			NAA Other
Fort Point NHS	2		
Golden Gate NRA	2		
Presidio	2		
San Francisco Maritime NHP	2		
San Mateo Co			NAA Other

Region State Area County Park	Class	EAC	Classification 8hr/1hr
Golden Gate NRA		2	
San Joaquin Valley, CA			Serious
Fresno Co			NAA
Severe-15/Extreme (5/17)			
Kings Canyon / Sequoia NP	1		
Madera Co			NAA
Severe-15/Extreme (5/17)			
Devils Postpile NM	2		
Yosemite NP	1		
Tulare Co			NAA
Severe-15/Extreme (5/17)			
Kings Canyon / Sequoia NP	1		
Ventura Co, CA			Moderate
Ventura Co			NAA Severe-15
Santa Monica Mountains NRA	2		
Nevada			
Las Vegas, NV			Subpart 1
Clark Co			
Lake Mead NRA	2		

33. **Please identify any counties which have been designated as unclassifiable under the 8-hour ozone standard, though they have monitored sufficient violations of the standard to warrant a nonattainment designation under either subpart 1 or subpart 2.**

EPA is in the process of evaluating the monitoring data for Syracuse, NY and Kansas City, Kansas. We intend to make a determination about the 8-hour ozone attainment status of these communities in the near future.

34. **Recently, EPA entered into a settlement agreement on Title V operating permits and monitoring requirements. The Clean Air Act requires that the permit include monitoring as necessary "to assure compliance with the permit terms and conditions." 42 U.S.C. § 7661c(c). EPA's new and dubious interpretation of the law in that agreement with industry says that monitoring requirements can only be added to Title V permits for those conditions that totally lack monitoring, lack a specific monitoring frequency, or require only a one time measurement. Please provide a description of monitoring requirements before this settlement agreement and after it, a discussion of the environmental and health benefits and costs that would result from its implementation, and an assessment of the impact on the availability of data for compliance and enforcement activities.**

Operating permits clarify which air pollution control requirements (applicable requirements) apply to a facility and require the facility to share in tracking its compliance with those requirements. The applicable requirements that go into the operating permit come from other EPA regulations (such as NSPS and MACT standards) and State implementation plan (SIP) requirements. Among other requirements, these regulations and SIPs typically limit the amount of air pollution the facility can emit, require the operation of specific pollution control equipment or the performance of work practices to reduce emissions, and require monitoring and record keeping to determine compliance with the limits, pollution controls, and work practices. The operating permit regulations contain several different provisions concerning monitoring. In general, these provisions require the permits to contain whatever monitoring is required by the applicable requirements and for the permit to specify additional monitoring in some cases.

The settlement agreement to which you refer addresses the interpretation of one provision of the operating permits regulations which required additional monitoring when the existing applicable requirements already required some monitoring. This interpretation allowed for the possibility that additional monitoring may be necessary to satisfy Act requirements for monitoring in operating permits. In response to the settlement agreement, the operating permits regulations have not been changed.

What has changed based on a final rule issued pursuant to the settlement agreement is EPA's interpretation of another specific provision of the operating permit rules [sections 70.6(c)(1) and 71.6(c)(1)] – called “sufficiency monitoring” before the settlement agreement and “umbrella monitoring” after the settlement agreement. The “sufficiency monitoring” interpretation required the permitting authority to create new monitoring in the permit anytime they judged the monitoring required by the applicable requirement not to be “sufficient to assure compliance,” even though it might be required on a “periodic” basis. Under this interpretation, the permit might contain a combination of monitoring required by applicable requirements, periodic monitoring, and sufficiency monitoring. After issuance of a final rule pursuant to the settlement agreement, the “umbrella monitoring” interpretation of this same provision of the operating permit rules says that monitoring may only be required in permits if it is required by applicable requirements or through periodic monitoring requirements. On January 22, 2004, we took final action adopting this interpretation and explaining why we believe it is the correct interpretation of the rules (69 FR 3202).

We remain committed to ensuring that permits contain monitoring sufficient to assure compliance with all permit terms. In our January 22, 2004 final rule, we not only reiterated the requirement that States include monitoring required by applicable requirements and periodic monitoring under the operating permit rules, but we also committed to several future steps to seek possible changes (perhaps through rulemaking or other programmatic means) to improve the monitoring required by the existing emissions standards and SIPs and to clarify how the periodic monitoring requirements of the operating permits rules may be used to obtain better monitoring in operating permits. Additional information on these activities is included in the preamble to the January 22, 2004 umbrella monitoring rule.

Regarding your question about the environmental and health benefits and costs that will result from implementation of the settlement agreement, we do not have data on how title V permits have affected Clean Air Act compliance.

We expect that there will be substantial benefits for permitting authorities and permitted facilities alike associated with these upcoming efforts. EPA's prior approach to title V monitoring sought to improve monitoring by creating monitoring terms on a permit-by-permit basis. By contrast, EPA's new approach relies on a combination of new monitoring added to permits through the periodic monitoring rules and anticipated changes to underlying standards to improve inadequate monitoring before it goes into particular permits. EPA believes this new approach to monitoring should be less burdensome, more effective, more equitable, and more efficient for permitting authorities and sources, compared to the prior approach. This is so because the new approach will likely reduce the amount of time needed for permit drafting, and result in more consistent monitoring decisions for similar sources and across State programs.

Regarding your question about availability of data for compliance and enforcement activities that will result from implementation of the Settlement Agreement, our response is the same as for the environmental and health data.

35. **Your letter of March 30, 2004, responding to my request for NSR enforcement information suggests that EPA's mercury proposal creates 'a cap-and-trade system that will go further and faster, reducing mercury by almost seventy percent over a 15-year period.' However, the docket of this rulemaking contains results from EPA's Integrated Planning Model that indicate mercury emissions from power plants under the proposed cap-and-trade scheme will be approximately 25 tons per year from 2018 to 2022. This is approximately a 50% reduction. Do you have evidence that these modeling results are in error, do you plan on revising the proposal to guarantee that the plan will live up to your claim, or do you wish to revise your estimate?**

The Clean Air Mercury Rule (CAMR) represents the first time under any Administration that the federal government has proposed a rule designed to reduce mercury emissions from coal-fired power plants. We have described five principles that will guide our deliberations as we prepare to making my final decision on this important matter (see http://www.epa.gov/mercury/control_emissions/inquiry.htm for more information on these principles). As part of this work we have recently signed a Notice of Data Availability where we solicit additional public input on a series of linchpin questions. One area where we will be seeking additional public input is how best to model the mercury reduction scenarios.

36. **Why did Assistant Administrator Holmstead direct that all work on the mercury MACT analysis be discontinued prior to the completion and delivery of the analysis requested by the mercury FACA workgroup?**

EPA did not direct that all work on the mercury MACT analysis be discontinued prior to the completion and delivery of the analysis requested by the mercury FACA workgroup. In August 2001, we established the work group in accordance with the Federal Advisory Committee Act to provide advice and recommendations to EPA during the development of the utility MACT standard. The work group was an offshoot of the long-standing Permits, New Source Review, and Toxics Subcommittee of the Clean Air Act Advisory Committee. It included representatives from environmental advocacy groups, State and local regulatory authorities, and companies and trade associations. After more than 1 year of deliberation, the work group was unable to develop a consensus recommendation. Instead, the group submitted a report to the Agency that described four recommended approaches, each of which was supported by only a subset of the entire work group. We have carefully considered the input of this group as we have worked to develop the proposed rule.

The Agency has determined that the type of analysis that some members of the work group requested is not appropriate, because the model that they asked us to use (IPM) is not configured to analyze the type of near-term scenarios that would be required under MACT. However, the Agency has not ruled out performing more analysis of a Section 112 MACT approach.

37. **As I understand it, EPA is on the verge of providing guidance to the states, as part of a permitting decision, that could significantly limit the options that the states can consider when applying Best Available Control Technology to new, coal-fired power plants. This decision or guidance would prevent them from considering integrated gasification technology, one substantially cleaner and more efficient combustion method than conventional pulverized coal. Why would the Agency limit the states options and curb the development of such technologies?**

This is an issue that has come up in several recent permitting decisions and EPA has yet to make a decision on how to respond to the issue.

38. **The State of North Carolina recently filed a petition under the authority of section 126 of the Clean Air Act that enables a downwind state harmed by upwind air pollution to request action by EPA to clean up the harmful pollution from the upwind sources. What are EPA's views of the merits of North Carolina's petition, and will EPA respond to the petition within 60 days, as required by the Clean Air Act?**

The EPA received the section 126 petition from North Carolina on March 19, 2004. Section 126 requires EPA to grant or deny the petition within 60 days. Prior to issuing a final response to the petition, EPA will issue a proposal and provide an

opportunity for public comment. Under a separate provision of the Clean Air Act (section 307(d)), EPA is authorized to extend the deadline for action on the petition by up to 6 months if EPA determines that the additional time is needed for EPA's rulemaking process. In a final action signed by the Administrator Leavitt on May 18, 2004, EPA made a determination that the 60-day period is not sufficient for EPA to develop an adequate proposal on whether the sources identified in the North Carolina petition contribute significantly to nonattainment problems downwind, and, further, to allow public comment on the promulgation of any controls to mitigate or eliminate those contributions. The EPA extended the deadline the full six months until November 18, 2004. The EPA is currently evaluating the petition. The EPA is still considering the petition and has not yet made a decision on the appropriate action to take. The EPA is currently focused on completing the Clean Air Interstate Rule (CAIR) which will address the nitrogen oxides and sulfur dioxide pollution transport affecting North Carolina and many other States in the eastern half of the nation. These are the same pollutants identified in the petition. We intend to issue the final CAIR soon.

39. **There are three Tennessee Valley Authority power plants - Bull Run, T.H. Allen, and Sevier - that are within the boundaries of an Early Action Compact area. How will New Source Review apply to these plants from April 15, 2004, until April 15, 2007?**

Counties in Early Action Compact areas that were designated nonattainment with a deferred effective date of September 30, 2004 continue to be subject to the requirements of the Prevention of Significant Deterioration (PSD) new source review program unless they miss a future EAC milestone and do not get the subsequent deferrals. In other words, they remain subject to PSD new source review unless the 8-hour ozone nonattainment designation becomes effective.

STATEMENT OF ROBERT ECKELS, COUNTY JUDGE, HARRIS COUNTY, TX

Mr. Chairman and members of the Subcommittee, my name is Robert Eckels. I am the County Judge of Harris County, Texas. I want to thank the Committee for inviting me to testify on the implementation of the 8-hour ozone and fine particulate National Ambient Air Quality Standards. Since 1995, as the presiding officer of the Harris County Commissioners Court, the governing body of the county, I represent all the citizens of the third most populous county in the United States. Harris County, which includes the city of Houston, is 1,788 square miles in area and home to 3.6 million residents making us more populous than 21 states. In my years of public service, first for 12 years as a member of the Texas Legislature and currently as County Judge, I have had the opportunity to be directly involved in air quality planning for the region. As Chairman of the Transportation Policy Council of the Houston-Galveston Area Council since 1998, I have overseen the environmental planning aspects of more than \$2.7 billion in state and Federal funds invested to rebuild and expand the region's roadways. As a member of the Board of Directors of the National Association of Counties (NACo) and immediate past Chair of the NACo Environment, Energy and Land Use Policy Steering Committee I have had the opportunity to engage in national environmental issues, including air quality. Finally, over the past 4 years I've worked closely with citizens and community leaders in the Harris County region, with the Texas Commission on Environmental Quality and with the EPA to devise an acceptable air quality plan for that region. I can say from first-hand experience, air quality issues are among the most complex and divisive an elected official can experience.

Clean air is of vital interest to all of us. It's important for the health of our citizens and for the health of our economy. This Nation has made great strides in improving air quality. Since 1970 we've achieved a 50 percent reduction in emissions while at the same time seen a 160 percent increase in the Gross Domestic Product and a 40 percent increase in energy consumption. Yet, some 145 million citizens live in areas that are or will be designated as non-attainment for ozone and fine particulates. Clearly, more work is needed.

I want to relay my personal experience in developing clean air plans to attain the 1-hour ozone standard in the Houston-Galveston region. I believe it will be relevant to what other major metropolitan areas are about to experience as the 8-hour ozone and fine particulate standards are implemented. We've embarked on an ambitious plan, with the backing of the environmental organizations, elected officials, the business community and state regulators, which touches all aspects of the air pollution problem. Industries in the 8-county Harris County region are investing \$4 billion over the next 3 years to install state-of-the-art controls to reduce nitrogen oxides by 80 percent—ambitious by any standard. The Texas Legislature has funded the Texas Emission Reduction Program, a \$150 million per year, 7-year grant program to reduce emissions from the mobile source sector faster than Federal controls will otherwise achieve.

We've reformulated the diesel in our region, reduced speed limits, banned the use of commercial lawn maintenance before noon and initiated the first phase of a light rail mass transit system at a cost of \$350 million with no Federal funding. We've even regulated residential hot water heaters, requiring high efficiency units in new construction, and this is on top of an 80 percent reduction in industrial and automobile hydrocarbon emissions over the past 20 years. I believe this speaks to a strong commitment to clean air in Houston.

As a public official, I worry about clean air and also about the economic vitality of our region. We want clean air and a sound economy. In 2000, the Greater Houston Partnership, our local Chamber of Commerce, sponsored a thorough, independent economic study of our clean air plan. This study was conducted by Dr. George Tolley, a former Deputy Secretary of the Treasury and Professor Emeritus of Economics and Social Sciences at the University of Chicago. He worked closely with Dr. Barton Smith of the University of Houston, a well-known and respected expert on the Houston regional economy. The study, published in 2001, looked at the socio-economic impacts of Houston's clean air plan and concluded that by 2010 the region will have 38,000 fewer jobs, Gross Regional Product reduced by \$3.5 billion and reduced tax receipts to state and local government by \$300 million dollars per year. These are serious economic consequences by any yardstick, but we believe they are necessary to attain the 1-hour standard.

Let me look to the future for a moment. Some 530 counties nationwide will be designated as non-attainment for the 8-hour ozone standard; and we're in the process for making similar determinations for the fine particulate standard. Many of these areas will be non-attainment for the first time ever; others have been trying to attain for 30 years.

EPA is now in the process of developing the regulatory framework for states to implement these standards. EPA modeling shows that many of these areas will attain the 8-hour ozone and fine particulate standards with measures already on the books such as cleaner fuels and engines, and with measures being implemented to reduce transported emissions. I want to commend the EPA and this Administration for these efforts.

However, for some large metropolitan areas such as the Harris County region, New York City, large areas of New Jersey and Connecticut, Philadelphia, and others, the same EPA modeling shows continued non-attainment of the 8-hour ozone standard as far out as 2020. This is after significant reductions in transport emissions either from Clear Skies or the Interstate Air Quality Rule, reductions from cleaner fuels and engines, and local 1-hour ozone control measures. Modeling by third parties such as the Ozone Transport Commission in the northeast and the Lake Michigan Air Directors Consortium in the mid-west supports the EPA predictions. This presents several important public policy issues for EPA, local elected officials and for this Committee to consider.

The first policy issue for consideration is the attainment deadlines that EPA has proposed for these large metropolitan areas that modeling shows will not attain for the 8-hour ozone standard by 2020. These areas have proposed attainment deadlines in the 2010–2013 timeframe, well before emission reductions from Federal measures such as transport and mobile source controls are fully realized. In fact, modeling in Harris County shows you can completely eliminate the industrial emissions or mobile source emissions and still not attain the standard. As a result of these areas not being able to achieve enough emission reductions to demonstrate attainment by their respective deadlines, they may not be able to submit approvable State Implementation Plans to the EPA. Unless these metropolitan areas can demonstrate through modeling that they will attain the standard by their designated deadlines, the Clean Air Act imposes sanctions, including the loss of Federal highway funds. In Harris County, this is about \$1 billion per year in loss of Federal highway dollars and other restrictions on economic growth. One option suggested is to have states volunteer to move up into a more severe air quality classification to get more time for attainment, I can tell you from the standpoint of an elected official, this is not a feasible option.

The second issue is the attainability of the standards. I'm not here to say we need to change or eliminate the 8-hour ozone or fine particulate standards. That is for the public health professionals and scientists to determine. However, I can say that EPA's modeling, and modeling by others, suggests these standards will not be attainable in some areas for the foreseeable future despite our best efforts. Unattainable standards only place more areas in the position of facing severe economic sanctions under the Clean Air Act because they can't submit approvable State Implementation Plans. I don't believe this is good public policy. It creates division in our communities and often results in litigation, which slows clean air progress.

So, where do we go from here?

First, I believe all areas need attainment deadlines that are technically and economically feasible. We need to acknowledge the EPA's modeling work and develop sound public policies for those areas that will not attain in the foreseeable future.

Second, I believe air quality standards should be reasonable and attainable; otherwise areas will be in a position of not being able to submit approvable SIPs and living under economic sanctions or the threat of sanctions for the foreseeable future.

Third, I believe we should fully capture the emission reduction benefits from existing and pending Federal control measures. We have and will continue to invest in cleaner fuels, engines and transport controls; let's capture those benefits at the local level before implementing the next round of very high cost controls, if any remain.

Fourth, we need to take a closer look at how our current air quality management process is working and how it can be improved. One indicator I use to suggest the need for improvement is that despite literally hundreds of billions of dollars spent on Federal, regional and local control measures over the past 20 years, we still have not attained the ozone and PM standards in many areas. We're not even close in some areas. This suggests to me that we have an underlying science and policy problem that needs to be addressed.

Finally, and speaking as a representative of NACo, county governments are ultimately responsible for protecting the health, welfare and safety of their citizens. Many rural and suburban counties do so with limited resources and are often brought into clean air plans because they are adjacent to large urban areas. Many times such counties are non-attainment because of upwind transport or because they have emissions from major freeways leading to the urban centers. These counties need a seat at the air quality table and they should not be penalized solely be-

cause they are impacted by adjacent urban areas. They need resources, support and flexibility from Federal agencies.

In conclusion, as we continue our efforts to clean the nation's air, there needs to be a balance with economic prosperity. We need to be especially mindful of this, as we are required to make even more costly local investments and begin to look at how to alter human behavior to affect positive environmental change. Clean air and a sound economy do not have to be mutually exclusive but to accomplish both does require thoughtful public policy. That is an obligation the citizens of this country expect of all of us.

I want to thank the EPA, this Administration and this Committee for the ongoing hard work required to clean the nation's air. We've made progress and will continue to do so. I want to thank the Committee for asking me to testify today. I am happy to answer any questions you may have.

STATEMENT OF MICHAEL FISHER, PRESIDENT, GREATER CINCINNATI
CHAMBER OF COMMERCE

Chairman Voinovich, ranking member Carper, and distinguished members of the Clean Air, Climate Change and Nuclear Safety Subcommittee good morning.

Chairman Voinovich, thank you for the invitation to present testimony today. My name is Michael Fisher and I am the President and CEO of the Greater Cincinnati Chamber of Commerce. It is an honor to have the opportunity to speak to the Subcommittee this morning. The issues on which you are deliberating on which many Americans, in the public and private sectors, are deliberating are issues critical to Greater Cincinnati its people, its environment and its economic prosperity.

Our Chamber is one of the largest such business organizations in the country. We have more than 6000 business members ranging from global companies like Procter & Gamble, Toyota and GE Transportation to strong privately held middle market companies to sole proprietors. Eighty percent of our members have fewer than 50 employees. The number of manufacturing companies in our membership approaches 1000. Our region includes 15 counties in Southwestern Ohio, Northern Kentucky and Southeastern Indiana.

Importantly, I want to stress that our Chamber's interests are aligned with the larger community interests. I mention this because the topic and process of attaining and maintaining environmental quality especially air quality has a common bottom line for our region undoubtedly for every region in America. That is: we want to achieve and exceed clean air standards—for ozone, particulates and regional haze. We want healthy citizens in healthy communities in a clean environment.

The Greater Cincinnati Chamber has a long-standing commitment to clean air and a strong history of engagement in this issue. The Chamber played a lead role in local cooperative efforts to reduce ozone-levels while minimizing potential adverse economic consequences (government-mandated pollution-control measures and penalties that would curtail regional economic development). The Chamber was a co-founder of the Regional Ozone Coalition in 1994 and continues to participate with this group. The first such partnership among local government, business and community organizations in Ohio, Kentucky and Indiana, the Coalition works to prevent ozone levels from threatening the region's future. Coalition efforts resulted in redesignation of our region to "attainment" of the Federal ozone standard in early 2000. More recently, the Coalition has awarded financial incentives covering the incremental cost difference between a traditionally fueled vehicle and an alternatively fueled vehicle that creates less pollution. The Chamber has also encouraged businesses to participate in the Coalition directly.

More recently, we also began collaboration with OKI (Ohio-Kentucky-Indiana Regional Council of Governments), our local metropolitan planning organization, to work with the state EPAs in our region on managing the impact of new regulations forthcoming as a result of the April 2004 attainment designation announcement.

Before I share with you my thoughts on the business impacts of the current clean air standards, I would like to offer some personal context for my comments. First, I may be somewhat unique as a Chamber President. This is my first position as a civic leader. After building a manufacturing support service business that started with one customer and fifty employees to a substantial enterprise with eighty locations in 11 countries and 2500 employees, I stepped into my new community role 3 years ago. I am a fourth-generation, life-long resident of Cincinnati with a deep interest in improving not only the region's business climate, but its quality of life. I am also a parent of four children ages 8 to 15. For all of these reasons, I believe in improving our region's air quality: for my family, for the two million residents

of our region and for the long-term economic attractiveness and competitiveness of Cincinnati USA.

I am also very proud that we will be named one of America's Most Livable Communities at a National Press Club ceremony here in Washington in just a few weeks. But I find it ironic, and a bit frustrating, to be here today acknowledging that our community is also considered in non-attainment status by US EPA ozone standards.

AIR QUALITY IS IMPROVING

Of course, it is important to celebrate real progress. Like many of our nation's urban areas, our region has made great strides in improving local air quality. Greater Cincinnati meets all air quality standards except for ozone and as I will point out later, our problem with the ozone standard does not result from monitoring data, but because, at the state level, certain control policies were improperly credited by Ohio EPA. In particular, the good news for Greater Cincinnati is that large particulate matter (PM₁₀) has decreased by 33 percent since 1988. Fine particulates (PM_{2.5}) have decreased 12 percent since 1999. In 2001, sulfur dioxide was measured at .005 parts per million, against a standard of .09. Nitrogen oxides are down from .035 parts per million in 1994 to .02 in 2002.

Clearly, this demonstrates significant advances, even as our economy increased, energy consumption increased and vehicle miles traveled increased. But the work is not finished. We are committed to continuous improvement.

The Greater Cincinnati Chamber of Commerce seeks continued air quality improvements and predictable regulatory and legislative requirements for business. Our members and our broader region are interested in a clear and comprehensive approach to air quality.

Currently, our businesses face a confusing series of environmental laws and regulations that often lead to miscommunication, regulatory uncertainty, lost business investment and even higher energy costs. Hopefully, Congress will help by identifying improvements focused on results and predictability.

BUSINESS IMPACT OF NON-ATTAINMENT DESIGNATION

Simply stated, conducting business in an area designated as non-attainment is more complicated, more time-consuming and more costly. In addition to the incremental burdens that are placed on the businesses already located here, the non-attainment designation is a disincentive for new business investment into our region.

First and foremost, the consequence of regulatory uncertainty and the corresponding concerns over investment in non-attainment areas is job loss. A 1995 study conducted by NERA (National Economic Research Associates) Economic Consulting concerning the economic impact of ozone non-attainment in Greater Cincinnati projected job losses of 14,000, including both manufacturing and spin-off jobs, for the period 1995 until 2000.

In 1995 Greater Cincinnati was home to 162,000 manufacturing jobs according to state employment data. By 2003, that number had fallen to 127,000. While it is difficult to discern the specific number of job losses attributable to the non-attainment designation, it is clear that the 35,000 workers were displaced and the non-attainment status was at least one contributing factor.

The fact is, job growth and capital investment for existing operations in our region have been hindered by the non-attainment designation. This point is critical as one considers that 80 percent of a region's job growth stems from expansion of resident companies, not new business attraction.

Sophisticated businesses carefully analyze the costs and risks associated with expansion in different locations. The increased scrutiny, potential for higher fines if permit violations occur, and the uncertainty over what the next round of regulations may bring; all serve as a disincentive for reinvestment and expansion of businesses, especially manufacturing operations, located in non-attainment areas like ours. Of course non-attainment areas are often urban areas—the very locations large metropolitan Chambers are frequently trying to revitalize.

Our Chamber's internationally recognized and award-winning economic development team, the Cincinnati USA Partnership, has been told by national site location consultants that non-attainment areas are frequently not even included as potential locations for major new manufacturing projects. As a non-attainment area, Greater Cincinnati suffers in some cases because we never make it onto the prospect list.

This can be especially true of foreign investors who are highly sensitive to compliance costs, potential public relations problems associated with environmental con-

cerns, and the quality of life perceptions of their executives soon to be relocated to the United States.

The tougher standards also add to the complexity. The Hamilton County (our major urban county) Department of Environmental Services strongly advises applicants for air permits to hire a consultant to assist in the development of information required for submission. While this is good for consulting businesses and for the applicant companies' lawyers, these are not the growth industries in which we are most interested.

Air quality permits for companies in non-attainment areas are held to tougher standards and closer review. These stricter standards cost businesses time and money, and sometimes negatively impact the ability of a company to keep or win customers—especially when competitors, both domestic and overseas, are not held to the same standards.

One of the most important assets of Greater Cincinnati is our outstanding transportation system. Because we are located within a 1-day drive of 60 percent of the North American population, our surface transportation infrastructure is an important selling point for our regional economic development efforts. The non-attainment designation even threatens the viability of this valuable asset, in part, because essential Federal highway dollars are jeopardized in non-attainment areas. Our region's metropolitan planning organization is required to demonstrate that its regional transportation improvement plan is consistent with the overall emissions budget for the region. Failure on this can also result in significant reductions in Federal highway funding.

PROCESS VERSUS RESULTS

I would like to share with you one example of the impact of confusing regulations—the designation of Greater Cincinnati as a non-attainment area.

Based on data from the 1980's, the Cincinnati area was classified as a moderate non-attainment area. After that designation, government, businesses and the community came together to develop a plan to reach attainment status. Following much work by a large and diverse group of stakeholders, and at substantial expense, the Greater Cincinnati region was designated as in attainment for ozone in 2000.

Our success was short-lived. An adverse 2001 court decision by the U.S. Court of Appeals for the Sixth Circuit ruled on a technicality that the Ohio EPA erred in its evaluation and approval of our region's attainment plan, and the region was abruptly placed back in non-attainment. This re-designation happened in spite of the fact that the region's air quality has not exceeded the current 1-hour ozone standard since 1995—not a single violation has been recorded! (A violation occurs when a high level—greater than 120 parts per billion, averaged over 1 hour—of ozone is recorded more than three times at a single monitor within a 3-year period.)

The 2001 ruling was a surprise and scuttled much hard work by our community. The case also illustrates a fundamental flaw with the current system great emphasis is placed on the process, often at the expense of focusing on actual air quality results.

NEW DESIGNATIONS AND REGULATIONS ON THE HORIZON

As you are well aware, the national business community is especially anxious about April 15th this year, and only not because it is "tax day." In 2004 it is also "final designation" day. On that day, the US EPA is scheduled to issue its final designation of non-attainment areas under the 8-hour air quality standard for ozone, likely to affect thousands of communities across the country.

For businesses and state EPAs alike, the permitting process has been challenging. We're concerned it may become overwhelming beginning later this month as the new regulations draw in thousands more facilities including many mid-size and smaller businesses. These businesses will be newly subject to air quality permitting requirements and state agencies will be challenged to thoroughly, and expeditiously, review more applications. The early months of the new regulatory framework are critical as state EPAs prepare for an onslaught of applications from an entirely new group of businesses in need of permits.

In addition, the small- and mid-sized businesses facing these new equipment and compliance costs have scant resources to allocate for expert consultant assistance when adding new equipment or expanding operations.

As a region and as a business community we need help. The current array of laws and regulations are difficult even for the experts to explain. The evolving standards challenge our businesses and ultimately cost us jobs. Strong businesses and strong regional economies are the result of good ideas, good planning, adequate resources and strong leadership—they succeed when they create a road map and follow it. We

hope for a similarly focused approach from our very important partner, the Federal Government—development of a clear roadmap that provides certainty, and points business, and other sectors of the community, in the right direction to attain clean air compliance.

RECOMMENDATIONS

In that spirit, I encourage the Congress to consider several improvements to the current legal and regulatory framework:

(1) Increase certainty and predictability in regulations and laws so businesses can first understand them, and then do what they do well—plan accordingly, make smart investments and adjust to market conditions and opportunities.

(2) Allow ample time for businesses to evaluate emission reduction strategies and technology options in order to make the best decisions.

(3) Be sensitive to the compliance costs—especially as they impact small businesses.

(4) Balance the solutions between stationary and mobile sources—proportionate to the sources of the pollution.

(5) Place emphasis where it belongs—on results, NOT process.

(6) Remember that businesses respond to incentives—consider providing more incentives to encourage compliance, rather than emphasizing enforcement measures.

In closing, thank you for championing cleaner air, even as we all work hard together to build healthy communities and strong economies for the long-term.

Chairman Voinovich, again, thank you for the opportunity to visit with you. Members of the Subcommittee, I appreciate your attention and will answer any questions you may have about my testimony.

STATEMENT OF GEORGE D. THURSTON, NEW YORK UNIVERSITY SCHOOL OF MEDICINE, DEPARTMENT OF ENVIRONMENTAL MEDICINE

Mr. Chairman and members of the subcommittee, I am George D. Thurston, a tenured Associate Professor of Environmental Medicine at the New York University (NYU) School of Medicine. My scientific research involves investigations of the human health effects of air pollution.

I am also the Director of the National Institute of Environmental Health Sciences' (NIEHS) Community Outreach and Education Program at NYU. A goal of this program is to provide an impartial scientific resource on environmental health issues to decisionmakers, and that is my purpose in testifying to you here today.

The adverse health consequences of breathing ozone or particulate matter are serious and well documented. This documentation includes impacts demonstrated by controlled chamber exposures and by observational epidemiology showing consistent associations between these pollutants and adverse impacts across a wide range of human health outcomes. The implementation of the NAAQS promulgated by the U.S. EPA on July 18, 1997 will provide a substantial improvement in the public health protection provided to the American people by the Clean Air Act.

Ozone (O₃) is a highly irritating gas which is formed in our atmosphere in the presence of sunlight from other "precursor" air pollutants, including nitrogen oxides and hydrocarbons. These precursor pollutants, which cause the formation of ozone, are emitted by pollution sources including automobiles, electric power plants, and industry.

Particulate Matter (PM) air pollution is composed of two major components: primary particles, or "soot", emitted directly into the atmosphere by pollution sources such as industry, electric power plants, diesel buses, and automobiles, and; "secondary particles" formed in the atmosphere from sulfur dioxide (SO₂) and nitrogen oxide (NOx) gases, emitted by many combustion sources, including coal-burning electric power plants.

Observational epidemiology studies have shown compelling and consistent evidence of adverse effects by ozone and PM. These studies statistically evaluate changes in the incidence of adverse health effects in a single population as it undergoes varying real-life exposures to pollution over time, or across multiple populations experiencing different exposures from one place to another. They are of two types: (1) population-based studies, in which aggregated counts of effects (e.g., hospital admissions counts) from an entire city might be considered in the analysis; and, (2) cohort studies, in which selected individuals, such as a group of asthmatics, are considered. Both of these types of epidemiologic studies have confirmed the associations of ozone and PM air pollution exposures with increased adverse health impacts, including:

- decreased lung function (a measure of our ability to breathe freely);

- more frequent respiratory symptoms;
- increased numbers of asthma attacks;
- more frequent emergency department visits;
- additional hospital admissions, and;
- increased numbers of daily deaths.

Among those people known to be most affected by the adverse health implications of air pollution are: infants, children, those with pre-existing respiratory diseases (such as asthma and emphysema), older adults, and healthy individuals exercising or working outdoors.

The state of the science on particulate matter and health has undergone thorough review, as reflected in the recently released draft of the U.S. EPA Criteria Document for Particulate Matter—of which I am a contributing author. Since the PM_{2.5} standard was set in 1997, the hundreds of new published studies, taken together, robustly confirm the relationship between PM_{2.5} pollution and severe adverse human health effects. In addition, the new research has eliminated many of the concerns that were raised in the past regarding the causality of the PM-health effects relationship, and has provided plausible biological mechanisms for the serious impacts associated with PM exposure.

In my own research, I have found that both ozone and particulate matter air pollution are associated with increased numbers of respiratory hospital admissions in New York City, Buffalo, NY, and Toronto, Ontario, even at levels below the current standards. My results have been confirmed by other researchers considering locales elsewhere in the world (e.g., see Schwartz, 1997). Indeed, the U.S. EPA used my New York City asthma and air pollution study results in their “Staff Paper” when setting the ozone air quality standard in 1997. Furthermore, I was Principal Investigator of an NIH funded research grant that showed in an article published in the *Journal of the American Medical Association (JAMA)* that long-term exposure to particulate matter air pollution is associated with an increased risk of death from cardiopulmonary disease and lung cancer, as displayed in Figure 1 (Pope et al, 2002). In fact, the increased risk of lung cancer from air pollution in polluted U.S. cities was found in this study to be comparable to the lung cancer risk to a non-smoker from living with a smoker. Thus, the health benefits to the U.S. public of meeting these new air quality standards by reducing ozone and particulate matter will be substantial.

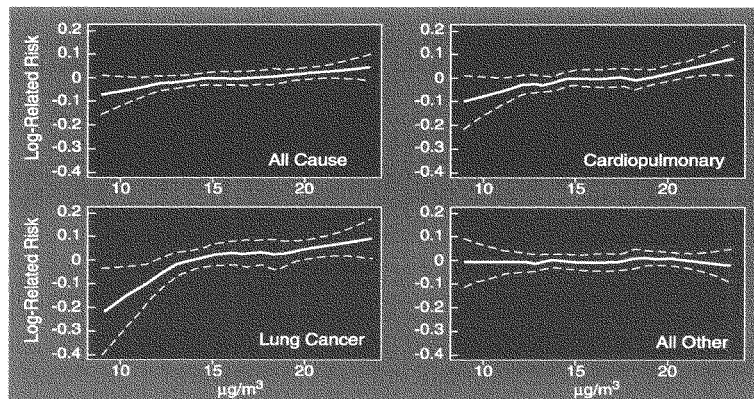


Figure 1. Lower PM_{2.5} Levels Are Associated with Lower Mortality

Source: Pope, Burnett, Thun, Calle, Krewski, Ito, and Thurston. (*Journal of the American Medical Association, JAMA*, 2002)

But air pollution affects a much broader spectrum of human health than mortality. In 1997, in order to give the Congress some insight into the large numbers of adverse health effects that could be avoided by meeting the new air quality standards, I made working estimates of some of the other documented adverse health impacts of ozone exposure that will also be reduced in New York City when the proposed new ozone standard is fully implemented. The results of my analysis, which were included in the Senate hearing records at the time, are presented in Figure

1 below, entitled the "Pyramid of Annual New York City Adverse Impacts of Ozone Avoided by the Implementation of the Proposed New Standard".

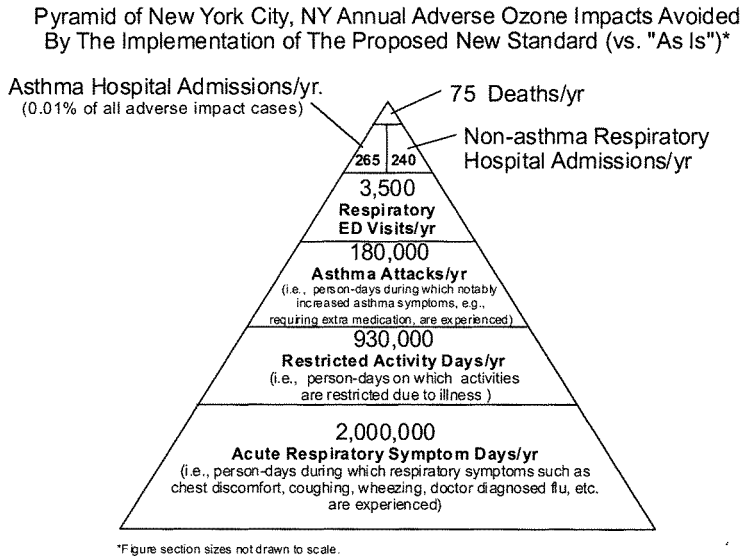


Figure 2. Pyramid of Adverse Effects Associated with Meeting the Ozone Standard in New York City (G. Thurston, 1997).

While there are about 7 million persons in New York City, there are many more millions of persons throughout the U.S. who now live in areas exceeding the new O₃ and particulate matter standards, and will therefore also benefit from the rapid implementation of these air quality standards. Thus, these New York City effects are best viewed as an indicator of a much broader spectrum of the avoidable adverse health effects being experienced by the Nation today as a result of ongoing air pollution exposures.

Unfortunately, despite the fact that the new, more health protective ozone and particulate matters were set nearly 7 years ago, we have not made progress toward meeting those standards. As shown in Figure 3 below, ozone levels have been flat over the last decade, even rising slightly in the last 10 years, with a majority of U.S. air quality areas in non-compliance with the new ozone air quality standard. Among the worst areas, in terms of change over the last two decades is EPA's Midwest Region 5, including Ohio. We need to rapidly bring polluted areas into compliance with the new air quality standards if we are to adequately protect the U.S. public's health.

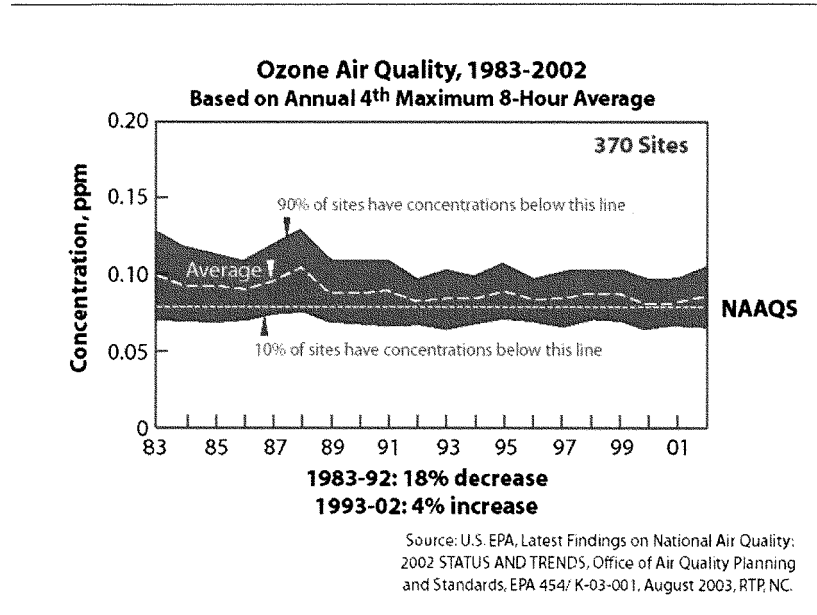


Figure 3. Progress on U.S. Ozone Air Quality Has Stalled

Similarly, as shown in Figure 4, while there was historical progress in reducing fine particle levels as a result of the states' command and control regulations and the U.S. EPA's SO₂ emissions trading/cap programs, this progress has slowed significantly since 1995. As noted in the figure, the areas of the country where regional particulate matter levels are worst are: the Midwest, the Southeast, and in California. The problems in California can be expected to improve in future years as low sulfur fuels and diesel controls are implemented, but the problems in the Eastern U.S. will not significantly improve until SO₂ and NO_x emissions from the unregulated coal-fired power plants are controlled.

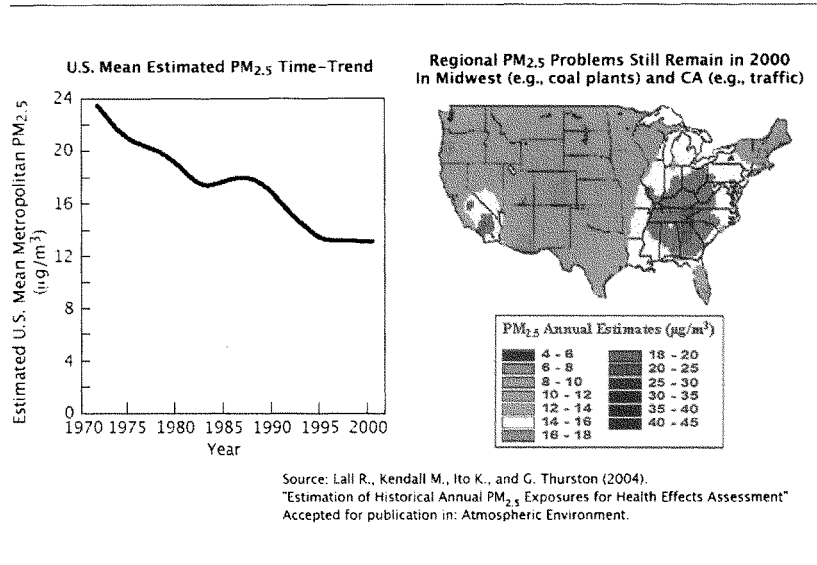


Figure 4. Progress on U.S. PM_{2.5} Levels Have Slowed Since 1995

Thus, it is important for committee members to realize that the downside to any further delay in controlling these pollutants is that these pollutants' adverse health effects will continue to occur unabated.

Therefore, we must move forward in a vigorous fashion to achieve the new PM_{2.5} and ozone standards throughout the Nation as quickly as possible. If we don't, then the U.S. public will unnecessarily continue to bear the ongoing diminished quality of life and the health care costs we presently pay because of the adverse health effects of these air pollutants.

Thank you for the opportunity to testify on this important issue.

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STATEMENT OF THE OFFICE OF RESEARCH AND DEVELOPMENT, NATIONAL RISK MANAGEMENT RESEARCH LABORATORY, U.S. ENVIRONMENTAL PROTECTION AGENCY, AIR POLLUTION PREVENTION AND CONTROL DIVISION, RESEARCH TRIANGLE PARK, NC

CONTROL OF MERCURY EMISSIONS FROM COAL-FIRED ELECTRIC UTILITY BOILERS

INTRODUCTION

During combustion, the mercury (Hg) in coal is volatilized and converted to elemental mercury (Hg^0) vapor in the high temperature regions of coal-fired boilers. As the flue gas is cooled, a series of complex reactions begin to convert Hg^0 to ionic mercury (Hg^{2+}) compounds and/or Hg compounds (Hg_p) that are in a solid-phase at flue gas cleaning temperatures or Hg that is adsorbed onto the surface of other particles. The presence of chlorine gas-phase equilibrium favors the formation of mercuric chloride (HgCl_2) at flue gas cleaning temperatures. However, Hg^0 oxidation reactions are kinetically limited and, as a result, Hg enters the flue gas cleaning device(s) as a mixture of Hg^0 , Hg^{2+} , and Hg_p . This partitioning of Hg into Hg^0 , Hg^{2+} , and Hg_p is known as mercury speciation, which can have considerable influence on selection of mercury control approaches. In general, the majority of gaseous mercury in bituminous coal-fired boilers is Hg^{2+} . On the other hand, the majority of gaseous mercury in sub-bituminous- and lignite-fired boilers is Hg^0 .

Control of mercury emissions from coal-fired boilers is currently achieved via existing controls used to remove particulate matter (PM), sulfur dioxide (SO_2), and nitrogen oxides (NO_x). This includes capture of Hg_p in PM control equipment and soluble Hg^{2+} compounds in wet flue gas desulfurization (FGD) systems. Available data also reflect that use of selective catalytic reduction (SCR) NO_x control enhances oxidation of Hg^0 in flue gas and results in increased mercury removal in wet FGD.

Table 1 shows the average reduction in total mercury (Hg_T) emissions developed from EPA's Information Collection Request (ICR) data on U.S. coal-fired boilers. Plants that employ only PM controls experienced average Hg_T emission reductions ranging from 0 to 90 percent. Units with fabric filters (FFs) obtained the highest average levels of control. Decreasing average levels of control were generally observed for units equipped with a cold-side electrostatic precipitator (CS-ESP), hot-side ESP (HS-ESP), and particle scrubber (PS). For units equipped with dry scrubbers, the average Hg_T emission reductions ranged from 0 to 98 percent. The estimated average reductions for wet flue gas desulfurization (FGD) scrubbers were similar and ranged from 0 to 98 percent.

As seen in Table 1, in general, the amount of Hg captured by a given control technology is greater for bituminous coal than for either sub-bituminous coal or lignite. For example, the average capture of Hg in plants equipped with a CS-ESP is 36 percent for bituminous coal, 3 percent for sub-bituminous coal, and 0 percent for lignite. Based on ICR data, it is estimated that existing controls remove about 36 percent of the 75 tons of mercury input with coal in U.S. coal-fired boilers. This results in current emissions of 48 tons of mercury.

There are two broad approaches to mercury control: (1) activated carbon injection (ACI), and (2) multipollutant control, in which Hg capture is enhanced in existing/new SO_2 , NO_x , and PM control devices. Relative to these two approaches, this paper describes currently available data, limitations, estimated potential, and Research Development and Demonstration (RD&D) needs. Depending on levels appropriated by Congress, EPA may not be able to continue its review of mercury removal technologies in fiscal year 2004.

Table 1.—Average mercury capture by existing post-combustion control configurations used for PC-fired boilers

Post-combustion Control Strategy	Post-combustion Emission Control Device Configuration	Average Mercury Capture by Control Configuration		
		Coal Burned in Pulverized-coal-fired Boiler Unit		
		Bituminous Coal	Subbituminous Coal	Lignite
PM Control Only	CS-ESP	36 percent	3 percent	0 percent
	HS-ESP	9 percent	6 percent	not tested
	FF	90 percent	72 percent	not tested
	PS	not tested	9 percent	not tested
PM Control and Spray Dryer Adsorber.	SDA+CS-ESP	Not tested	35 percent	Not tested
	SDA+FF	98 percent	24 percent	0 percent
	SDA+FF+SCR	98 percent	Not tested	Not tested

Table 1.—Average mercury capture by existing post-combustion control configurations used for PC-fired boilers—Continued

Post-combustion Control Strategy	Post-combustion Emmission Control Device Configuration	Average Mercury Capture by Control Configuration		
		Coal Burned in Pulverized-coal-fired Boiler Unit		
		Bituminous Coal	Subbituminous Coal	Lignite
PM Control and Wet FGD System ^(a) .	PS+FGD	12 percent	0 percent	33 percent
	CS-ESP+FGD	75 percent	29 percent	44 percent
	HS-ESP+FGD	49 percent	29 percent	Not tested
	FF+FGD	98 percent	Not tested	Not tested

(a) Estimated capture across both control devices.
 CS-ESP = cold-side electrostatic precipitator.
 HS-ESP = hot-side electrostatic precipitator.
 FF = fabric filter.
 PS = particle scrubber.
 SDA = spray dryer absorber system.

STATE-OF-THE-ART OF CONTROLLING MERCURY EMISSIONS BY ACTIVATED CARBON INJECTION

ACI has the potential to achieve moderate to high levels of Hg control. The performance of an activated carbon is related to its physical and chemical characteristics. Generally, the physical properties of interest are surface area, pore size distribution, and particle size distribution. The capacity for Hg capture generally increases with increasing surface area and pore volume. The ability of Hg and other sorbates to penetrate into the interior of a particle is related to pore size distribution. The pores of the carbon sorbent must be large enough to provide free access to internal surface area by Hg⁰ and Hg²⁺ while avoiding excessive blockage by previously adsorbed reactants. As particle sizes decrease, access to the internal surface area of particle increases along with potential adsorption rates.

Carbon sorbent capacity is dependent on temperature, the concentration of Hg in the flue gas, the flue gas composition, and other factors. In general, the capacity for adsorbing Hg²⁺ will be different than that for Hg⁰. The selection of a carbon for a given application would take into consideration the total concentration of Hg, the relative amounts of Hg⁰ and Hg²⁺, the flue gas composition, and the method of capture [electrostatic precipitator (ESP), FF, or dry FGD scrubber].

ACI may be used either in conjunction with existing control technologies and/or with additional control such as the addition of an FF. To date ACI has only been evaluated during short-term tests on commercially operating electrical generating plants. Longer-term tests of ACI have been limited to continuous operation, 24 hr/day-7days/week, for a period of less than 2 weeks at four field test sites. Also, combustion modification, such as coal reburning technology, may increase the carbon in fly ash and yield enhanced Hg capture in PM control devices.

The Department of Energy/National Energy Technology Laboratory (DOE/NETL), the Electric Power Research Institute (EPRI) and a group of utility companies have funded projects to evaluate the use of ACI as summarized in Table 2. The Hg removal via ACI is measured between the inlet and outlet of the particulate matter control device. Note that these projects represent ACI applications that can be used to control Hg emissions from units that (1) are currently equipped with an ESP, and (2) burning bituminous or sub-bituminous coals. The tests at Alabama's Gaston Plant show the potential Hg control levels that can be achieved by installing a compact hybrid particulate collector (COHPAC) or small pulse-jet FF downstream of an existing ESP and injecting activated carbon upstream of the COHPAC unit.

Table 2.—ACI Field Test Projects

Test Site Information			Mercury Capture, Percent		
Test Site	Coal	Particulate Control	Baseline	ACI Test Results	Long-term Test Duration
PG&E NEG Brayton Point, Unit 1	Low-sulfur Bituminous.	Two CS-ESPs in Series.	90.8	94.5	ACI for two 5-day periods
PG&E NEG Salem Harbor, Unit 1	Low-sulfur Bituminous.	CS-ESP	90	94	ACI for one 4-day period
Wisconsin Electric Pleasant Prairie, Unit 2.	Subbituminous	CS-ESP	5	65	ACI for one 5-day period

Table 2.—ACI Field Test Projects—Continued

Test Site Information			Mercury Capture, Percent		
Test Site	Coal	Particulate Control	Baseline	ACI Test Results	Long-term Test Duration
Alabama Power Gaston, Unit 3	Low-sulfur Bituminous.	HS-ESP+COHPAC ..	0	25–90	ACI for one 9-day period
University of Illinois, Abbott Station.	High-sulfur Bituminous.	CS-ESP	0	73	

A mobile sorbent injection system and a mobile test laboratory were constructed for use at all test sites except Abbott. Norit lignite-based carbon, Darco-FGD, was used as the benchmark sorbent at all test sites. Tests at the sites generally included:

- the use of Apogee Scientific semi-continuous emission monitors (S-CEMs) for measurement of Hg^0 and total vapor-phase Hg (Hg_v);
- periodic measurements of Hg_p , Hg^{2+} and Hg^0 with the Ontario-hydro (OH) method;
- laboratory and slipstream sorbent screening tests;
- baseline tests without the use of sorbents;
- parametric tests to evaluate the effects of process conditions and sorbent variables; and
- 4- to 9-day tests with Darco-FGD.

The purpose of tests at each site was to determine the performance and costs of activated carbon sorbents for controlling Hg emission from coal-fired electrical generating plants equipped only with an ESP. The field tests are summarized below.

Brayton Point

ACI testing was conducted on the 245-MW Unit 1, which fired a low-sulfur bituminous coal with 0.03 ppm Hg and 2000–4000 ppm chlorine. The unit is equipped with low- NO_x burners and typically has high levels of unburned carbon (UBC) in the fly ash as indicated by loss on ignition (LOI) measurements. The PM control system at the unit is unusual in that it consists of two CS-ESPs in series and long duct runs. Carbon was injected between the ESPs.

The average baseline removal efficiency across both ESPs averaged 90.8 percent, as measured during three tests with the OH method. During parametric tests, a variety of activated carbons, including Darco-FGD, were injected just downstream of the first ESP. Incremental Hg removal efficiencies across the second ESP ranged from 3 to 93 percent depending on the carbon injection concentration. Total average Hg removal efficiencies across both ESPs as determined by the S-CEMs averaged 94.5 percent during injection of Darco-FGD at 10 lb/MMacf.

Longer-term performance tests involved the continuous injection of Darco-FGD 24 hours/day for 10 days at two different injection concentrations. Five days of injection at 10 $\mu g/dncm$ was followed by 5 days of injection at 20 $\mu g/dncm$. The average removal efficiency across both ESPs during ACI concentrations of 10 lb/MMacf was 94.5 percent as measured during 3 OH method tests. These high Hg capture efficiencies are considered to be atypical of other CS-ESP units because of the high UBC concentrations, the two ESPs, and the long duct runs.

Salem Harbor

Tests were conducted on Unit 1, an 88 MW single wall-fired unit which is equipped with low- NO_x burners, a selective noncatalytic reduction (SNCR) system for NO_x control and a CS-ESP. Salem Harbor fires a South American low-sulfur bituminous coal with 0.03–0.08 ppm Hg and 206 ppm chlorine. The resulting fly ash had an LOI of 20 to 30 percent.

Parametric tests at reduced loads that lowered fly ash LOI to 15 to 20 percent did not significantly reduce Hg capture. Increasing the ESP inlet temperature from 300° F to 350° F reduced Hg removal from approximately 90 percent to the 10–20 percent range. The effects of changes in LOI over test range of 15 to 30 percent were not as strong as the effects of temperature changes.

During November 2002, 4 days of long-term sorbent injection tests were conducted with Darco-FGD at an injection concentration of 10 lb/MMacf. The average Hg capture efficiency during 3 OH tests was 94.0 percent. The Hg^0 concentrations for all inlet and outlet samples were below the method detection limit. More than 95 percent of the total inlet Hg was measured as Hg_p , indicating nearly complete in-flight capture of Hg upstream of the ESP. The very high in-flight Hg capture by the UBC

in fly ash and injected activated carbon are not believed to be representative of plants equipped with a CS-ESP.

Pleasant Prairie

ACI testing was conducted on the 600-MW Unit 2, which fired a PRB coal with 0.11 ppm Hg and 8 ppm chlorine. The unit is equipped with an ESP. Testing was conducted on one ESP chamber ($\frac{1}{4}$ of the unit). The plant sells its fly ash for use in concrete.

Baseline tests using the OH method exhibited Hg capture in the ESP of about 5 percent with more than 70 percent of the Hg at the ESP inlet being Hg⁰. Major parametric test variables included sorbent properties and sorbent injection concentration. At low ACI concentrations, Hg reductions across the ESP were higher than expected, reaching 60 to 65 percent at injection concentrations near 10 lb/MMacf. Increasing sorbent injection concentrations to 20 to 30 lb/MMacf increased Hg reduction efficiencies to only about 70 percent. Subsequently, in long-term tests carbon was injected continuously at 24 h/day for 5 days. OH measurements confirmed that about 60–70 percent mercury removal could be achieved at a carbon injection concentration of 10 lb/MMacf.

Gaston

ACI testing was conducted on the 270-MW Unit 3, which fired low-sulfur eastern bituminous coals with 0.14 ppm Hg and 160 ppm chlorine. The unit is equipped with low-NOx burners, a HS-ESP and a COHPAC, which was retrofit earlier to capture residual fly ash escaping the ESP. Testing was conducted on one-half of the flue gas stream.

Baseline test results showed that neither the HS-ESP nor COHPAC captured a significant amount of Hg. During ACI parametric tests, Hg capture efficiencies ranged from 25 to more than 90 percent, depending on the carbon injection rate. ACI concentrations of 3 lb/MMacf resulted in gas-phase Hg reductions greater than 90 percent across the COHPAC. However, it was determined that ACI resulted in a significant increase in COHPAC cleaning frequency. The different activated carbons used in the parametric tests produced Hg capture efficiencies similar to Darco-FGD, the benchmark sorbent. Differences in sorbent particle size or base material (bituminous coal or lignite) did not result in appreciable performance differences. Subsequently, in long-term tests, carbon was injected continuously at 24 h/day for 9 days. The COHPAC cleaning frequency and ACI rate was kept at a reduced level to avoid adverse impacts on COHPAC bag life. Relatively short duration OH measurements reflected about 90 percent removal of mercury, but measurements taken with S-CEMS reflected about 78 percent removal over the period of the long-term testing.

Abbott

In the summer of 2001, EPRI sponsored ACI tests at the Abbott Power Plant located in Champaign, Illinois. Unit 5, the test unit, is a stoker-fired unit followed by air heater and a CS-ESP. During the tests, Unit 5 burned an Illinois Basin coal with nominal sulfur and chlorine contents of 3.8 and 0.25 percent, respectively. Activated carbons used during the parametric tests included Darco FGD, fine FGD (size segregated Darco FGD), and an experimental Corn Char sorbent.

During the parametric tests ACI concentrations were varied from 5.1 to 20.5 lb/MMacf. The ESP inlet temperatures ranged from 340°F to 390°F. The performance of Darco FGD and the corn char sorbents were similar, showing increases in Hg capture proportional to the ACI concentration. The fine FGD sorbent exhibited improved performance relative to the standard FGD. The best performance, 73 percent Hg capture, was achieved by injection of fine FGD at 13.8 lb/MMacf at an ESP inlet temperature of 341°F. The high sulfur flue gas appeared to impair the performance of the activated carbon. This is consistent with bench-scale research that shows that high SO₂ concentrations diminished the adsorption capacity of activated carbons.

Recently, EPA has estimated cost for ACI-based controls.¹ These estimates range from 0.03–3.096 mills/kWh. However, the higher costs are usually associated with the plant configuration utilizing SDA+CS-ESP or HS-ESPs. Excluding the costs associated with the plant configurations involving SDA+ESP or HS-ESP, cost estimates are from 0.03 to 1.903 mills/kWh. At the low end of this cost range, 0.03

¹ Performance and Cost of Mercury and Multipollutant Emission Control Technology Applications on Electric Utility Boilers, EPA/600/R-03/110, October 2003, United States Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Research Triangle Park, NC.

mills/kWh, it is assumed that no additional control technologies are needed, but mercury monitoring will be necessary.

RD&D Needs for Sorbent Injection Systems

In order to enhance the cost effective capture of Hg by ACI, and other sorbent injection systems, for the important coal type/retrofit control combinations, the following RD&D efforts are needed.

- Research efforts on Hg speciation and capture should be continued. These efforts will include bench- and pilot-scale investigations on the effects of flue gas composition, fly ash properties (UBC content and catalytic metal content), flue gas quench rates, and other important parameters. Speciation and capture computer models must be developed to evaluate field test results and for application to other utility sites.

- Development and demonstration of low-cost sorbents, impregnated sorbents and innovative sorbents that are effective in controlling Hg emissions from sub-bituminous coal and lignite should continue. High temperature sorbents for use with HS-ESPs also should be investigated.

- Development and demonstration of techniques to improve Hg capture in units equipped with an ESP, SDA/ESP or SDA/FF and burn sub-bituminous coal and lignite is needed. This will include evaluation of coal blending, combustion modifications, use of oxidizing reagents, and use of impregnated sorbents.

- Evaluation and demonstration of cost-effective ESP retrofit approaches including installation of ducting to increase residence times and use of circulating fluidized bed absorbers for optimal utilization of sorbents should be conducted. The use of multipollutant sorbents that capture SO₂ and Hg should also be investigated.

- Determination and demonstration of optimum design and operating conditions for COHPAC applications on a range of boiler operating conditions is needed. This will include evaluation of the effects of air-to-cloth ratios, fabric filter material, cleaning frequencies, and baghouse arrangements on Hg capture. COHPAC-based tests should be conducted with both mercury and multipollutant sorbents.

- Continued evaluation of potential leaching or re-emission of mercury from sorbent/ash residues that are disposed of or utilized is needed.

MERCURY CONTROL BY ENHANCING THE CAPABILITY OF EXISTING/NEW SO₂/NO_x CONTROLS

Implementation of fine PM standards, EPA's Interstate Air Quality Rule, Utility MACT rulemaking to control mercury emissions from utility boilers, the Clear Skies legislation and other multi-pollutant reduction bills in the Congress are focusing on future reductions of NO_x, SO₂, and mercury emissions from power plants. Also, a significant fraction of existing boiler capacity already has wet or dry scrubbers for SO₂ control and/or SCR for NO_x control. As such, multipollutant control approaches capable of providing SO₂/NO_x/Hg reductions are of great interest. These approaches and their potential impact on mercury reductions are discussed below.

Multipollutant Removal in Wet FGD

More than 20 percent of coal-fired utility boiler capacity in the United States uses wet FGD systems to control SO₂ emissions. In such systems, a PM control device is installed upstream of the wet FGD scrubber. Wet FGD systems remove gaseous SO₂ from flue gas by absorption. For SO₂ absorption, gaseous SO₂ is contacted with a caustic slurry, typically water and limestone or water and lime.

Gaseous compounds of Hg²⁺ are generally water-soluble and can absorb in the aqueous slurry of a wet FGD system. However, gaseous Hg⁰ is insoluble in water and therefore does not absorb in such slurries. When gaseous compounds of Hg²⁺ are absorbed in the liquid slurry of a wet FGD system, the dissolved species are believed to react with dissolved sulfides from the flue gas, such as H₂S, to form mercuric sulfide (HgS); the HgS precipitates from the liquid solution as sludge.

The capture of Hg in units equipped with wet FGD scrubbers is dependent on the relative amount of Hg²⁺ in the inlet flue gas and on the PM control technology used. ICR data reflected that average Hg captures ranged from 29 percent for one PC-fired ESP plus FGD unit burning sub-bituminous coal to 98 percent in a PC-fired FF plus FGD unit burning bituminous coal. The high Hg capture in the FF plus FGD unit was attributed to increased oxidization and capture of Hg in the FF followed by capture of any remaining Hg²⁺ in the wet scrubber.

RD&D Needs for Wet FGD Systems to Enhance Mercury Capture

- Achieving high Hg removal efficiencies in a wet scrubber depends on mercury in the flue gas being present in the soluble Hg²⁺ form. While the majority of mercury in bituminous coal-fired boilers exists as Hg²⁺, the fraction available as Hg²⁺

varies. Further, as discussed above, flue gases from sub-bituminous and lignite coal-fired boilers predominantly contain Hg^0 , which is insoluble. Therefore, to ensure high levels of mercury capture in wet scrubbers in a broad range of applications, process means for oxidizing Hg^0 in coal combustion flue gas are needed. RD&D efforts should be conducted with the objective of making available oxidizing catalysts and reagents by 2015. Also, RD&D efforts should be undertaken to examine coal blending as a means to increase oxidized mercury content in flue gas.

- Scrubber design and operating conditions may require modification to optimize Hg dissolution in the scrubber liquor. Therefore, optimization research should be undertaken at pilot-scale and then demonstrated at full-scale.

- It has been noted that in some scrubbers, dissolved Hg^{2+} is reduced to Hg^0 , which can be stripped from the scrubbing liquor and entrained in the stack gas. RD&D efforts should be conducted in this area with additives developed in bench- and pilot-scale testing and demonstrated at full-scale.

- Since a significant portion of the absorbed Hg may end up in the spent scrubber liquor in the form of dissolved aqueous-phase Hg^{2+} , RD&D should be conducted to develop Hg removal techniques from wastewater.

- RD&D efforts should be conducted to make available multipollutant scrubbers capable of removing SO_2 , Hg, and NOx, from flue gases of coal-fired boilers. Research conducted in the 1970's through 90's has investigated removal of NOx in wet scrubbers. Since use of wet scrubbers at power plants is expected to increase in the near future in response to regulatory requirements, it is very desirable to develop wet scrubber-based technologies capable of providing simultaneous SO_2 -Hg-NOx, control. Such technologies would not only make wet scrubbers more cost-effective, but would avoid the need for installing additional control equipment, especially at constrained plant layouts.

- Full-scale demonstrations should be conducted to achieve high levels of mercury control using ACI with wet FGD, with or without additional oxidizing agents. This is especially relevant to sub-bituminous- and lignite-fired boilers.

Multipollutant Removal in Dry Scrubbers

More than 10 percent of the U.S. coal-fired utility boiler capacity uses spray dryer absorber (SDA) systems to control SO_2 emissions. An SDA system operates by the same principle as a wet FGD system using a lime scrubbing agent, except that the flue gas is mixed with a fine mist of lime slurry instead of a bulk liquid (as in wet scrubbing). The SO_2 is absorbed in the slurry and reacts with the hydrated lime reagent to form solid calcium sulfite and calcium sulfate. Hg^{2+} may also be absorbed. Sorbent particles containing SO_2 and Hg are captured in the downstream PM control device (either an ESP or FF). If the PM control device is a FF, there is the potential for additional capture of gaseous Hg^0 as the flue gas passes through the bag filter cake composed of fly ash and dried slurry particles.

ICR data reflected that units equipped with SDA scrubbers (SDA/ESP or SDA/FF systems) exhibited average Hg captures ranging from 98 percent for units burning bituminous coals to 24 percent for units burning sub-bituminous coal.

RD&D Needs for Dry Systems to Enhance Mercury Capture

- SDA is considered to be quite effective in removing Hg^{2+} from flue gases. Full-scale demonstrations of SDA and ACI should be conducted to achieve high levels of SO_2 and mercury controls on sub-bituminous and lignite-fired boilers. These demonstrations should include both ESP and FF PM controls.

- Circulating fluidized bed absorber technology appears promising to provide high levels of SO_2 and Hg control. Recent applications of this technology reflect SO_2 control in excess of 90 percent. As for mercury control, limited pilot-scale experience has shown high mercury removal rates. This technology, with or without ACI, should be demonstrated for mercury control in several full-scale tests using a range of coals.

Multipollutant Removal Via SCR and Wet FGD

As mentioned above, the speciation of mercury is known to have a significant impact on the ability of air pollution control equipment to capture it. In particular, the oxidized form of mercury, mercuric chloride (HgCl_2), is highly water-soluble and is, therefore, easier to capture in wet FGD systems than Hg^0 which is not water-soluble. SCR catalysts can act to oxidize a significant portion of the Hg^0 , thereby enhancing the capture of mercury in downstream wet FGD.

Several studies have suggested that oxidation of elemental mercury by SCR catalyst may be affected by the following:

- The space velocity of the catalyst;
- The temperature of the reaction;
- The concentration of ammonia;

- The age of the catalyst; and
- The concentration of chlorine in the gas stream.

DOE, EPRI, and EPA have co-sponsored a field test program that evaluated mercury oxidation across full-scale utility boiler SCR systems. Testing was performed at four coal-fired electric utility plants having catalyst age ranging from around 2500 hours to about 8000 hours. One plant fired sub-bituminous coal and three other plants fired Eastern bituminous coal. The test results showed high levels of mercury oxidation in two of the three plants firing eastern bituminous coal and insignificant oxidation at the other two plants (one firing bituminous coal and the other, sub-bituminous). For the bituminous coal-fired plant with low mercury oxidation, over 50 percent of the mercury at the SCR inlet was already in the oxidized form. It is also noted that the SCR system at this plant was operated with significantly higher space velocity (3930 hr^{-1}) than those of the other plants ($1800\text{--}2275 \text{ hr}^{-1}$). Finally, ammonia appeared to have little or no effect on mercury oxidation.

The two bituminous coal-fired plants at which high levels of mercury oxidation across SCRs was observed were retested in the following year (2002). Again, similar high levels of oxidation were observed. Two additional plants firing bituminous coals were also tested in 2002. Results of the tests showed high levels of mercury oxidation, similar to the two plants tested previously. Currently, a DOE-sponsored field test program is further evaluating the potential effect of SCRs and FGDs on mercury removal.

RD&D Needs for SCR and Wet FGD Systems to Enhance Mercury Capture

- Aging of SCR catalyst with regard to mercury oxidation should be examined in bench-, pilot-, and field tests.
- SCR impact on mercury oxidation should be examined for sub-bituminous and lignite-coal-fired boilers and boilers firing coal blends. These impacts should be evaluated on pilot- and field-scales.
- Bench- and pilot-scale research on understanding the science behind SCR-Hg interactions should be continued. This research has the potential to provide valuable information for optimizing SCR catalysts for combined NO_x and mercury control.

POTENTIAL IMPACT OF COAL USE AND AVAILABILITY OF NO_x/SO₂ CONTROLS ON MERCURY CONTROL

In general, the extent to which mercury control approaches discussed above may be utilized in the future would depend on the extent to which coal would be used in U.S. power plants and the availability of existing/new NO_x/SO₂ emission controls in response to potential emission reduction requirements.

Figures 1 and 2 depict projected United States coal consumption and production trends for the United States, respectively. It is evident from Figure 1 that the majority of coal consumed in the U.S. is by the electric power generation sector and that this consumption rate is expected to increase in the future. Figure 2 reflects that the amount of low-sulfur coals (e.g., sub-bituminous coals) produced has been significant and this production is expected to increase in the future. Based on these data, it can be deduced that consumption of low-sulfur coals in the power generation sector is expected to increase in the future. As discussed above, control of mercury emissions from boilers firing low-rank (sub-bituminous and lignite) coals is more difficult than from boilers firing bituminous coals. Considering the projected increase in use of low-sulfur (i.e., low-rank) coals, it is important that cost-effective approaches for controlling mercury emissions from boilers firing such coals be developed via focused RD&D efforts.

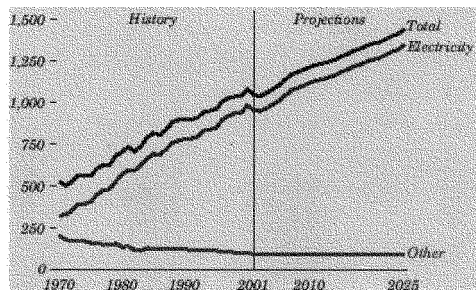


Figure 1. Electricity and other coal consumption (million short tons).²

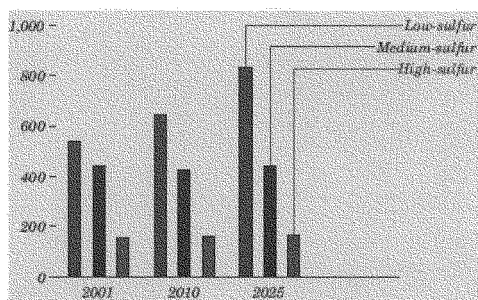


Figure 2. Projected coal production (million short tons) by sulfur content.²

The trends in coal-fired capacity equipped with SCR and scrubbers based on EPA's analysis of Clear Skies Act are shown in Figures 3 and 4, respectively. It is clear from these figures that current and future NO_x and SO₂ emission reduction requirements are expected to result in large capacities (about 100 GW each) of SCR and scrubber systems for coal-fired utility boilers, as early as 2005. Further, these capacities are expected to increase at steady and significant rates. These projections underscore the need to engage in focused RD&D efforts to determine cost-effective means for optimizing/tweaking these NO_x/SO₂ controls to achieve mercury control as a co-benefit with small incremental costs.

²Source: Annual Energy Outlook 2003 with Projections to 2025, DOE/EIA-0383(2003), Energy Information Administration, Office of Integrated Analysis and Forecasting, U.S. Department of Energy, Washington, DC 20585, January 2003.

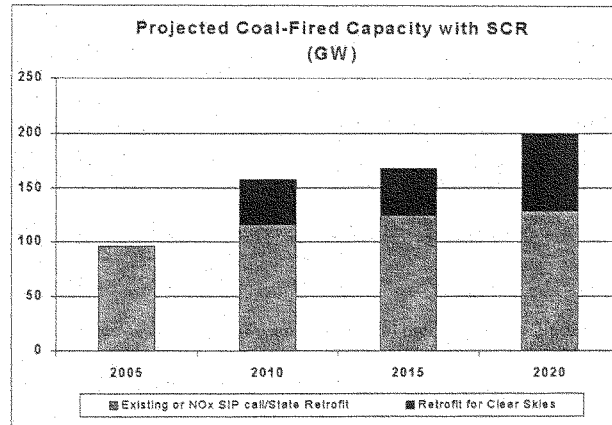


Figure 3. Projected capacity of SCR applications on U.S. coal-fired utility boilers.³

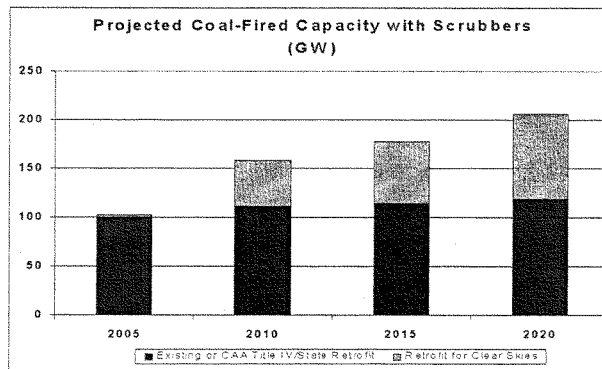


Figure 4. Projected capacity of scrubber applications on U.S. coal-fired utility boilers.³

SUMMARY AND CONCLUSIONS

Although the potential Hg emissions are calculated to be 75 tons per year based on the Hg content in coal, the actual current emissions are estimated to be 48 tons per year due to Hg capture with pollution controls for PM and SO₂. The reduction at any individual plant ranges from 0 to 98 percent dependent on coal type, control technology type, and other unquantified factors.

A very limited set of short term full-scale trials of activated carbon injection have been carried out as described earlier in this white paper. These trials do not cover a representative range of control technology/fuel combination that would be required to demonstrate the widely achievable levels of Hg control that might be achieved in a cost-effective manner. Furthermore, they represent short-term (4–9 day) continuous operation and do not address all of the operational issues and residue impacts that may be associated with commercial operation. Therefore, these technologies are not currently commercially proven to consistently achieve high levels of Hg control on a long-term basis.

³ Source: "2003 Technical Support Package for Clear Skies: Section D: 2003 projected impacts on generation and fuel use," available at <http://www.epa.gov/air/clearskies/technical.html>.

These data provide a basis for hypothesizing the levels of Hg reductions that might be achievable using technology specifically for Hg control alone or enhanced capture in existing or new systems for control of SO₂ and NO_x. These estimates contained in Table 3 are based on best engineering judgment and the assumption that a focused RD&D program is carried out in an effective and expeditious manner.

Key observations are as follows:

1. The data base clearly indicates that Hg emission controls for low-rank (sub-bituminous and lignite) coal-fired boilers are more difficult than for bituminous-fired boilers. Further, a significant amount of low-rank coal is currently being used by the electric utility industry, and this use is expected to increase in the future. Accordingly, it is important to engage in focused RD&D efforts aimed at developing emission controls for low-rank coal-fired boilers.

2. Assuming sufficient development and demonstrations are carried out, by 2010, ACI with an ESP has the potential to achieve 70 percent Hg control. ACI with an ESP and a retrofit fabric filter, or a fabric filter alone, has the potential to achieve 90 percent Hg reduction. Proper design and consideration of operational and residue impacts need to be incorporated into the effort.

3. Projections reflect that current and future NO_x and SO₂ emission reduction requirements are expected to result in large capacities (over 100 GW each) of SCR and scrubber systems for coal-fired utility boilers, as early as 2005. Further, these capacities are expected to increase at steady and significant rates. Ongoing R&D has the potential to provide the basis for enhanced Hg removal in retrofitted system by 2010. Assuming sufficient research development and demonstration of representative technologies, by 2015 new and existing systems installed to control NO_x and SO₂ (e.g., SCR+FGD+FF) have the potential to achieve 90 to 95 percent control of Hg. Subbituminous and lignite systems may require Hg oxidation technology and/or additional advanced sorbents to achieve these levels. The longer timeframe for these systems is driven by the fact that more R&D is required to optimize Hg control approaches before demonstrations are conducted.

4. Cost estimates fall in a wide range. It is projected that the Hg removal capabilities projected in Table 3 would add no more than about 3 mills/kWh to the annualized cost of power production. Control by an enhancing/optimizing FGD and SCR has the potential to reduce such costs substantially, since optimized systems may require little additional investment and/or operational costs, especially for bituminous coals.

5. The projected performance in Table 3 represents the date by which the demonstration of the most difficult case (e.g., lignite) for the particular technology would be completed. The demonstrations of the technology for easier situations (e.g., high-chlorine bituminous coal) could be completed somewhat earlier. It is important to note that completion of such demonstrations would represent only the potential initiation of the retrofit program which would take a number of years to fully implement, assuming of course, both successful demonstrations and a regulatory driving force. The time it would take to fully deploy such technologies would depend on a number of factors, including the specifics of the regulatory mandates, available vendor capability to meet the hardware demand, and the time for design and construction of the specific retrofit technologies selected.

Based on our experience with coal-fired utility boiler retrofit technologies, we estimate that once a utility has signed a contract with a vendor, installation on a single boiler could be accomplished in the following timeframe:

- ACI on an existing ESP or FF could be installed in approximately 1 year;
- ACI and a retrofit fabric filter (e.g., COHPAC) could be retrofitted to an existing ESP in approximately 2 years; and
- a new SCR/FGD/PM/Hg control system could be retrofitted in 3–4 years dependent on the retrofit difficulty.
- existing SCR or FGD to enhance Hg control could be retrofitted in about 1 year

6. Table 3 also reflects the existing capacities associated with key coal type/control technology combinations. These capacities, with the exception of CS-ESP + retrofit FF and PM + dry FGD, are significant, thereby underscoring the fact that development of mercury control approaches would need to take into consideration these key coal type/control technology combinations. The relatively low capacity associated with the CS-ESP + retrofit FF combination is not surprising because in the absence of mercury reduction requirements, relatively few plants have used this combination to control residual amounts of fly ash escaping their ESPs. Again the relatively low capacity associated with PM + dry FGD is a result of the present economics associated with sulfur reduction via wet or dry FGD or firing low-sulfur coal. However, as discussed above, in the presence of mercury reduction requirements, these latter combinations will offer attractive mercury control approaches.

Table 3.—RD&D goals for projected cost-effective mercury removal capability (percent) for key coal type/control technology combinations.⁴

Control Technology	Existing Capacity (MW) in 2003 ⁵	Projected Hg Removal Capability in 2010 by the Use of ACI ⁴		Projected Hg Removal Capability in 2010 by Enhanced Multipollutant Controls ⁴		Projected Hg Removal Capability in 2015 by Optimizing Multipollutant Controls ⁴	
		Bituminous (Bit.)	Low-rank coals	Bit. coals	Low-rank coals	Bit. coals	Low-rank coals
PM Control Only-CS-ESP.	153133	70 ⁶	70 ⁶	NA ⁷	NA	NA	NA
PM Control Only-CS-ESP + retrofit FF.	2591	90	90	NA	NA	NA	NA
PM Control Only-FF ..	11018	90	90	NA	NA	NA	NA
PM+ Dry FGD	8919	NA	NA	90 ⁸	60–70 ⁸	90–95 ⁸	90–95 ⁸
PM + Wet FGD	48318	NA	NA	90 ⁹	70–80 ⁹	90–95 ⁹	90–95 ⁹
PM + Wet or Dry FGD + SCR.	22586	NA	NA	90	70–80 ¹⁰	90–95 ¹⁰	90–95 ¹⁰

⁴ Based on the assumption of aggressive RD&D implementation as outlined elsewhere in this white paper.

⁵ Capacity values have been obtained from EMF controls available in "EPA's 2003 Clear Skies Act parsed file for 2010" available at <http://www.epa.gov/airmarkets/epa-ipm/results2003.html>. The capacity values have been rounded to the nearest whole number.

⁶ This control level is based on data from the Pleasant Prairie field tests.

⁷ NA = not applicable.

⁸ Assumes that additional means to ensure oxidation of Hg⁰ or innovative sorbents will be used as needed.

⁹ Assumes that means to oxidize Hg⁰ will be used as needed. Note that in some cases this may, in part, be accomplished by FF.

¹⁰ Assumes that additional means to ensure oxidation of Hg⁰ or innovative sorbents will be used as needed.

STATEMENT OF THE AMERICAN LUNG ASSOCIATION

2003 SELECTED AIR POLLUTION HEALTH STUDIES OF NOTE: OZONE AND PARTICULATE MATTER

Periodically, the American Lung Association summarizes selected studies from current research in the published literature on outdoor air pollution. These summaries are grouped below by major topic. These summaries are in no way intended to substitute for medical information from a physician, nor are they intended to represent conclusions of the American Lung Association. Citations for all studies are provided.

ADVERSE BIRTH OUTCOMES

L.A. Women Who Live Near Busy Roads Have Increased Risk of Premature Births.

Researchers at UCLA have previously reported that increases in ambient air pollution in the Los Angeles basin increase the risk of low birth weight babies and premature births. This followup study examined mothers' differential exposure to air pollutants resulting from living near roadways with heavy traffic.

Researchers examined data on low birth weight and/or pre-term birth in Los Angeles County between 1994–1996. They mapped the home locations at birth, and estimated exposure to traffic-related air pollution using a measure that takes into account residential proximity to and level of traffic on roadways surrounding homes.

The study reported a 10–20 percent increase in the risk of pre-term births and low birth weight in infants born to women potentially exposed to high levels of traffic-related air pollution. Women whose third trimester fell during the fall or winter, when atmospheric stability tends to limit dispersion of pollutants, experienced the greatest effects.

Willhelm, M., and Ritz, B. Residential Proximity to Traffic and Adverse Birth Outcomes in Los Angeles County, California, 1994–1996. *Environmental Health Perspectives*, Vol. 111, No. 2, pp. 207–216, February 2003.

Maternal Exposure to Air Pollution May Lower Birth Weight of Babies

A study in Kaohsiung, Taiwan has reported a significant exposure-response relationship between maternal exposures to sulfur dioxide and PM₁₀ during the first trimester of pregnancy and lowered birth weight. The study of 54,000 deliveries in Taiwan's second largest city correlated mothers' residences with data from air quality monitoring stations less than 2 kilometers away.

Maternal exposures were estimated for the different gestational stages of each child. Various confounders including maternal age, season, marital status, maternal education and infant gender were controlled for.

Another study on the relationship between low birth weight and air pollution exposure in Seoul, Korea found that exposure to carbon monoxide, PM₁₀, sulfur diox-

ide, and nitrogen dioxide during early to mid-pregnancy contributes to risks or low-birth weight babies.

Yang, C.Y., Tseng, Y.T., Chang, C.C. Effects of Air Pollution on Birth Weight Among Children Born Between 1995 and 1997 in Kaohsiung, Taiwan. *J Toxicol Environ Health, A*. Vol. 65, No. 9, pp. 6070816, May 9, 2003.

Lee, B.E., Ha, E.H., Park, H.S., Kim, Y.J., Hong, Y.C., Kim, H., and Lee, J.T. Exposure to Air Pollution During Different Gestational Phases Contributes to Risks of Low Birth Weight. *Human Reproduction*. Vol. 3, pp. 638–643, March 2003.

Low Concentrations of Gaseous Air Pollutants and Adverse Birth Outcomes

Recent studies in China, the Czech Republic, and the United States have related ambient air pollution to adverse pregnancy outcomes. This study examines relationships between pre-term birth, low birth weight, and intrauterine growth retardation and ambient concentrations of sulfur dioxide, nitrogen dioxide, carbon monoxide, and ozone in Vancouver, Canada, a relatively clean city.

Researchers conclude that, overall, the associations among SO₂ and low birth weight, pre-term birth, and intrauterine growth retardation “appear to be the most robust against copollutant adjustment,” but that the effects of air pollutants on birth outcomes are likely related to more than one component of the complex mix of air pollutants present in urban environments.

Siu, S., Krewski, D., Shi, Y., Chen, Y., and Burnett, R.T. Association between Gaseous Ambient Air Pollutants and Adverse Pregnancy Outcomes in Vancouver, Canada. *Environmental Health Perspectives*, Vol. 111, No. 14, pp. 1773–1778, November 2003.

EFFECTS ON INFANTS AND CHILDREN

Infants are Most Susceptible Age Group to Mortality from Air Pollution

This is the first study to determine that infants are more susceptible to mortality from air pollution than other age groups. Researchers tracked daily counts of total and respiratory death in Seoul, Korea relative to PM₁₀ and other air pollutant concentrations for three age groups: infants aged 1 month to 1-year old, those from 2-years to 64-years old, and those over 65 years of age. Newborns were not included in the study.

For all age groups, the number of total deaths and particularly respiratory deaths increased on days when PM₁₀ air pollution was the worst, but the effect was most pronounced in infants. The elderly were second in increased susceptibility.

Researchers hypothesize that:

“Infants are more vulnerable to respiratory disease leading to death from particulate air pollution, because the infant lung and immune system is immature and unable to control adequately the inflammation resulting from exposure to ambient particles.”

The researchers conclude that the results of their study have “*serious implications on the air pollution criteria, which should be based on the effects on infant health rather than on adult health.*”

Ha, E.-H., Lee, J.-T., Kim, H., Hong, Y.-C., Lee, B.-E., Park, H.-S., and Christiani, D. Infant Susceptibility of Mortality to Air Pollution in Seoul, South Korea. *Pediatrics*. Vol. 111, pp. 284–290, February 2003.

Ozone Alters Development of Trachea in Infant Rhesus Monkeys

This study examined the development of the “basement membrane zone” in the trachea of infant rhesus monkeys exposed to ozone, filtered air, and ozone plus allergen from house dust mites. In monkeys, this structure develops after birth, allowing studies of the effects of environmental exposures.

The study found significant differences, including irregular width, in the tracheal “basement membrane zone” in monkeys exposed to either ozone, or ozone plus allergens, during the developmental period. This resulted in altered regulation of proteins that may explain the atypical development of the lung observed in rhesus monkeys after exposure to ozone.

Evans, M.J., Fanucchi, M.V., Baker, G.L., Van Winkle, L.S., Pantle, L.M., Nishio, S.J., Schelegle, E.S., Gershwin, L.J., Miller, L.A., Hyde, D.M., Sannes, P.L., and Plopper, C.G. Atypical Development of the Tracheal Basement Membrane Zone of Infant Rhesus Monkeys Exposed to Ozone and Allergen. *American Journal of Physiology—Lung Cellular and Molecular Physiology*. Vol. 285, pp. 931–939, June 27, 2003.

Diesel Exposure Increases Susceptibility to RSV Infection

Researchers studied the impact of inhaled diesel engine emissions in mice, to investigate the potential mechanisms for inhaled pollutants in modulating susceptibility to respiratory infection. Prior exposure to diesel particulate pollution was shown to increase lung inflammation in response to respiratory syncytial virus (RSV), a common respiratory pathogen in young children.

The lungs of the mice were flushed, and inflammatory cells in the fluid were found to increase in a dose-dependent manner with the diesel exhaust exposure. Changes in the mucous cells increased markedly in the diesel exposed mice following RSV infection. Researchers suggest that diesel exhaust exposure “*modulates the lung host defense to respiratory viral infections and may alter the susceptibility to respiratory infections leading to increased lung disease.*”

Harrod, K.S., Jaramillo, R.J., Rosenberger, C.L., Wang, S.-Z., Berger, J.A., McDonald, J.D., and Reed, M.D. Increased Susceptibility to RSV Infection by Exposure to Inhaled Diesel Engine Emissions. *American Journal of Respiratory Cell and Molecular Biology*. Vol. 28, pp. 451–463, 2003.

Particle Pollution Worsens Asthma in School-Aged Children

A large number of epidemiologic studies have found that short-term increases in particulate matter levels can trigger lung function decrements, use of asthma medications, emergency department visits, hospital admissions, and symptoms in people with asthma. A group of researchers at the University of Washington sought to investigate the severity of asthma symptoms in relationship to air pollution. The researchers recruited a panel of 133 children with mild to moderate asthma, ages 5 to 13 years old, who were enrolled in a clinical asthma management program in Seattle. The children completed daily diary cards for an average of 58 days to indicate their medication use and asthma severity.

Researchers found that daily increases $PM_{2.5}$ and PM_{10} increased the risk of having a more severe asthma attack, and increased the use of rescue inhaler medication in the children. Specifically, a $10 \mu/m^3$ rise in $PM_{2.5}$ concentrations increased the risk of having a more serious asthma attack the next day by 20 percent.

Increases in carbon monoxide were also associated with more severe asthma attacks, but researchers believe that this pollutant is a marker for exposure to combustion byproducts.

Slaughter, J.C., Lumley, T., Sheppard, L., Koenig, J.Q. and Shapiro, G.G. Effects of Ambient Air Pollution on Symptom Severity and Medication Use in Children with Asthma. *Ann. Allergy Asthma Immunol.* Oct. 1, 2003, Vol. 91, No. 4, pp. 346–53.

Air Pollution Triggers Bronchitis in Children with Asthma

The Children’s Health Study has followed a cohort of children with asthma in 12 Southern California communities for over a decade. This study explored the role that different components of the air pollution mix can have on various symptoms of bronchitis, such as cough, congestion, and phlegm, in children with asthma. The study found that effects varied in relation to changes in yearly concentrations of air pollutants within each community. The authors found associations of bronchitic symptoms with yearly changes in $PM_{2.5}$ and organic carbon particles (from gasoline and diesel exhaust), and with gaseous nitrogen dioxide and ozone.

Researchers suggest that previous cross-sectional studies may have underestimated air pollution risks and conclude that:

“The yearly variability in bronchitic symptoms in association with changes in air pollution provides indirect evidence that even modest reductions in air pollution could result in improved respiratory health in children.”

McConnell, R., Berhane, K., Gilliland, F., Molitor, J., Thomas, D., Lurmann, F., Avol, E., Gauderman, W.J., and Peters, J.M. Prospective Study of Air Pollution and Bronchitic Symptoms in Children with Asthma. *American Journal of Respiratory and Critical Care Medicine*. Vol. 168. pp. 790–797, 2003.

Low Levels of Ozone Increase Respiratory Risk in Asthmatic Kids

Yale University researchers studied a group of 271 asthmatic children under age 12, living in Connecticut and Springfield, Massachusetts involved in a prospective study of asthma severity. The children’s mothers tracked their asthma symptoms such as wheeze, persistent cough, chest tightness, and shortness of breath, and their medication use, on a daily basis.

The study published in the *Journal of the American Medical Association*, reported that a 50 ppb increase in 1-hour ozone concentrations dramatically increased the likelihood of wheeze (by 35 percent) and chest tightness (by 47 percent). The study found that asthmatic children using maintenance medication were particularly vulnerable to ozone even after controlling for co-exposure to fine particles, and even at

pollution levels below EPA's current air quality standards for ozone. The highest levels of ozone on a 1-hour and 8-hour average basis were associated with increased shortness of breath and rescue medication use. PM_{2.5} was not significantly associated with a worsening of asthma when both ozone and fine particles were co-analyzed.

In an accompanying editorial, Dr. George Thurston and Dr. David Bates write that "air pollution is one of the most under-appreciated contributors to asthma exacerbations."

Gent, J.F., Triche, E.W., Holford, T.R., Belanger, K., Bracken, M.B., Beckett, W.S. and Leaderer, B.P. Association of Low-Level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma. *Journal of the American Medical Association*. Vol. 290, No. 14, pp. 1859–1867, October 8, 2003.

Thurston, G.D. and Bates, D.V. Air Pollution as an Underappreciated Cause of Asthma Symptoms. *Journal of the American Medical Association*. Vol. 290, No. 14, pp. 1915–1917, October 8, 2003.

Air Pollution and Asthmatic Symptoms in Panel of Hispanic Children

Researchers conducted a panel study of 22 Hispanic children aged 10–16 years old with asthma living in a Los Angeles community with high traffic density. Subjects kept daily diaries of their symptoms for 3 months. Air quality measurements were collected for ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, PM₁₀, as well as for the elemental and organic carbon fractions of PM₁₀ and for numerous toxic volatile organic compounds. PM_{2.5} data was not available.

Researchers presented new evidence that particle composition is important to adverse respiratory effects. There were positive associations reported between asthma symptoms and organic carbon, elemental carbon and PM₁₀, but the evidence was stronger for organic carbon and elemental carbon in the two-pollutant models. Elemental carbon is a marker for diesel emissions. Positive associations were also reported for selected volatile organic compounds associated with motor vehicles, including benzene, formaldehyde, toluene and xylene.

Delfino, R.J., Gong Jr., H., Linn, W.S., Pellizzari, E.D., and Hu, Y. Asthma Symptoms in Hispanic Children and Daily Ambient Exposures to Toxic and Criteria Air Pollutants. *Environmental Health Perspectives*, Vol. 111, No. 4, April 2003.

Poor Children in U.S.-Mexico Border City Suffer Effects of Air Pollution

The Commission for Environmental Cooperation of North America commissioned a study of the health impacts of air pollution on the children of Ciudad Juárez, Mexico a city where children may be more vulnerable because of poor living conditions. The study found significant associations between ambient levels of ozone, and respiratory-related emergency visits by children, for upper respiratory infections and asthma. No association was observed with ambient concentrations of PM₁₀.

Overall, ambient air pollutants were not related to respiratory deaths, but when data were stratified by socioeconomic status, an increase in respiratory mortality was observed among infants in the poorest group.

Romieu, I., Ramirez Aguilar, M., Moreno Macias, H., Barraza Villarreal, A., Hernandez Cadena, L., Carbajal Arroyo, L. Health Impacts of Air Pollution on Morbidity and Mortality Among Children of Ciudad Juárez, Chihuahua, Mexico. Working Paper prepared for the Commission for Environmental Cooperation, November 10, 2003 available online at: <http://www.cec.org/files/PDF/POLLUTANTS/cdjuarez-en.pdf>.

Urban Air Pollution Damages Children's Lungs

Children in Mexico City are chronically exposed to a complex mixture of air pollutants, including hydrocarbons, ozone concentrations well above the NAAQS, and significant concentrations of metal-containing PM. Researchers followed 174 children aged 5–17, and compared them to 27 control children living in low-polluted areas. Researchers assessed several measures of respiratory damage in the children, including nasal abnormalities, hyperinflation and interstitial markings in the lungs observed by chest X-ray, lung function changes, and blood concentrations of proteins that are indicative of the health of the immune system.

Researchers found that the air pollution exposure produces significant chest X-ray abnormalities in the exposed children, depressed lung function, and an imbalance of blood proteins important to immune response. They found that 22 percent of the exposed children had grossly abnormal nasal mucosa, which can impair nasal defense mechanisms against inhaled gases and particles. The lung damage observed is similar to the chronic inflammatory damage observed in an earlier study of dogs in Mexico City. Researchers report that the x-ray and lung function changes they found in the exposed children could be due to pollution-associated chronic

bronchiolitis, which could put the children at greater risk of developing chronic obstructive airway disease later in life.

They conclude that lifelong exposure to urban air pollution causes respiratory damage in children and may predispose them to development of chronic lung disease and other problems due to suppression of the immune system.

Calderón-Garcidueñas, L., Mora-Tiscareño, A., Fordham, L.A., Valencia-Salazar, G., Chung, C.J., Rodríguez-Alcaraz, A., Paredes, R., Variakojis, D., Villarreal-Calderón, A., Flores-Camacho, L., Antunez-Solis, A., Henriquez-Roldán, and Hazucha, M.J. Respiratory Damage in Children Exposed to Urban Pollution. *Pediatric Pulmonology*. Vol. 36, No. 2, pp. 148–61, August 2003.

More Ozone “Responders” Among Children and Asthmatics

Large differences in the sensitivity of individuals to ozone have been well documented. Those that are particularly sensitive are known as “responders.” This study sought to establish the prevalence of “responders” in four different population subgroups: children, asthmatics, the elderly, and athletes, by assessing symptoms and measuring respiratory function.

The study found higher rates of ozone responders in asthmatics (21 percent) and children (18 percent), as compared to the elderly and athletes (both 5 percent). This means that children and asthmatics have a higher risk of being ozone sensitive and experiencing more acute lung function decrements than other population groups.

Höppe, P., Peters, A., Rabe, G., Praml, G., Lindner, J., Jakobi, G., Fruhmann, G., and Nowak, D. Environmental Ozone Effects in Different Population Subgroups. *International Journal of Hygiene and Environmental Health*. Vol. 206, pp. 505–516, 2003.

CARDIOVASCULAR EFFECTS IN ADULTS

Air Pollution Boosts Stroke Risk

Higher levels of air pollution increase the risk of hospitalization for stroke, especially in warmer weather, according to a study in Kaohsiung, Taiwan. Researchers tracked data on multiple air pollutants and 23,000 hospital admissions for stroke over a 4-year period in Taiwan’s second largest city. They compared air pollution levels of the dates of admissions with the levels 1 week before and after admission. They found that PM₁₀ and nitrogen dioxide were the most important pollutants and that their effects were greatest on warmer days.

Another recent study in England and Wales reported that road traffic pollution is associated with excess risk of mortality from stroke. Researchers reported that stroke deaths were 7 percent higher in men living within 200 meters of a main road, compared with men living more than 1,000 meters away.

Tsai, S.-S., Goggins, W.B., Chiu, H.-F., and Yang, C.-Y. Evidence for an Association Between Air Pollution and Daily Stroke Admissions in Kaohsiung, Taiwan. *Stroke*. Published online before print October 9, 2003, doi:10.1161/01.STR.0000095564.33543.64

Maheswaran, R., and Elliott, P. Stroke Mortality Associated with Living Near Main Roads in England and Wales, A Geographical Study. *Stroke*. Vol. 34, pp. 2776–2780, 2003.

Ozone Pollution Sends Elderly to Hospitals in Denver

A large number of epidemiologic studies from around the world have reported an association between various air pollutants and hospital admissions for cardiovascular causes. Extremes in weather have also been associated with adverse health effects, including mortality.

This study tracked hospital admissions for cardiovascular diseases at all 11 Denver County hospitals during July and August, two extreme temperature months, for a 4-year period. The study focused on men and women older than 65 years of age.

Researchers found that ozone increases the risk of hospitalization for acute myocardial infarction, coronary atherosclerosis, and pulmonary heart disease. Sulfur dioxide was related to increased hospital stays for cardiac dysrhythmias, and carbon monoxide was significantly associated with congestive heart failure hospitalization. No associations were found between particulate matter or nitrogen dioxide and hospitalizations. Higher temperatures were an important factor in increasing the frequency of hospitalization for acute myocardial infarction and congestive heart failure, but were associated with a decrease in the frequency of visits for the other heart conditions studied.

Researchers conclude that:

“exposures to higher air pollutant concentrations (except for particulate matter and NO₂), even at levels that meet Federal air quality standards, appear

to have an effect of increasing the number of hospital admissions for cardiovascular diseases as a whole.”

Koken, P.J.M., Piver, W.T., Ye, F., Elixhauser, A., Olsen, L.M., and Portier, C.J. Temperature, Air Pollution, and Hospitalization for Cardiovascular Diseases among Elderly People in Denver. *Environmental Health Perspectives*. Vol. 111, No. 10, pp. 1312–1317, August 2003.

PARTICULATES LINKED TO HOSPITAL STAYS FOR HEART ATTACKS

A study in Rome, Italy, used a “case-crossover” design to evaluate the relation between daily indicators of air quality and hospitalizations for acute myocardial infarctions, or heart attacks. Individual data on patients was considered as possible effect modifiers. The study period was over 2 years and included over 6,000 patients.

The strongest and most consistent positive effects were found for total suspended particulates, with positive associations also reported for nitrogen dioxide and carbon monoxide.

The study suggests that traffic-derived air pollutants increase the risk of heart attacks, especially during the warm season, among the elderly, and in people with heart conduction disturbances.

D'Ippoliti, D., Forastiere, F., Ancona, C., Agabity, N., Fusco, D., Michelozzi, P., Perucci, C.A. Air Pollution and Myocardial Infarction in Rome: A Case-Crossover Analysis. *Epidemiology*, Vol. 14, No. 5, pp. 528–535, 2003.

Air Pollution Particles Lower Heart Rate Variability in Elderly Humans

Investigations of cardiovascular health effects are being carried out to better explain the mechanisms responsible for mortality attributable to particulate air pollution. For instance, recent studies have reported associations between elevated PM levels and serious ventricular arrhythmias and myocardial infarctions.

Several recent panel studies have investigated heart rate variability in relationship to particle air pollution. Heart rate variability reflects the autonomic function of the heart. In this study, a small panel of healthy elderly volunteers aged 60 to 80, were exposed to concentrated particles derived from the ambient air in Chapel Hill, North Carolina, and to clean air. Changes in heart rate variability were measured before, immediately following, and 24-hours after exposure.

The study found that a 2-hour exposure of healthy elderly subjects to moderate levels of particulate pollution—comparable to levels seen in many metropolitan areas—resulted in alterations in heart rate variability. Lowered heart rate variability has been associated with increased risk for developing coronary heart disease and to sudden cardiac death.

These results are in contrast to the findings of the same researchers in a similar study of healthy young adults, suggesting that elderly people are more responsive to particulate matter pollution.

Devlin, R.B., Ghio, A.J., Kehrl, H., Sanders, G., and Cascio, W. Elderly Humans Exposed to Concentrated Air Pollution Particles Have Decreased Heart Rate Variability. *The European Respiratory Journal*. Vol. 21, Suppl. 40, pp. 76s–80's, 2003.

Fine Particles and Ozone Suppress Heart Rate Variability in Nursing Home Residents

Thirty-four residents of a nursing home in Mexico City underwent 5-minute electrocardiograms every other day for a 3-month period. Ambient ozone measurements were obtained, as well as indoor and outdoor PM_{2.5} concentrations. After adjusting for age and heart rate, investigators observed a decline in heart rate variability in association with air pollutants, particularly among those with high blood pressure. Reductions in heart rate variability are correlated with increased rates of cardiovascular morbidity and mortality in the high-risk and general population, but the clinical significance of minor, transient changes such as observed in this study are uncertain.

Holguin, F., Tellez-Rojo, M.M., Hernandez, M., Cortez, M., Chow, J.C., Watson, J.G., Mannino, D., and Romieu, I. Air Pollution and Heart Rate Variability Among the Elderly in Mexico City. *Epidemiology*. Vol. 14, No. 5, pp. 521–527, 2003.

Mittleman, M.A. and Verrier, R.L. Air Pollution: Small Particles, Big Problems? *Commentary*. *Epidemiology*. Vol. 14, No. 5, pp. 512–513, September 2003.

Fine Particles and Gaseous Air Pollutants Increase Risk of Hospitalization

This time-series study in Atlanta, Georgia funded by the Electric Power Research Institute used data on more than 4 million emergency department visits from 331 hospitals, and detailed air quality data on criteria air pollutants. For the last 2 years of the study, detailed data on several chemical characteristics of PM were available.

Researchers found evidence for an association between hospitalization for cardiovascular disease and PM_{2.5}, nitrogen dioxide, carbon monoxide, and components of PM_{2.5} including organic carbon, elemental carbon, and oxygenated hydrocarbons.

The effect of ambient pollution on cardiovascular conditions tended to be rapid, with the strongest associations observed with pollution levels on the same day as emergency department visits.

Metzger, K.B., Tolbert, P.E., Klein, M., Peel, J.L., Flanders, W.D., Todd, K., Mulholland, J.A., Ryan, P. B., and Frumkin, H. Ambient Air Pollution and Cardiovascular Emergency Department Visits in Atlanta, Georgia, 1993–2000. *Epidemiology*, Vol. 15, No. 1, pp. 46–56, January 2004.

RESPIRATORY EFFECTS IN ADULTS

Living Near a Major Road Exacerbates Respiratory Symptoms in U.S. Veterans

There have been numerous population-based studies investigating the health effects of exposure to traffic, many focusing specifically on the effects on children, and most undertaken in other countries.

This study focused on effects in over 5,000 veterans—adult males—living in southeastern Massachusetts. Participants completed questionnaires on their chronic illnesses and respiratory symptoms, and a Geographic Information System was used to estimate the distance of their residence from a major road.

The results of this study point to increased risk for persistent wheeze and possibly chronic phlegm for people living within 50 meters of heavily trafficked roads. The authors conclude that “*exposure to vehicular emissions by living near busy roadways might contribute to symptoms of chronic respiratory disease in adults.*”

Garshick, E., Laden, F., Hart, J.E., and Caron, A. Residence Near a Major Road and Respiratory Symptoms in U.S. Veterans. *Epidemiology*. Vol. 14. No. 6, pp. 728–736.

Hospitalizations and Emergency Room Visits Increase Following High Particulate Matter Episodes

A study of half a million Kaiser Permanente members living in the San Joaquin Valley of California has reported that following wintertime episodes of high PM_{2.5} and PM₁₀ concentrations, and to a lesser extent carbon monoxide and nitrogen oxides, hospital admission rates and emergency room visits increased for patients who suffer from acute respiratory ailments such as asthma and bronchitis. Admissions for chronic respiratory ailments such as emphysema were similarly elevated, particularly during the winter. The study followed patients over a 4-year period. Effects estimates were consistently greater for PM_{2.5} than for PM₁₀. Investigators did not find convincing evidence of associations with coarse particles or with ozone.

Van Den Eeden, S.K., Quesenberry, C.P., Jr., Shan, J., and Lurmann, F. Particulate Air Pollution and Morbidity in the California Central Valley: A High Particulate Pollution Region. Final Report to the California Air Resources Board, Contract 97–303, July 12, 2002. Available at: <ftp://ftp.arb.ca.gov/carbis/research/apr/past/97-303.pdf>.

Fine Particles Induce Symptoms in Elderly Heart Patients

This is the first study in recent years to explore the relationship between cardiovascular symptoms and air pollution. Researchers followed a panel of non-smoking elderly subjects with coronary heart disease in three cities during the winter of 1998–1999: Amsterdam, the Netherlands; Erfurt, Germany; and Helsinki, Finland. Participants recorded occurrence of selected cardiovascular and respiratory symptoms in a daily diary. Air quality measurements were made for PM₁₀, PM_{2.5}, ultrafine particles, nitrogen oxide, carbon monoxide, sulfur dioxide and ozone. Information on potential confounding factors such as weather variables and influenza data was also collected.

Researchers reported consistent positive associations of PM_{2.5} with shortness of breath and phlegm, and weak positive associations between PM_{2.5} and being awakened by breathing problems and avoidance of activities. Associations were more consistent with PM_{2.5} than with other pollutants, including ultrafine particles. There was no association between chest pain and air pollution.

de Hartog, J.J., Hoek, G., Peters, A., Timonen, K.L., Ibalid-Mulli, A., Brunekreef, B., Heinrich, J., Tittanen, P., van Wijnen, J.H., Kreyling, W., Kulmala, M., and Pekkanen, J. Effects of Fine and Ultrafine Particles on Cardiorespiratory Symptoms in Elderly Subjects with Coronary Heart Disease. *American Journal of Epidemiology*. Vol. 157, No. 7, pp. 613–623, 2003.

Ozone Exacerbates Symptoms in COPD Patients

Thirty-nine senior adults with severe chronic obstructive pulmonary disease (COPD) were followed by their physicians in Paris, France, during a 14-month period. Daily levels of PM₁₀, ozone, sulfur dioxide and nitrogen dioxide were monitored.

No evidence of symptom exacerbation and PM₁₀, SO₂, or NO₂ was observed. However, the 8-hour average ozone concentration was associated with exacerbation of COPD symptoms.

According to the researchers,

“our results are consistent with those of toxicological studies that have shown the inflammatory mechanisms of O₃. The recruitment of inflammatory cells into the lung presents a risk of tissue damage through the release of toxic mediators by activated inflammatory cells. Perhaps this phenomenon would be more serious among patients suffering from COPD, in whom a pre-existent inflammation of the small or large airways would be constant.”

Desqueyroux, H., Pujet, J.C., Prosper, M., Le Moullec, Y., Momas, I. Effects of Air Pollution on Adults With Chronic Obstructive Pulmonary Disease. *Archives of Environmental Health*, Vol. 57, No. 6, pp. 554–560, Nov.–Dec. 2002.

Autopsies Show Evidence of Particle Damage to Small Airways

Researchers evaluated a series of autopsied lungs from Mexico City, a city with high PM levels, and compared them by formal grading analysis to lungs from Vancouver, a region of generally low air pollution. The small airways in the Mexico City lungs showed markedly higher levels of fibrous tissue and muscle, and microscopic evidence of particle accumulation in the respiratory bronchioles. The study demonstrates that particle pollution penetrates into and is retained in the walls of the small airways. The type of airway wall remodeling found here is the same as that associated with chronic airflow obstruction in cigarette smokers and in asthmatics, and may have a similar effect in those exposed to PM.

A related laboratory study has demonstrated that air pollution particles produce airway wall remodeling in rat tracheal tissue maintained in culture. Researchers exposed the tissue to two types of particles—Ottawa urban air particles, and diesel exhaust particles. The study found that exposure to these particles can induce expression of genes involved in fibrogenesis and airway wall fibrosis, suggesting an explanation for the fibrosis and increased muscle observed in human airways subject to chronic exposure to high levels of PM.

Researchers conclude that “*PM-induced airway wall remodeling may play an important role in producing airflow obstruction in individuals living in high PM regions.*”

Churg, A. Brauer, M., Avila-Casado, M.d.C., Fortoul, T.I., and Wright, J.L. Chronic Exposure to High Levels of Particulate Air Pollution and Small Airway Remodeling. *Environmental Health Perspectives*. Vol. 111, No. 5, pp. 714–718, May 2003.

Dai, J., Xie, C., Vincent, R., and Churg, A. Air Pollution Particles Produce Airway Wall Remodeling in Rat Tracheal Explants. *American Journal of Respiratory Cell Molecular Biology*. Vol. 29, pp. 352–358, 2003.

SARS Deaths Higher in More Polluted Regions

High levels of air pollution may increase the risk of dying from SARS—severe acute respiratory syndrome. A study in China found that patients with SARS who were living in areas with high air pollution were more than twice as likely to die from the illness than those living in cleaner areas.

Researchers developed an air pollution index from data on ambient concentrations on ozone, particulate matter, sulfur dioxide, nitrogen dioxide and carbon monoxide, to compare with data on SARS illnesses and fatalities. There have been over 5,000 cases of SARS reported in China since November 2002, with 349 fatalities.

The study authors suggest that air pollution might compromise lung function, predisposing SARS patients to illness and death.

Cui, Y., Zhang, Z.-F., Froines, J., Zhao, J., Want, H., Yu, S.-Z., and Detels, R. Air Pollution and Case Fatality of SARS in the People's Republic of China: An Ecologic Study. *Environmental Health: A Global Access Science Source*. Vol. 2, No. 15, November 20, 2003. Available online at: <http://www.ehjournal.net/content/pdf/1476-069X-2-15.pdf>.

Prior Exposure to Fuel Oil Combustion Particulates Enhances Allergic Response

Experimental studies have shown that diesel exhaust and gaseous pollutants may enhance the allergic response.

In this human experimental study, researchers sought to determine whether pre-exposure to combustion particles would enhance the response to subsequent expo-

sure to pollen. The combustion particles used in the study were residual oil fly ash from a Boston power plant. Nasal cells were examined following exposure for evidence of inflammation and allergic response.

Researchers reported evidence of a greater than additive interaction between particulate exposure and allergen challenge. Specifically, they found an increase in certain inflammatory cells and cytokines that are measures of irritant or allergic response, relative to subjects pre-exposed to clean air.

Hauser, R., Rice, T.M., Krishna Murthy, G.G., Wand, M. P., Lewis, D., Bledsoe, T., and Paulauskis, J. The Upper Airway Response to Pollen is Enhanced by Exposure to Combustion Particulates: A Pilot Human Experimental Challenge Study. *Environmental Health Perspectives*, Vol. 111, No. 4, pp. 472–477, April 2003.

Diesel Exhaust Emissions Causes Chronic Damage to Nasal Mucous Membrane

Diesel exhaust contains numerous toxic substances such as sulfur dioxide, acrolein, formaldehyde, metals, and particulate matter. Many of these combustion by-products are known to be genotoxic, cytotoxic, fibrogenic, and carcinogenic. Uncontrolled diesel emissions from heavy equipment constitute a major public health concern.

Researchers in Switzerland studied some 200 male, non-smoking customs officers over a 5-year period. Some of the officers were engaged in the clearing of diesel trucks over 8 hours per day during the workweek, while the control group worked in the office. Researchers measured concentrations of diesel exhaust in the ambient air and collected nasal swabs from the workers during the summer and winter.

In humans, the nose is the initial site of injury by inhaled irritants, and it is a common site for particle deposition and for the absorption of potentially toxic gases.

Researchers found increased abnormalities in the nasal skin cells and an increase in white blood cells, in the workers chronically exposed to diesel exhaust. They describe the changes as a chronic inflammation of the nasal mucous membrane. In addition, researchers report that the cell changes may be indicative of a genotoxic effect (capable of causing damage to DNA) of chronic diesel exposures in humans.

Gluck, U., Schütz, R., Gebbers, J.-O. Cytopathology of the Nasal Mucosa in Chronic Exposure to Diesel Engine Emission: A Five-Year Survey of Swiss Customs Officers. *Environmental Health Perspectives*, Vol. 111, No. 7, pp. 925–929, June 2003.

LONG- AND SHORT-TERM STUDIES OF PREMATURE MORTALITY

Soot's Impact on Heart Comparable to Risk for Former Smokers

In a followup analysis to the American Cancer Society cohort study, researchers have reported a striking link between chronic exposure to fine particle air pollution and increased risk of death from cardiovascular disease in the United States. The increased risk was comparable to that associated with being a former smoker. The new analysis is based on data collected by the American Cancer Society on the cause of death of 500,000 adults over a 16-year period, and on data on air pollution levels in cities nationwide. Data on other risk factors such as body mass, smoking, occupational exposures, and diet were also considered.

The study identifies a strong link between particulate air pollution and ischemic heart disease (which causes heart attacks), and also a link between pollution and irregular heart rhythms, heart failure, and cardiac arrest. It also suggests general biological pathways through which pollution might cause these diseases that lead to death—increased inflammation and nervous system aberrations that change heart rhythm. Mortality attributable to respiratory disease had relatively weak associations in this study.

Researchers conclude that:

“the results of this analysis are largely consistent with the proposition that the general pathophysiological pathways that link long-term PM exposure and cardiopulmonary mortality risk include pulmonary and systemic inflammation, accelerated atherosclerosis, and altered cardiac autonomic function.”

Pope, C.A. III, Burnett, R.T., Thurston, G.D., Thun, M.J., Calle, E.E., Krewski, D., and Godleski, J.J. Cardiovascular Mortality and Long-Term Exposure to Particulate Air Pollution: Epidemiological Evidence of General Pathophysiological Pathways of Disease. *Circulation*. Vol. 109, pp. 71–77, 2004. Published online before print at: <http://www.circulationaha.org>, DOI: 10.1161/01.CIR.000108927.80044.7F.

Short-Term Studies Underestimate Premature Deaths

The APHEA–2 project was a major study of the health effects of air pollution in 30 cities across Europe and in adjacent countries. That and many other studies have reported that short-term changes in PM₁₀ lead to short-term fluctuations in sickness and death. This study uses a statistical model—known as the distributed lag

model—to explore whether those deaths are advanced by just a few days or a few weeks, or more.

The researchers found that the adverse effects of short-term increases in air pollution persist for more than a month after exposure. They estimate that the size of the effect of exposure to PM₁₀ doubles for cardiovascular deaths when looking at effects 40 days after exposure, and increases five-fold for respiratory deaths. These results are consistent with higher risk estimates found in cohort studies such as the Harvard Six Cities Study, and strongly suggest that estimates of the effects of short-term exposures to air pollution seriously underestimate the impact of particle exposure.

Researchers conclude that:

“risk assessment based on the short-term associations likely underestimate the number of early deaths that are advanced by a significant amount, and that estimates based on the cohort studies, or studies such as this one, would more accurately assess the public health impact.”

Another research group took a different approach to evaluate the extent of life-shortening implied by short-term estimates of particulate air pollution on mortality. They sought to establish a separate relative rate of mortality for different time scales. They applied this method of a database on particulate air pollution, daily mortality, and weather in four cities: Pittsburgh, Minneapolis, Seattle, and Chicago.

The authors found that the mortality rates during periods from 14 days to 2 months after exposure were larger than the rates from 1 to 4 days after the exposure. This refutes the “harvesting hypothesis”: that is the argument that any increase in mortality associated with increased particle concentrations stems entirely from the death of very frail persons who die a few days early. If “harvesting” were the case, the rate of mortality would not continue to be higher for these extended periods of time.

Zanobetti, A., Schwartz, J., Samoli, E., Gryparis, A., Tuoloumi, G., Peacock, J., Anderson, R.H., Le Tertre, A., Bobros, J., Celko, M., Goren, A., Forsberg B., Michelozzi, P., Rabcezenko, D., Perez Hoyos, S., Wichmann, H.E., and Katsouyanni, K. The Temporal Pattern of Respiratory and Heart Disease Mortality in Response to Air Pollution. *Environmental Health Perspectives*. Vol. 111, No. 9, pp. 1188–1193, July 2003.

Dominici, F., McDermott, A., Zeger, S.L., and Samet, J.M. Airborne Particulate Matter and Mortality: Timescale Effects in Four US Cities. *American Journal of Epidemiology*. Vol. 157, No. 12, pp. 1055–1065, June 15, 2003.

Dutch Study Confirms that Long-Term Exposures to Particulate Matter are Deadly

This long-term cohort study confirms the findings of the Harvard Six Cities Study and the study of the American Cancer Society Cohort that found an association between chronic exposure to particulate air pollution and shortened life expectancy.

Investigators assessed the association between long-term exposure to traffic-related air pollution and cause-specific mortality in a cohort of 4,500 elderly people, participants in the ongoing Netherlands Cohort study on Diet and Cancer. People who lived near major roads had a 95 percent greater risk of dying early from cardiopulmonary causes than people living in cleaner air areas.

Hoek, G., Brunekreef, B., Goldbohm, S., Fischer, P., and van den Brandt, P. A. Association Between Mortality and Indicators of Traffic-Related Air Pollution in the Netherlands: A Cohort Study. *The Lancet*. Vol. 360, pp. 1203–1209, October 19, 2002.

INTERVENTION STUDIES

Control of PM Substantially Diminishes Daily Deaths

Air quality in Dublin, Ireland deteriorated in the 1980's after a switch from oil to bituminous coal for domestic heating. In 1990, the Irish Government banned the marketing and sale of bituminous coals within the city of Dublin. A dramatic improvement in air quality ensued. This study investigates the effect of a ban on coal sales.

Concentrations of air pollution, measured as “black smoke” and death rates were compared for 72 months before and after the ban. The analysis was adjusted to reflect age, weather, respiratory epidemics, and other factors. Respiratory and cardiovascular death rates fell markedly following the ban on soft coal.

The authors conclude:

“Our findings suggest that control of particulate air pollution in Dublin led to an immediate reduction in cardiovascular and respiratory deaths. These data lend support to a relation between cause and the reported increase in acute mortality associated with daily particulate air pollution. Moreover, our data

suggest time-series studies could be underestimating the benefits of particulate air pollution controls.”

A followup study presented an analysis of the medium term (weeks to months) exposure effects of particulate pollution, measured as “black smoke” and temperature, over a period of 17 years in Dublin. Investigators found that the effects of particulate air pollution are strongest on the day of and the few days following exposure, but extend out over 40 days following exposure. This was especially noticeable for respiratory causes of death. “*These extended followup effects were two to three times greater than the acute effects reported in other studies, and approach the effects reported in longer term survival studies. This analysis suggests that the studies on the acute effects of air pollution have underestimated the total effects of temperature and particulate air pollution on mortality,*” report the investigators.

Clancy, L., Goodman, P., Sinclair, H., and Dockery, D.W. Effect of Air-Pollution Control on Death Rates in Dublin, Ireland: An Intervention Study. *The Lancet*. Vol. 360, pp. 1210–14, October 19, 2002.

Goodman, P.G., Dockery, D.W., and Clancy, L. Cause Specific Mortality and the Extended Effects of Particulate Pollution and Temperature Exposure. *Environmental Health Perspectives*, In Press. Available online November 12, 2003, doi 1289/ehp.6451, available at <http://dx.doi.org/>.

Improvement in Air Quality Benefits Children’s Health

Following German reunification in 1990, there was a tremendous decline in combustion-derived emissions of sulfur dioxide and total suspended particulate (TSP) in Eastern Germany. This provided a unique opportunity to study trends in the prevalence of respiratory illness along with the improvement in air quality.

This review focused on the results of two repeated surveys of nonallergic respiratory disease of children living in East Germany. The surveys found that declines in chronic bronchitis were associated with the decline in TSP.

Another study of three communities in East Germany measured lung function in 2,500 children. Lung function increased as TSP and sulfur dioxide pollution declined. Researchers concluded that “*a reduction of air pollution in a short time period may improve children’s lung function.*”

Heinrich, J. Nonallergic Respiratory Morbidity Improved Along With a Decline of Traditional Air Pollution Levels: A Review. *European Respiratory Journal*. Vol. 21, Suppl. 40, pp. 1s–6s, 2003.

Frye, C., Hoelscher, B., Cyrus, J., Wjst, M., Wichmann, H.-E., and Heinrich, J. Association of Lung Function Declining Ambient Air Pollution. *Environmental Health Perspectives*. Vol. 111, No. 3, pp. 383–387, March 2003.

Reductions in Pollution Particles Linked to Reductions in Infant Mortality

Economists at the University of Chicago and the University of California, Berkeley have reported new evidence of an association between particles in the air, and infant health. They examined the sharp reduction in manufacturing, and in turn, reductions in particulate air pollution (measured as Total Suspended Particulates (TSP)) during the 1981–1982 recession, in relation to county-specific data on infant deaths.

In Chicago, for instance, researchers estimated that the decline in air pollution lowered the infant mortality rate by 5 percent between 1980 and 1982.

Their research suggests that 2,500 fewer infants died during this period than would have, absent the reductions in air pollution. The majority of the infant deaths occurred within 1 month of birth, suggesting a possible impact of air pollution on fetal development.

Another study by these same researchers examined the relationship between implementation of the 1970 Clean Air Act Amendments and infant mortality. They documented sharp reductions in TSP pollution between 1971 and 1972, when the Clean Air Act took effect, and a corresponding reduction in infant death rates.

Chay, K.Y., and Greenstone, M. The Impact of Air Pollution on Infant Mortality: Evidence From Geographic Variation in Pollution Shocks Induced by a Recession. *Quarterly Journal of Economics*. Vol. CXVIII, pp. 279–300, August 2003. (Available online at: <http://wwwnews.uchicago.edu/releases/03/particles/chay-greenstone.pdf>.)

Chay, K.Y., and Greenstone, M. Air Quality, Infant Mortality, and the Clean Air Act of 1970. National Bureau of Economic Research, Working Paper No. w10053, October 2003. (Available online at: http://www.nber.org/cgi-bin/author_papers.pl?author=kenneth+chay).

Air Pollution Hits Poor People the Hardest

This study investigated mortality in relation to neighborhood levels of income and air pollution in a cohort of 5,000 people who had been referred for pulmonary function testing in the urban area of Hamilton-Burlington in southern Ontario. Income was estimated using census data, and average neighborhood levels of total suspended particulates and sulfur dioxide were estimated by interpolating data from the monitoring network.

Mean pollution levels tended to be higher in the lower-income neighborhoods, and these neighborhoods also had higher mortality rates. While biologic risk factors were not controlled for, investigators reported that “two of the broader determinants of health—income and air pollution levels—were important correlates of mortality in this population.”

Finkelstein, M.M., Jerrett, M., DeLuca, P., Finkelstein, N., Verma, D.K., Chapman, K., and Sears, M.R. Relation between Income, Air Pollution and Mortality: A Cohort Study. *Canadian Medical Association Journal*, Vol. 169, No. 5, September 2, 2003.

PM Research Centers Report Progress

In 1988, Congress directed the U.S. EPA to substantially increase its level of funding on PM health effects research. It also mandated that a National Research Council (NRC) committee be established to provide scientific oversight for PM research. In its first report, the NRC Committee on Research Priorities for Airborne Particulate Matter recommended the establishment of interdisciplinary research centers to be funded on a multi-year basis to foster comprehensive and integrated research on particle health effects. In a competitive process, EPA awarded grants to five centers: A California consortium headquartered at the University of California Los Angeles, Harvard University, New York University, the University of Rochester, and the University of Washington.

This review article reports on the substantial accomplishments of the PM centers in their first two and a half years of operation, and lays out short- and longer-term research goals. Six topics are discussed: biological mechanisms, acute effects, chronic effects, dosimetry, and exposure assessment.

Lippmann, M., Frampton, M., Schwartz, J., Dockery, D., Schlessinger R., Koutrakis, P., Froines, J., Nel, A., Finkelstein, J., Godleski, J., Kaufman, J., Koenig, J., Larson, T., Luchtel, D., Liu, L-J., S., Oberdörster, G., Peters, A., Sarnat, J., Sioutas, S., Suh, H., Sullivan, J., Utell, M., Wichmann, E., and Zelikoff, J. The U.S. Environmental Protection Agency Particulate Matter Health Effects Research Centers Program: A Midcourse Report of Status, Progress and Plans. *Environmental Health Perspectives*. Vol. 111, No. 8, pp. 1074–1092, June 2003.

Autopsy Evidence Points to Diesel's Role in 1952 London Smog Episode

Researchers obtained archived lung tissue from autopsies of 16 victims of the London smog disaster over 50 years ago. This provided a unique opportunity to examine the form and composition of the particulate matter found in the lungs of those known to have died from exposure to the smog. Pathologists examined samples from different compartments of the lungs: for instance the airway, airspace, interstitium, and lymph node. This allowed researchers to see what people had been exposed to just before their deaths and over the longer term.

The study found high volumes of ultrafine carbon particles and various metals including lead. But most significant was the evidence of particles associated with diesel fuel, given that London had made a switch from electric trams to diesel buses early in 1952.

Hunt, A., Abraham, J.L., Judson, B., and Berry, C.L. Toxicologic and Epidemiologic Clues from the Characterization of the 1952 London Smog Fine Particulate Matter in Archival Autopsy Lung Tissues. *Environmental Health Perspectives*. Vol. 111, No. 9, pp. 1209–1214, July 2003.

STATEMENT OF ROBERT STEC, CHAIRMAN AND CEO, LEXINGTON HOME BRANDS, LEXINGTON, NC, ON BEHALF OF THE AMERICAN FURNITURE MANUFACTURERS ASSOCIATION (AFMA)

Chairman Inhofe and members of the committee, I am Robert Stec, Chairman and CEO of Lexington Home Brands of Lexington, North Carolina. I appreciate the committee's interest in the potential impact that Clean Air non-attainment designations would have on furniture manufacturing facilities like ours.

Lexington started out as Dixie Furniture Company, organized in 1901 by a group of Lexington, North Carolina, business leaders to capitalize on the region's abundant natural resources and skilled labor force. The company produced its first oak bedroom group on the site where our largest plant is still located today in downtown Lexington, NC.

As sales increased, the new company expanded throughout downtown Lexington, buying adjacent factory buildings, renovating them, and erecting new ones, until it eventually occupied nine city blocks and 31 acres of land. Additional expansion stretches west along Interstate 40 from the town of Lexington to Hildebran, North Carolina, some 75 miles. Such a grouping of facilities, typical of furniture manufacturing, magnifies the potential adverse impact of county-by-county non-attainment designation.

As a full-line furniture manufacturer, we produce bedroom, dining, casual dining, occasional, home entertainment, home office, youth, upholstered, leather, and wicker furniture for domestic and international customers. Local production is augmented with imported product and components manufactured to Lexington specifications in the Far East, Central America, and Europe. Over 2000 associates manufacture, service, distribute, and sell Lexington products. Lexington pioneered lifestyle furniture brands with the introduction of the Bob Timberlake collection in 1990, the world's all-time, best-selling furniture brand.

While the furniture industry is a small contributor to air emissions compared to most manufacturers, two types of emissions are characteristic. These include evaporative volatile organic compounds (VOCs) released during the staining and finishing process, as well as NOx emissions from the combustion of fuels used to provide steam for plant heat and finishing operations.

The industry is dramatically reducing emissions pursuant to a cooperative rule-making under the Clean Air Act. Changes in our manufacturing process, combined with redesigned paints, coatings, glues and application equipment has so far yielded a 73 percent reduction in emissions, substantially more than regulators and environmental interests originally sought. Then-EPA Administrator Carol Browner called this achievement "a credit to industry-environmental-government cooperation."

Lexington Home Brands takes a proactive approach concerning environmental issues. One initiative geared to exceeding regulatory compliance obligations is our partnership with the North Carolina Department of Environment and Natural Resources in their Environmental Stewardship Initiative. This voluntary program uses pollution prevention and other approaches to exceed regulatory compliance.

Lexington was also the first company to implement the American Furniture Manufacturers Association's environmental management system (EMS) on a company wide basis. The system, know as Enhancing Furniture's Environmental Culture (EFEC), has allowed Lexington Home Brands to review and improve operations for better environmental performance. Environmental targets have been established to facilitate the integration of environmental management with business management processes. These goals include reducing air emissions, reducing the amount of waste generated and increasing recycling efforts.

Our success and the success of many other North Carolina employers could be threatened by an upcoming decision by U.S. EPA regarding ozone non-attainment. As you may be aware, the counties of the Triad region have entered into an agreement with EPA to develop strategies to reduce emissions of the ozone precursors NOx and VOC. Data, including modeling done by the State of North Carolina, clearly indicates that NOx emissions from mobile sources are the major precursor to ozone formation in the region.

Consequently, the Early Action Compact (EAC) has focused on transportation NOx as the central mechanism to achieve ozone attainment by 2007. Subject to EPA approval, the compact would move the timetable for non-attainment designation to 2007 in order to provide an opportunity for these strategies to be implemented effectively. EPA will release their non-attainment boundaries April 15, 2004 and the EAC stakeholders are hopeful that the non-attainment designation will be scheduled to coincide with the 2007 timetable.

If EPA instead decides to set the non-attainment boundaries this April, manufacturing facilities located in those areas will be required to reduce NOx and VOC emissions on a very short timeline. Local business leaders are convinced that severity of permit restrictions prescribed in both the NSR and PSD requirements would effectively put an end to plans for facility expansion, and could force companies to evaluate the possibilities of relocation or outsourcing. This is clearly not the sort of outcome for the manufacturing sector that the American people and their elected representatives are demanding.

If the Triad area of North Carolina is designated as non-attainment, furniture plants would have to evaluate their total VOG emissions and determine the "amount of reduction required" based on the non-attainment designation and determine the type of controls necessary to achieve this reduction. Add-on control options would include catalytic oxidation, thermal oxidation, carbon absorption, the conversion of the current finishing system to water base coatings or a combination of water-based coatings coupled with one or the previously mentioned controls. These options would prove very costly and disruptive to our business plan.

One AFMA member company is using catalytic oxidation to control VOC/HAP emissions and employees this technology to capture the entire finishing exhaust air stream with an installed cost of \$450,000. A typical carbon absorption system capable of handling large make-up air streams could cost in excess of \$500,000 with an annual operations and maintenance cost in excess of \$50,000.

The capital costs associated with transition to water-based coating are also significant, since most of the existing lines, pumps, bulk storage, day mixing tanks, regulators and spray guns must be replaced. Further, water-based coatings, while suitable for some applications, are not commercially viable for much of our product line. They tend to exhibit less sheen and mar resistance than conventional coatings. Water-based coatings can also react with the wood, causing grain raising, splitting and other quality control problems.

Mr. Chairman, it is no secret that the last few years have been the most challenging in the history of the U.S. furniture industry. According to the Bureau of Labor Statistics, since September 2000, more than 98,000 furniture manufacturing employees have lost their jobs. Domestic plants are competing with a tidal wave of imports from low-wage nations of the Pacific Rim. The driving force is China, where the combination of two-dollar-a-day labor, and lower environmental and workplace health and safety standards has made that country the dominant producer of wood furniture in the world. None of us would trade our standard of living, including environmental safeguards, for those of developing nations like China. The realities of global competition do, however, compel us to design our regulatory systems in the most cost-effective ways, always sensitive to the preservation of jobs.

On behalf of the employees of Lexington Home Brands and other members of the American Furniture Manufacturers Association, I recommend that the Committee urge EPA to respect the terms and timetable of the compacts. Adhering to the compacts will maintain the proper focus on transportation NOx as the primary mechanism for ozone control. It will help preserve the role for cost-effective state implementation of criteria pollutant standards envisioned by the Clean Air Act. And, significantly, it will help protect the competitiveness of furniture manufacturing facilities in North Carolina and across the Nation.

STATEMENT OF MICHAEL E. BAROODY, EXECUTIVE VICE PRESIDENT, ON BEHALF OF
THE NATIONAL ASSOCIATION OF MANUFACTURERS

On behalf of the National Association of Manufacturers (NAM), I would like to thank the Subcommittee on Clean Air, Climate Change and Nuclear Safety for conducting an oversight hearing on implementation of the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM) and ozone. As you know, air quality has improved dramatically over the past 33 years as hundreds of communities have complied with current rules. However, new standards for ozone and fine particulate matter (PM_{2.5}) will put hundreds of additional communities into non-compliance with the Clean Air Act. In order to reduce production costs and improve the condition of U.S. manufacturing and its millions of workers, Congress must ensure that implementation of the NAAQS does not drive up the cost or reduce supplies of natural gas, transportation fuels or electricity, discourage businesses from investing in non-attainment communities or otherwise negatively affect the economy.

The NAM is the nation's largest industrial trade association. The NAM represents 14,000 members (including 10,000 small- and mid-sized companies) and 350 member associations serving manufacturers and employees in every industrial sector and all 50 states. The NAM's mission is to enhance the competitiveness of manufacturers and to improve American living standards by shaping a legislative and regulatory environment conducive to U.S. economic growth and to increase understanding among policymakers, the media and the public about the importance of manufacturing to America's economic strength. Accordingly, the NAM has a vested interest in the implementation of air quality standards in a cost-effective manner that does not interfere with affordable and reliable energy for American manufacturers, consumers and others.

Manufacturing is on the front line in the unprecedented competition we are seeing in the world marketplace. More and more frequently, domestic manufacturers cannot pass through increased operation costs, making it more difficult to stay competitive in the United States or sell products in export markets. Our analysis shows that weak exports, coupled with low capital investments, have been prolonging the anemic recovery in the manufacturing sector. The economic situation in the manufacturing sector is serious, as shown by 43 consecutive months of employment decline that has totaled 3 million lost jobs.

External overhead costs from taxes, health and pension benefits, tort litigation, regulation and rising energy prices add approximately 22 percent to U.S. manufacturers' unit labor costs (nearly \$5 per hour worked) relative to their major foreign competitors. A NAM study comparing costs faced by manufacturers in the U.S. and its nine leading trading partners shows that, contrary to much national and international political rhetoric, United States spending for pollution abatement is higher than that of other countries purporting to be more conscientious about the environment. As a percentage of output, American manufacturers spend considerably more on pollution abatement than do their competitors in Germany, Japan, France, the U.K., Canada, Mexico, China, South Korea and Taiwan. Manufacturers even spend more on the environment as a percentage of overall GDP. In light of global deflationary pressures that prevent American manufacturers from raising the prices of their products, it becomes increasingly clear that Congress must do more to help us remain competitive. With ozone non-attainment area designations slated to be finalized this month, we must take this opportunity to urge adoption of a common-sense and reasonable NAAQS implementation approach.

In 1997, the Environmental Protection Agency (EPA) issued new NAAQS governing ozone and PM_{2.5}. On February 27, 2001, the U.S. Supreme Court upheld the EPA's ability to set air quality standards, without consideration of costs, but ruled that the agency's implementation of the ozone standard was unlawful. The issue was sent back to the EPA to develop a reasonable ozone implementation strategy. The EPA appears to be ready to finalize its ozone implementation rule at the same time that it makes final designations of ozone non-attainment areas on April 15, 2004. Last year, the EPA proposed an ozone implementation rule intended to provide flexibility to states and tribal governments as they address their unique air quality problems. In summer 2004, the EPA plans to propose its PM_{2.5} implementation strategy, with a deadline to follow in December 2004, to designate areas in and out of attainment with the PM_{2.5} standards. However, the new ozone and PM_{2.5} standards may be difficult, or in some cases impossible, to meet without shutting down new development altogether and perhaps curtailing some existing economic activity.

Hundreds of counties nationwide are expected to be designated as non-attainment for the new 8-hour ozone standard. A designation of "non-attainment" will create a black mark on communities in those areas. A non-attainment designation will substantially reduce business opportunities, investments and competitiveness in a particular area. Once an area is designated to be out of compliance with air quality standards, businesses already located in those areas face additional and more expensive pollution control requirements. Manufacturers and small businesses will need to carefully analyze how much the additional costs, increased permitting and reporting requirements and higher fines for potential violations will affect their ability to operate in the newly designated area. Meanwhile, companies seeking to locate or expand will see these factors as a disincentive to invest in non-attainment areas. Cost estimates to comply with the PM_{2.5} and 8-hour ozone standards range from \$48 billion to hundreds of billions of dollars.

From an energy security standpoint, implementation of the NAAQS must be consistent with the need for reliable and affordable electric power. Energy prices have been identified by the NAM as one of the significant competitive disadvantages facing U.S. manufacturers in the world marketplace. During the late 1990's, the historic surplus of natural gas disappeared due to a growing economy, governmental access restrictions to large gas deposits onshore and offshore and clean air regulations that encouraged electric generators to build almost all new capacity to use natural gas. By 2000, spot market prices soared and the average annual prices for gas have continued to be more than double the average natural gas prices of the 1990's. The manufacturing sector, unable to pass through costs, has been hit hard. U.S. natural gas production is not keeping pace with the demands of a growing population and a slowly recovering economy. Due to the current supply/demand imbalance, domestic natural gas prices are substantially higher than the equivalent prices paid by most foreign manufacturers. These high natural gas prices are undermining U.S. economic recovery and pushing jobs offshore in gas-dependent industries and are increasing the cost of electricity to most consumers.

Electricity prices being paid by U.S. manufacturers continuing to rise due not only to high natural gas prices, but also the ever-increasing burden of Clean Air Act (CAA) regulations. During the past dozen years, CAA regulations have played a major role in pushing electric generators to build natural gas units instead of new coal units. Yet, coal is the most abundant and inexpensive domestic energy-providing natural resource in the United States. Coal-fired generation still provides approximately 52 percent of the nation's electricity, with no other energy source able to replace it in the near-term.

Accordingly, coal must be maintained and expanded as a viable and affordable energy source if we are to keep natural gas from becoming increasingly more expensive and potentially less readily available for homeowners, manufacturers and electric generators. Implementation of the new ozone and PM_{2.5} NAAQS must not aggravate the already precarious natural gas supply and price situation by allowing the market to select coal-fired generation for new electricity capacity, as well as avoiding any wholesale switching from existing coal-fired generating capacity to natural gas. The United States must maintain a diverse fuel supply that includes affordable coal options if the economy is to continue to rebound and prosperity is to continue.

States and the EPA need maximum flexibility to adopt controls and other requirements that will contribute to the timely achievement of attainment of the 8-hour standard, in light of current knowledge regarding controls that may help or hinder progress toward attainment of that standard. The EPA should implement the necessary policy and administrative options to recognize and fully credit within the state implementation planning process the significant air quality progress that will be made by new Federal measures such as cleaner fuels and engines. Such a process will help minimize the burden of this very expensive implementation on state and local entities.

Specifically, there are currently various regulatory mandates in effect, or about to come online, that will further reduce air emissions. Before we implement the next set of stringent expensive controls, we should realize the local controls that are currently in effect. Attainment deadlines should be linked to when reductions will occur from transport and mobile source controls (e.g., on-road and off-road diesel rule in 2006–10 timeframe; clean gasoline and engine standards in the 2012–15 timeframe; transport emissions from the proposed Interstate Air Quality Rule in the 2010–15 timeframe).

In your oversight and authorization capacity, please take into account the following suggestions to mitigate the impact of the stringent NAAQS on businesses in non-attainment areas. First, consider options that would make it easier to extend attainment deadlines that may be economically or technically infeasible for areas to meet. Second, as the EPA continues its review of the current ozone and PM NAAQS, please consider legislation to ease the rigid deadlines and control requirements flowing from NAAQS standard-setting which ignores actual health benefits, compliance costs and technical feasibility.

Third, we urge you to continue to oppose all efforts to weaken, delay or block the EPA's New Source Review (NSR) reforms. NSR reform is needed for business certainty, energy security and environmental quality. The reforms would encourage emissions reductions, promote pollution prevention and provide incentives for energy efficiency improvements. For more than two decades, states, industry and the EPA have recognized that the NSR program needs serious repair. The final NSR rules will help promote safer, cleaner and more efficient factories, refineries and power plants.

Finally, we urge that you continue to support multi-emissions legislation that will reduce emissions while replacing conflicting and problematic regulations with one clear set of rules that will improve upon the gauntlet of CAA requirements and litigation. Such legislation must provide electricity generators with regulatory certainty that will allow investment decisions needed to meet both objectives of cleaner air and affordable power from a diverse fuel base. To be successful, any multi-emissions legislation must be consistent with a viable and affordable fuel mix for growing the economy, including manufacturing.

Since 1970, all of the major pollutants targeted by the CAA have been drastically reduced by 48 percent against the backdrop of a 164 percent growth in gross domestic product, 42 percent increase in energy consumption, 155 percent increase in vehicle-miles traveled and 38 percent rise in population. There is certainly much work ahead for Americans as leaders in the stewardship of our global environment. And we must remain vigilant and relentless in our efforts to create cleaner and safer technologies and efficient energy sources for a more secure and healthy future. But we also must insist that sound science—not political scare tactics—drives our environmental regulations. And with a clear understanding that economic growth and

a cleaner environment do indeed go hand-in-hand, we must resist the scare tactics of those who would have us believe the sky is falling when, in fact, science tells us we can all breathe a little easier.

We request that you make this letter a part of the record for the subcommittee hearing on NAAQS implementation. If you have any questions, please have your staff contact Jeffrey Marks at (202) 637-3176.

Thank you.

