S. HRG. 105–946

REGIONAL HAZE AND MERCURY POLLUTION

HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR, WETLANDS, PRIVATE PROPERTY AND NUCLEAR SAFETY

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED FIFTH CONGRESS

SECOND SESSION

OCTOBER 1, 1998

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REGIONAL HAZE AND MERCURY POLLUTION

THURSDAY, OCTOBER 1, 1998

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR, WETLANDS, PRIVATE PROPERTY,
AND NUCLEAR SAFETY,
Washington, DC.

The subcommittee met, pursuant to notice, at 2 p.m. in room 406, Dirksen Senate Office Building, Hon. James M. Inhofe (chairman of the subcommittee) presiding.

Present: Senators Inhofe, Allard, and Sessions.

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

Senator INHOFE. The hearing will come to order.

We're going to start the hearing right on time, even though we have several Members on both sides that will be coming down. They threw us a little bit of a curve, and they're having a briefing on Kosovo that's required attendance at 4, so we're going to make this a 2-hour hearing—I'm sure you're very sorry to hear that. I will shorten my opening remarks accordingly.

Today's hearing is going to be on two different subjects, as we know: one, regional haze; and the second, the state of science in mercury. Both of these are very important issues, and we have an excellent group of witnesses who are truly the leading experts in their field. Because of this, I'll keep my statement short and get to the testimonies very quickly.

The first issue today is regional haze. We held a hearing on regional haze last April, and since that time two major changes have occurred. If you'll recall, we actually recommended six, and two of them have already taken place. One is, we put an amendment on the highway bill to lock in the time line for regional haze to be the same as the $PM_{2.5}$ standard. This means that the States will not be required to submit plans for haze before they submit their plans for the particulate matter.

The second major change was a result of our hearing. The Western Governors negotiated an agreement with several of the interested groups to implement the Grand Canyon Report. The EPA then reopened the comment period on these two issues, which is scheduled to close next week.

And, while I commend the EPA for publishing the Western proposal, I do have a number of concerns. At our last hearing, I listed six concerns. We took care of one of these, EPA is doing one of the

others, the other four are—and I'd like to have the witnesses keep this in mind, and perhaps if you will address these in your opening remarks or some of these it would save us time in questioning later on. One is prescribed burnings—remember, we talked about that; second, use of deciview; third, how ''reasonable progress'' will be measured; and, four, flexibility regarding BART.

In addition, I'm concerned how the highway amendment will be coordinated with the Western proposal, and I'm very concerned about the level of commitment from the EPA for other state/regional commissions.

Our second issue today is mercury. This is the first time since the Clean Air Act Amendments in 1990 that our subcommittee has addressed mercury in a hearing. The purpose of the hearing is to hear from the best scientists that are available in the Government or in the private sector, and I think this is a wise thing. We don't intend for this panel to get into a debate on control measures or regulatory fixes. I think that would be putting the cart before the horse. First of all we've got to determine what the science is.

I think this is one of the mistakes that we made, even though we started our first hearing back in the NAAQS issue to be a hearing on the science. It seems like people quickly forgot and assumed that the science was there when, in fact, we found it was not there to the degree that they thought it was.

[The prepared statement of Senator Inhofe follows:]

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

The first issue today is regional haze. We held a hearing on this issue in April and since that time two major changes have occurred. First, as part of the Highway Bill we passed an amendment that coordinated the timeline for Regional Haze with the $PM_{2.5}$ standard. This means the States will not be required to submit plans for Haze before they submit their plans for PM. The second major change was a result of our hearing, the Western Governor's negotiated an agreement with several of the interest groups to implement the Grand Canyon Report. The EPA then reopened the comment period on these two issues which is scheduled to close next week.

While I commend the EPA for publishing the Western Proposal, I do have a number of concerns. At our last hearing I listed six concerns. We took care of one, the timelines, and it appears that EPA is on the road to taking care of the other, the Western Proposal; but I still have my original four:

1) prescribed burnings
2) use of the "deciview"
3) how "reasonable progress" will be measured, and
4) flexibility regarding BART (best available retrofit technology)

In addition, I am concerned how the Highway amendment will be coordinated with the Western Proposal, and I am very concerned about the level of commitment from the EPA for other State Regional Commissions.

Our second issue today is mercury. This is the first time since the Clean Air Act Amendments of 1990 that our subcommittee has addressed mercury in a hearing. The purpose today is to hear from the best scientists in government and the private sector as to the current state of the science for mercury. I do not intend for this panel to get into a debate on control measures or regulatory fixes; these are issues that are best left to another day.

Under the Clean Air Act, the EPA was required to submit a Report to Congress on Mercury, which they did just 11 months ago. Since then another Federal Agency, ATSDR has already released a more updated Report which relies on even more current science than EPA used. Therefore I feel it is important and necessary that the subcommittee take a close look at what we know and don't know, about mercury.

Senator INHOFE. Senator Allard?

OPENING STATEMENT OF HON. WAYNE ALLARD, U.S. SENATOR FROM THE STATE OF COLORADO

Senator ALLARD. Thank you, Mr. Chairman. I want to compliment you on your hard work on this particular regional haze problem, and, in addition to that, for having this hearing.

Haze is an extremely important issue for my State, as well as the entire western part of the United States. We need to deal with this issue, but we need to deal with it in a very sound manner that respects the various economies in the States, as well as the aesthetics in our environment.

As I mentioned, this is an extremely important issue, and I'm particularly pleased that you have, on your first panel, a member of the State Senate of Colorado, Senator Ament. Senator Ament has a long and distinguishing career in the legislature, both in the House and Senate. He's worked on various national legislative organizations and had input throughout, and I think you'll find that he's a very valuable witness.

Not only has he had to deal with the haze issue from a public policy standpoint, but he is also in agriculture, and so on a day-to-day basis he's had to live with a lot of the things that he's going to be talking about today as a citizen of this country.

I would state further that I'm especially pleased that you were successful in getting your amendment passed, which put off the haze rules and regulations until the PM new standards were put into effect. That's a very important amendment. I supported that.

And one of the main concerns that I've expressed time and time again in this committee is that somehow or the other we don't treat Federal agencies different than we do the average American out on Main Street.

I think that is particularly true in Colorado, where we find activities that are being carried on by the various agencies of the Federal Government that impact our regional haze issues, and yet the people of Colorado don't have a say about it. What happens in our neighboring States has an impact on us, and yet we don't have a say on it.

So I think this is a very important hearing. I apologize that I won't be able to stay here for the entire hearing, because I do have an intelligence hearing and a meeting at 2:30 that's very important, so I'll have to step out. But I'll have staff here, and I'll very carefully review what has been said in this.

I thank you, Mr. Chairman, for your leadership.

Senator INHOFE Thank you, Senator Allard.

We'd ask our witnesses in the first panel to come to the table, if you would, please. We're going to try to adhere to our 5-minute rule in opening statements. Your entire statement will be made a part of the record.

While there are not many of our subcommittee here, they're all represented by staff, and we understand some more will be coming.

Each witness will be allocated 5 minutes for opening statement. We have lights in front of us so that we can help you adhere to that. Then we'll have 5-minute rounds.

I'll start off by introducing the members of the first panel. Mr. John Seitz, director, Office of Air Quality Planning and Standards, Environmental Protection Agency; The Honorable Donald Ament,

chairman, Colorado Senate Agriculture Committee and Natural Resources and Energy Committee; Dr. Dianne Nielson, executive director, Utah Department of Environmental Quality; The Honorable John Paul Woodley, Jr., secretary of Natural Resources, Commonwealth of Virginia; and Mr. Shawn Kendall, executive assistant, Phelps Dodge Corporation.

Senator INHOFE With that, we'll call upon Mr. Seitz to begin.

STATEMENT OF JOHN S. SEITZ, DIRECTOR, OFFICE OF AIR QUALITY PLANNING AND STANDARDS, ENVIRONMENTAL PROTECTION AGENCY

Mr. SEITZ. Mr. Chairman, members of the subcommittee——

Senator INHOFE. If you would pause for a moment, Senator Sessions has come in.

Senator Sessions, did you have an opening statement to make?

Senator SESSIONS. No, other than to say I do consider these very important issues. I thank you for holding hearings on them, and I look forward to hearing from the panelists.

Senator INHOFE. Thank you.

Mr. Seitz?

Mr. SEITZ. Thank you.

Mr. Chairman and members of the subcommittee, thank you for inviting me back to discuss EPA's proposed rule dealing with regional haze.

As we discussed in April, virtually all of our parks and wilderness areas are suffering from some degree of visibility impairment. We know that the pollutants that create regional haze can be transported over long distances, and that the cause and severity of regional haze vary greatly from east to west.

Average visual range in the western United States is 60 to 90 miles, or about one-half to two-thirds what this range would be without the impairment.

In the eastern half of the United States, this range is 15 to 30 miles, or about one-third of what the visual range would be without the impairment.

One of the major challenges associated with dealing with this issue is the impairment is not caused by a single source or a group of sources next to the park or wilderness area, but rather a large group of sources that are spread over a large geographical region.

As you know, in the 1977 amendments to the Clean Air Act, Congress set the national goal for visibility, for the prevention of any future and the remediation of any existing manmade impairment of visibility in certain parts in wilderness areas known as class one.

As you also know, in the 1990 amendments to the Clean Air Act, Congress reinforced the 1977 goal by directing EPA to tackle the problem of regional haze. In response to that, we established the Grand Canyon Visibility Transport Commission. After several years of work, the commission concluded and gave a report to the Agency in June 1996.

Under the 1990 amendments, Congress required EPA to take regulatory action within 18 months of receipt of the report. EPA proposed the regional haze rule in July 1997 in conjunction with the final national ambient air quality standard for fine particles.

In developing the proposed regulation, EPA took into account the report of the Grand Canyon Visibility Transport Commission, as well as the findings from the 1993 National Academy of Science report, and the advice from EPA's Clean Air Act Advisory Committee.

After fully taking into account all public comments received from our proposal and the supplemental notice, we intend to finalize this rule over the next several months.

Mr. Chairman, at your previous hearing on this issue, Governor Leavitt, the co-chairman of the Western Regional Air Partnership—the body established to implement the recommendations of the Grand Canyon Commission—testified about the importance of protecting visibility in our parks and wilderness areas. He discussed the inherent social and spiritual values of the breathtaking vistas in the west. He also testified about concerns he had with our proposed rule and expressed his desire to ensure that EPA craft a final rule that was consistent with Commission recommendations.

At that same hearing, I testified that the Agency will ensure that our final rule will facilitate State implementation of the recommendations of the Grand Canyon Commission. I committed to work closely with the Western Regional Air Partnership and western States.

To that end, I have had numerous meetings and discussions with representatives from industry groups, western States, representatives from environmental groups, and other stakeholders concerning this rule.

On June 29 of this year, EPA received a letter from Governor Leavitt on behalf of the Western Governors Association that addressed how EPA should treat the Commission's recommendations in our national rule. WGA developed the letter in conjunction with various stakeholders involved in the process. EPA was not part of this process.

In the letter, Governor Leavitt requested that we put the letter in the public docket and reopen the comment period for 30 days so that other parties could react to the letter.

On September 3, we published the notice, making the full text of the Governor's letter available to the public, and also provided sample regulatory language for the public to react to.

In short, we are going the extra mile to ensure that we're responsive to the concerns raised by Governor Leavitt and the Commission.

In that same Federal Register notice, we asked for comment on how EPA should interpret the provisions of the Transportation Equity Act for the 21st Century, or TEA-21.

As you well know, Mr. Chairman, that legislation includes a provision that reinforces our goal to harmonize State planning of particulate matter and haze.

In conclusion, we expect that our final regional haze rule will establish a framework to improve visibility in our national parks and wilderness areas, as the Congress intended.

I want to make clear that we have not made final decisions on this matter, and that we will continue to carefully consider all public comments prior to finalizing our rule.

Our goal is to ensure that our final rule achieves the Congressionally-mandated improvements in these valuable treasures of our Nation.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Mr. Seitz. It's very nice to have you back again.

Senator Ament?

STATEMENT OF HON. DONALD AMENT, CHAIRMAN, COLORADO SENATE AGRICULTURE, NATURAL RESOURCES, AND ENERGY COMMITTEE, DENVER, COLORADO

Mr. AMENT. Thank you, Senator Inhofe. Mr. Chairman, I appreciate your holding the hearing. A special thank you to Senator Allard. I'll include your remarks in my campaign statement. Senator Sessions, nice to meet you.

I'm Don Ament. I chair the Senate Agricultural and Natural Resources Committee in the Colorado Senate. I'm also a farmer and rancher out on the northeast plains of Colorado. I've devoted a lot of time to the issues of agriculture and natural resources and environment. It affects my way of life, as well as the constituency that I represent.

Since 1990, I've watched the Federal Government, and particularly Environmental Protection Agency, struggle with the concept of regional haze and air pollution. I am here today to urge the Congress to take whatever steps it can to prevent the EPA from implementing the regional haze rule. I think it is unsupported by the law.

First, in the 1990 Clean Air Act, we debated all the provisions—specifically debated and rejected them. I think you probably recall all of those.

I think it is very important that Congress indicated that they rejected this idea. The regional haze rules were just, I don't think, based on science, and not giving States the necessary flexibility.

Second, EPA's regional haze rule ignores the most significant contributors' causes of what I conclude cause regional haze. I think we have to really attribute to those sources, the ones that are causing the major problems. I think you all know that that's largely fires, that's dust, and it is also import air from Mexico.

In addition to these substantive flaws found in the proposed regional haze rules, the EPA is now also proposing an accelerated implementation schedule for stationary sources in sulfur dioxide controls, ignoring the mandates of Congress found in the recently-enacted Inhofe Amendment.

I understand the Inhofe Amendment recognizes the necessity of flexibility regarding the Grand Canyon Commission's time table; however, EPA has selectively used the June, 1998, Western Governors Association—and I, too, have a copy of Government Leavitt's letter to the regional haze rule—to accelerate implementation of the regional haze rule well ahead of not only the Grand Canyon's recommendation, but well ahead of the Western Governors Association proposal.

Because of the reaction by the Colorado General Assembly that EPA and other unelected, out-of-state organizations might ignore some sources of air pollution of the west which impact visibility

and other aesthetic standards, I sponsored legislation in 1997 which mandates the State of Colorado maintain regulatory control of measures designed to reduce air pollution producing regional haze. This Colorado law was enacted primarily to prevent command and control, top-down regulation of Colorado air pollution problems which would ignore some sources of air pollution and increase dramatically the cost of operation of other sources without solving the haze problem.

In our State, it's common of Legislature review, final environmental regulations mandated by our Environmental Protection Agency so that elected representatives have first-hand knowledge of science, economics, and anticipated benefits of proposals to help improve our environment.

I'm sure that you on this committee are familiar with the Grand Canyon Visibility Commission. The Commission submitted recommendations to address western regional haze to the Environmental Protection Agency in June 1996. One of the major conclusions of the Commission was omissions from fire, both wildfire and prescribed fires, is likely to have the single-most impact on visibility in class one areas.

We in Colorado are familiar with the Grand Canyon Commission's recommendation. In fact, since 1996, the Colorado Legislature has twice passed legislation designed to hold Federal agencies accountable under the authority granted us by section 118 of the Clean Air Act for control of pollution from Federal resources.

Twice the Federal agencies have lobbied our Governor Romer to veto the bill, and twice that interference by Federal agencies has been successful. The result is the General Assembly still has not been able to demand a standard from Federal land managed to minimize emissions from fires and dust on Federal lands.

As I sit here today, we have controlled burns that are hazing up the air in Colorado. To me, it's only common sense that Federal resources should be managed to minimize emissions which cause haze if such non-health issues are truly a national priority.

I note with dismay EPA has not been helpful in requiring major sources of pollution from Federal facilities or lands to be taken into account in either its regional haze or in its daily operations. In fact, it appears to us that the EPA makes excuses and covers up other Federal agencies when air pollution emanates from those Federal lands.

Think about it. Here is the example. The Grand Canyon Commission science identified emission from Federal land fires as a major source of western haze, but soon after the Department of Interior managed a 500 percent increase in burns.

In the House Resources Committee hearing last fall, the Secretaries of Interior and Agriculture stated 50 percent of western forests would need to be mechanically treated before prescribed burns could be set, but the State need for logging or mechanical treatment does not reflect on the Agency.

I see my time is up. You will find that I have four suggestions for you about what we would hope Congress would take in my testimony, and maybe in the question and answer period I'll get a chance to reemphasize those four points, Mr. Chairman.

Senator INHOFE. Thank you, Senator Ament.

Dr. Nielson?

STATEMENT OF DIANNE NIELSON, EXECUTIVE DIRECTOR, UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY, SALT LAKE CITY, UTAH

Ms. NIELSON. Mr. Chairman, members of the committee, thank you very much for this opportunity to appear before you.

I'm the director of the Utah Department of Environmental Quality, and I'm Governor Leavitt's official representative to the Western Regional Air Partnership.

The Governor has taken an active role in air quality and visibility issues in Utah and in the west as the vice chair of the Grand Canyon Visibility Transport Commission, the co-chair of WRAP, and the lead Governor for air quality issues for the Western Governors Association. I'm here today on behalf of Governor Leavitt to provide testimony regarding a western regional approach to regional haze and the Environmental Protection Agency's recent notice of availability for additional information regarding that proposal.

This is an important issue to western States, to the people who live and work there, as you're hearing in the testimony today, and to the people who visit.

As Utah's chief environmental officer, I appreciate the inherent value of our western vistas, and my stewardship responsibility to those resources.

This subcommittee has been vigilant in its efforts to oversee not only the regional haze regulation that has been proposed, but the work of the Grand Canyon Visibility Transport Commission and its successor, the WRAP. You are aware of the history and the work on this unique partnership for regional environmental management, so I won't go into those details, although they are provided in my testimony.

What I would like to focus on is what happened since the hearing where Governor Leavitt appeared before you in April of this year.

At that time the Grand Canyon Commission and WGA's environmental doctrine had been formed of work and testimony that we had used as our guide in efforts to seek solutions for environmental and natural resource problems, specifically regional haze.

When we appeared before you in April, the Governor indicated that we were working with EPA, but at that time we did not have specific resolution on issues.

Following that hearing, there was a group of environmental interests who also voiced concern about conclusion of this work on the regional haze regulation.

So again, with a renewed determination, we formed a consensus work group to specifically define language which we could support for implementing the regional haze regulation.

On June 25, that consensus document was completed, and on June 29, Governor Leavitt, on behalf of the Western Governors Association, provided that document to Administrator Browner.

Since that time, the environmental groups have also endorsed that consensus document. EPA has now proposed, through their recent notice, consideration of the consensus document that was provided.

It is important to recognize that the Grand Canyon recommendations and the work of the WRAP in this recent consensus document all recognized that improvements in visibility must include more than just the management of emissions from industry stationary sources.

Mr. Chairman, at the beginning in your comments you asked about some very specific issues, including prescribed burns. There must be—and we have supported in the context of regional haze regulation—management of wildfires and the emissions from those wildfires. There must also be a part for management of the increasing volume of mobile sources and of vehicles on-road and off-road, as well as dust and trans-boundary pollution.

What I would like to focus on are recommendations that specifically come from the report that we provided to Administrator Browner.

First of all, the consensus document laid out time frames for the development and implementation of our recommendations. I realize those time frames are tight time frames, but we think that EPA has accurately reflected those, and we think they're attainable time frames. We need to get on with the business of implementing a regional plan for management of regional haze.

The consensus document also defined components necessary for inclusion in State and tribal implementation plans, and flexibility in terms of preparing those plans, and we think EPA has accurately reflected that in their notice.

I have provided in my comments additional comment on the report. I would offer those to you as they have been provided. I would emphasize that, as you review the rest of these recommendations, and as we answer questions today, that you appreciate that we still, as States, see the deciview as a measure but not a standard. We must focus on the mechanisms for controlling pollution, not on the deciview as we move forward; the reasonable progress is defined within the WRAP recommendations and will be in the plan that we bring forward under those recommendations; and that, while BART is a tool that, as States, we feel we need in the tool box, it should not be a mandatory regulation and it should be something that we have the discretion within our programs and our implementation plans to be able to implement.

I appreciate the time today, and I'll be happy to answer questions.

Senator INHOFE. Thank you, Dr. Nielson.

From the Commonwealth of Virginia, Secretary Woodley.

STATEMENT OF HON. JOHN PAUL WOODLEY, JR., SECRETARY, NATURAL RESOURCES, COMMONWEALTH OF VIRGINIA, RICHMOND, VIRGINIA

Mr. WOODLEY. Thank you, Mr. Chairman.

It is a privilege to be here today to represent the Commonwealth of Virginia, and our Governor, Jim Gilmore, who asked me to send special greetings to Senator Sessions, his former colleague as attorney general during the time he was attorney general of Virginia.

I wish to say that in Virginia we very deeply appreciate Congress' efforts in passing TEA-21 and adapting the time lines for the regional haze and $PM_{2.5}$ programs so that they coincide.

As you know, the eastern States have been focusing on health-related air pollution issues such as the issues surrounding ozone, nitrous oxides, and the $PM_{2.5}$. They have been unable to devote the resources needed to address the issue of regional haze.

The additional planning time this revision to the law will create will enable us to properly address or assess our regional haze conditions and develop effective strategies.

Second, Mr. Chairman, Virginia, along with other States, recognizes that visibility is a regional issue and must be dealt with on a regional basis. The inadequacy of EPA's proposed approach to regional planning is highlighted in its recent action with respect to a particular group of States, or the action that Dr. Nielson dealt with a moment ago, reflecting the supplemental notice on implementation in response to the Western Governors Association concerning the recommendations of the Grand Canyon Visibility Transport Commission.

These recommendations make the proposed rule more flexible, although, as Dr. Nielson indicated, the rule remains deeply flawed, but it is important for EPA to recognize that the other States and regions need the same opportunity to address their specific regional concerns.

States should be allowed to incorporate the recommendations of a regional commission as part of their State implementation plans without having to justify their programs individually.

Third point, Mr. Chairman, regional haze is an issue that must be addressed with the coordination of States, localities, and other stakeholders. The traditional methods of States and localities addressing control measures within their boundaries to resolve localized air pollution control problems cannot address regional haze problems. One State has no authority over any other State to implement control measures.

For most mandatory class one areas—and I include those located in Virginia—the host State cannot individually implement control measures that will ensure improvement in visibility within those class one areas. Transport regions and commissions will be required to implement effective regional programs for visibility improvements.

Now, EPA encourages regional stakeholder coordination to address regional haze, but does not address how such efforts will be facilitated or provide incentives for stakeholders to participate.

Congress acknowledged the need for multi-State coordination in the Clean Air Act by establishing authority for EPA to establish visibility transport regions and commissions, and States do not have such authority, as the authority in the Clean Air Act clearly places the responsibility on the Environmental Protection Agency.

The proposal requires that individual States address and justify control programs individually. This is a disincentive to expend resources to coordinate with regional groups.

Regional haze rule must also directly allow for implementation programs developed through the regional coordination process.

The fourth point, Mr. Chairman, is that, given regional haze is a welfare rather than a health issue, States should be allowed to abandon or to develop alternative goals and programs for visibility improvement separate from the deciview and no degradation tar-

gets. These regional haze measures should focus more directly on the scenic viewing, which is the point we're actually trying to get at, and use a system that has more of a relationship to the public's overall ability to experience improved viewing.

We believe that the use of the deciview scale, normal measurement developed by EPA, does not provide an accurate reflection of the total viewing experience.

The proposal also emphasizes the best available retrofit technology for point source emission control. It identifies the private sector in the western United States as being the most effective.

However, the EPA also subsequently agrees with the Grand Canyon Visibility Transport Commission's recommendation for addressing stationary source by providing a flexible air quality planning framework to facilitate the interstate coordination necessary to reduce regional haze visibility impairment in mandatory class one Federal areas nationwide.

It's certainly not clear how this BART program provides flexibility, as it is experiencing costly analytical, technical, and legal challenges that would divert scarce State resources.

The regulation should explicitly allow for alternatives to the BART process such as market trading programs and emission caps.

The last point I'd like to make, Mr. Chairman, is the proposal requires each State to submit revised sets which provide for periodic revision of the long-term strategy. These periodic provisions are not required by the Clean Air Act and are not needed to address the national goal and will draw on resources better used for pollution control elsewhere.

The provisions that EPA proposes for tracking regional progress are unnecessarily frequent and resource intensive.

Virginia would note that the section 169 of the Clean Air Act clearly makes EPA responsible for evaluating visibility improvement over time; therefore, each State should not be required to individually assess improvements through continual provisions.

Just in summary, Mr. Chairman, I suggest and Virginia suggests, first of all, that this rule that is proposed by EPA is a classic unfunded mandate on the States, and, furthermore, that we would point out and note to the committee that this regulation would be enforced by the same coercive Clean Air Act sanctions that Virginia has consistently regarded as highly detrimental to our Federal system.

Senator INHOFE. Thank you, Secretary Woodley.

Mr. Kendall?

STATEMENT OF SHAWN KENDALL, EXECUTIVE ASSISTANT, PHELPS DODGE CORPORATION, PHOENIX, ARIZONA

Mr. KENDALL. Thank you, Mr. Chairman and members of the subcommittee.

I'm Shawn Kendall, executive assistant on the corporate staff for Phelps Dodge Corporation. I'm the Corporation's policy and technical lead with respect to regional haze.

With respect to the Grand Canyon Visibility Transport Commission, I spent about 6,000 hours of my time working in the process, serving as the secretary of the public advisory committee that delivered the consensus recommendations to the Governor for their

consideration. I also served on the technical and policy committees and was heavily involved in all of the technical work.

Subsequent to that, the Commission formed, or the Governors and tribal leaders of the west formed, a voluntary alliance called the Western Regional Air Partnership to follow through on the Commission's recommendations. This was one of the key recommendations that came out of the Public Advisory Committee process—the need to be vigilant in monitoring where we are in the future.

That organization just got staffed up a whole bunch a couple of weeks ago. We've got about 180 people now involved and will probably have 250 by the time we're done. These groups are going to be following through on trying to help develop work products for the States to use and tribes to use in developing their implementation plans, and we're anticipating right now most of those work products will be available for the States and tribes to rely on by about the end of 2001.

With respect to EPA's regional haze rule, I was quite disappointed, Phelps Dodge was quite disappointed with respect to the proposal that came out last year. We felt that it really missed the mark. It didn't reflect what happened in the Commission process. It didn't have guidance about the Commission's work. The kind of guidance it was giving the States didn't encourage enough collaboration between the States.

We suggested that they seriously consider re-proposing the rule, especially recognizing that much of the work products out of the Commission were not in the docket.

Western Governors had an initiative Dianne talked about. I served as a stakeholder in that process to try to work through and develop some things that were more consistent with what we believe needs to happen on the list.

We—and I mean the stakeholders on the list, the environmentalists, the industry people, States—we believe that we've got the right plan. We spent a lot of time in the Commission process coming up with these recommendations, and we think this is the way to do it.

I really commend EPA for allowing that comment period. There are a lot of people in the west that felt disenfranchised from that process because it was a small group, but it was important for everybody to have an opportunity to participate. I believe very strongly in the public processes that we have going on here.

With respect to Visibility Transport Commission, I think that, of all the lessons we learned in the Commission process, the one that is the most important is that you cannot possibly deal with regional haze and visibility protection in class one areas unless you work collaboratively. You have to work together. You have to know what the emission management strategies and plans are of other States and how they will affect the visibility in your class one areas.

I encourage that we follow through on allowing other groups to form Visibility Transport Commissions, because it is a wonderful process to see the environmental community, the industrial community, and the regulatory community coming together and coming up with really valuable long-term strategies.

This brings up a major concern, which is funding. These processes are not terribly expensive when you consider the value of the in-kind contribution of time, but they do cost money. There is some concern right now within the Western Regional Air Partnership about where we are going to get funding, and we're looking for some specific things that need to be done with respect to the Commission's follow-on annex to guide the stationary source work.

With respect to re-proposal, Phelps Dodge believes that the Agency should re-propose this rule. We said that in December. We still feel that way.

This recent work with respect to the Grand Canyon Visibility Transport Commission went a long way, but it is still hard to see the entire rule context, and we would like to see the thing re-proposed.

Thank you.

Senator INHOFE. Thank you, Mr. Kendall.

Mr. Seitz, first, I'm glad that the EPA decided to publish the Western Governors proposal for comments. The form in which it is published is basically a rider on the haze rule. Do you believe the rest of the country should be given the same opportunity as the west has had in their own Visibility Transport Commission to craft local solutions to their visibility problems?

Mr. SEITZ. Senator, absolutely. We talked earlier in the hearing last April about the intent of the rule and some of the issues raised by the Commonwealth of Virginia. We strongly believe that success for this is local jurisdictions working together to craft solutions to the problem, and to that end I think, particularly with the TEA-21 legislation, in light of the schedules for submission of strategies for haze, we have more time than was provided the Grand Canyon Commission for these bodies to work together to come up with collaborative situations.

I totally agree that the only way this can be done is through States working together to come up with common strategies. I would suggest, however, that if EPA, through regulations, prescribes which States were to talk to each other, that I might be before you to explain or Western States would be saying that EPA was top-down prescribing how States should work together.

So what we tried to do was craft a rule that allowed States to work together much like they are now in the southeast, the Southern Appalachian Mountain initiative, which is a voluntary group, a non-mandated, regional body that is looking at combined solutions to the problem.

Senator INHOFE. Well, once these other regions have issued recommendations for their definition of "reasonable progress," would they deserve their own rider to the regional haze rule?

Mr. SEITZ. We formed the Grand Canyon Commission and established the Commission in response to the 1990 amendments, and its recommendations formed the basis for the development of the rule which was proposed.

I believe—and this is an area we're receiving lots of comment on—that all States do have the ability to do just what you're saying.

Senator INHOFE. Have their own rider?

Mr. SEITZ. I don't know that they need a rider. They have the ability to adopt their recommendations in their SIPS.

Senator INHOFE. What do you think, Secretary Woodley? Do you think that Virginia deserves its own program?

Mr. WOODLEY. Yes, sir, indeed, Mr. Chairman. I am not at all certain that the EPA's rule is so clear, that if such a program came forward it would be approved by the Agency.

Senator INHOFE. Yes. Mr. Seitz, now that the bill has passed with the extension that we put on the highway bill for the haze implementation plans, isn't there plenty of time for the EPA to pursue the regional commission process?

Mr. SEITZ. Well, I think there are two questions you have to deal with. One is the formal visibility transport commission, and the Agency would be pleased to engage with other States in that conversation. But, as you are aware, these commissions only deal with haze, and I think your amendment or the TEA-21 legislation clearly intends that haze and pollution programs be integrated.

The Commonwealth of Virginia has indicated very strongly that the work they are doing on ozone and particulate matter should be looked at as programs that also benefit haze. As you know, the Visibility Transport Commission only addresses haze.

We would be more than willing, and the Agency stands ready to talk to any regional body on that issue. We want an integrated strategy because we believe that's most cost effective, but that is the decision of the State.

Senator INHOFE. In trying to keep response rather short—I know it will be difficult to do, but in my opening remarks I talked about the four areas left, and would you briefly address what the EPA has done to meet these concerns?

Mr. SEITZ. Well, let me go through these, and if I miss the mark on some of them please remind me.

One of the issues was deciview, and in your hearing in April there was a tremendous concern that the deciview was a standard—that is, States could be enforced against that standard. EPA did not intend to make it a standard; just as suggested by one of the other witnesses, the deciview is a metric that is used to take a look at progress or to measure how we're doing. It is not an enforceable standard and was never intended to be an enforceable standard against the State.

Your second issue was reasonable progress. At the last hearing, you felt reasonable progress should be measured against, as I understand it, an emission reduction strategy rather than the target. EPA continues to believe that State implementation plans should be emission strategy based, that that is what we should hold a State accountable for. Are they doing their part in reducing emissions?

The other issue was prescribed burns and how they will be dealt with in the Grand Canyon, as well as nationwide.

I acknowledge fully that the Grand Canyon Commission report indicated that wildland fires could, in fact, overwhelm any of the progress that could be made with the emission reduction strategies.

As the Commission went on to say in the text of the report, we believe that prescribed burning in the long run will have a more beneficial effect.

I think we all would admit that a prescribed burn is better than a catastrophic burn such as we saw this year in Florida. What we are trying to do with the other Federal land managers—and I believe in Colorado there are already agreements with the Federal land managers, and I can check that for the record—is work with local areas to, as you recall, from the structure of the rule, control burning. We're talking about improvement on the 20 percent worst days. Prescribed burning should take place outside of that ban, should take place with advanced notice to the State regulatory agency, and in some cases be permitted. It should be monitored. The Federal land managers have said they will comply with this and have already come forward to work with most States.

I'm unfamiliar with the legislation the Senator refers to, but if that legislation directed that all use of fire in the State of Colorado for all sources—Federal lands, State lands, agricultural lands—that it be subject to some type of review, under section 110 of the Clean Air Act we would have to comply with that.

Senator INHOFE. I'd like for the other four to be thinking about their responding to those four points, and I'll pass it over to Senator Sessions. We'll kind of go back and forth with this.

Senator SESSIONS. Thank you.

Mr. Seitz, fundamentally you don't disagree with Mr. Ament's conclusion that fires are the most important cause of regional haze. The Federal Government is the primary entity responsible for those fires?

Mr. SEITZ. I guess, as a technical matter, I probably would. I believe that——

Senator SESSIONS. You would disagree?

Mr. SEITZ. I would disagree. There is no question——

Senator SESSIONS. Just briefly, why would you disagree?

Mr. SEITZ. I believe the total emissions from fires on a 10-year planning framework for improvement represent 10 percent of the total emissions. They are part of the issue, but they are not all of the issue.

Senator SESSIONS. How accurate do you consider the historical clean air standard based on manmade causes, as opposed to natural conditions?

Mr. SEITZ. I think, as we've talked about in the proposed rule, the issue is natural conditions versus forest fire. We are saying that that baseline has to be established within the first 5 to 7 years of the rule. This is one of the challenges that has to be addressed. That baseline is critical.

Senator SESSIONS. Well, let me ask those of you that have been involved in the Grand Canyon Commission, Government Leavitt, as I recall his testimony, he was very passionate about the effort he put into that. Mr. Kendall, you said you spent 6,000 hours. That's, what, 2 or 3 years of——

Mr. KENDALL. Yes.

Senator SESSIONS.—40-hour weeks of your time volunteering to come up with a proposal that would help improve visibility in the west.

Governor Leavitt, as I recall, Mr. Chairman, just explained that with great passion and concern about what they had done. He was

holding his breath to see what EPA would do with the hard work of so many involved persons.

I hear each of you saying you do not believe that it was received respectfully enough and was not acted on by EPA in a sufficient manner.

Would any of you like to comment on that? Yes, Dr. Nielson?

Ms. NIELSON. Yes, Senator, I believe that is certainly true of the original regulation that was proposed by EPA. I think since that time, and particularly since your hearing in April, the work that we have been doing with EPA and the other members of that partnership and the consensus document that we provided and EPA's commitment to reflect that consensus document as an entity, not parceled and picked apart, in the final rule is the key to success in what you're identifying as the critical piece and being able to manage regional haze.

We have developed a consensus approach to this through the Grand Canyon and now through the work of the WRAP. I think we have the ability to address those issues. Fire, overall, may be not the hugest or largest percent of the problem, but, on a given day, it is part of the problem.

We need to be able to address those issues. I think addressing them through a regional partnership at the local level with States, Federal land managers, and the EPA, and tribes in the process together defining the process gives us the ability to do that.

So at this point, I would support going forward with the partnership, defining the strategies as we've laid out in that consensus document and as I understand EPA's commitment to be that they will include within their final regional haze rule.

Senator SESSIONS. Secretary Woodley, you made an interesting point, and that is that, in my area of Alabama, Birmingham, foothills of the Smokies, I guess, we have a number of challenges—ozone, particulate matter challenges that are taking a lot of time.

Our main forest area, national forest area, is the Bankhead Forest, which is very little populated and very little seen by many people, and it seems to me that we've got a major metropolitan area with 600,000 or 700,000 people that are on the margin of being out of attainment, and this is distracting us from our primary health function.

Do you have any thoughts about that?

Mr. WOODLEY. Senator, I agree with you 100 percent. Implementing this rule, even on the time table proposed, would be a significant distraction, I believe, from Virginia's regulatory agencies and our metropolitan planning organization processes that we have underway that are seeking to address health-based standards that have previously been imposed in other initiatives under the Clean Air Act by the EPA.

As Mr. Seitz just indicated, the basic science is not now done to establish the baselines, to establish the emission factors from various kinds of activities that contribute to regional haze to determine the difference between the natural causes and manmade causes of these types of things, or to determine to what extent the work we're doing on health-based standards will, in fact, address the same issue.

Certainly small particulates in this 2.5 standard, we would expect, if we deal with that, and deal with it on a transport basis, would address——

Senator SESSIONS. Would it, itself, improve the circumstance?

Mr. WOODLEY. I fully expect that it would. In the meantime, we have laws in place that prevent significant deterioration. The PSD program that Virginia is now running within our State allows Federal land managers to interpose a virtual veto on any new permit for new facility that would significantly deteriorate the visibility in their class one areas.

So the need to do this science and to do this work at the same time that we're addressing the NOx SIP call, the 8-hour ozone standard, the $PM_{2.5}$ standard, I don't know where I will get the resources. I do not know where I will get the resources to do that and, unfortunately, EPA is not suggesting that they are able to fund that mandate.

Mr. SEITZ. Senator, could I comment since he referred to a statement I made?

Senator INHOFE. This is Senator Session's time.

Mr. SEITZ. Senator?

Senator SESSIONS. Yes. Fine.

Mr. SEITZ. I think there is no question where I would disagree with Secretary Woodley is the science is here. The National Academy of Science in their report found that the science is there. There is no doubt concerning what the various sources are that contribute to regional haze.

I think the baseline we're talking about is how does forest fire play in that issue, as I would respond to your question. The National Academy of Science found that, in fact, the science is there, and, in addition, as Secretary Woodley is well aware, the actions that he, himself, stated would be taken and we said in the rule you are correct, and in Birmingham you are correct. The acid rain reductions, the reductions that we're seeing as far as first planning increment for this rule will probably produce a two to three deciview improvement in those regions of the country, so there will be definite benefits from these health-based actions that the State of Virginia will be taking.

Senator SESSIONS. Well, it seems to me odd that we started with a problem of the Grand Canyon view, and now we've had virtually every area of the country moving away from health issues that have been driving us, having to focus on visibility, which will probably be benefitted by the same health activities that we are participating in.

And the law just required reasonable progress. I hope that we can be reasonable in what you're requiring.

And if you—I know my time is out, but I didn't give the others a chance to comment on how they felt about EPA's final or interim decisions on respecting the decision made by the Commission. Mr. Kendall or Mr. Ament?

Mr. KENDALL. With respect to that, I think that one thing we have to recognize is that the title 4 program, the ozone issues in the east are going to be major emission drivers that are going to have collateral effects on visibility. Out in the west we don't have those kinds of pressures.

We've looked at a strategy. We have to look at all sources of pollution. In our recommendations we talk about prescribed fire and fire management. We talk about mobile source issues. We talk about stationary source issues. We talk about issues about Mexico, transboundary issues.

All of these contribute. You know, the west is so clean, there's such a light loading of particles in the atmosphere that it's not one particular thing you can go after if you're talking about trying to manage this.

With respect to the state of the science, I take exception with the assumption that you can define "natural background" on the worst 20 percent days. We spent a lot of time. We still don't have good, sound models out there. The Commission did develop some models in our process. They need to be improved.

A lot of the work that we're doing now is trying to drive the state of the science forward to help EPA with these implementation strategies where we can take emission management plans from States and turn them into visibility projections. This is all driven by $PM_{2.5}$.

When we talk about $PM_{2.5}$, in effect that's a visibility model. That's all we did in the Commission process—we predicted the concentration of $PM_{2.5}$ by specie and then converted that into light extension.

With respect to the deciview metric, the Public Advisory Committee concluded that the deciview metric, as a way of describing visibility, was a sound one because it allowed people to see perceptible changes in increments.

They didn't agree to reasonable progress defined as a metric like that, but in terms of trying to convert your standard visual range or light extension into deciview we felt that that was a good way of trying to communicate to the public what that meant.

Senator SESSIONS. It would show you when you're making progress, but it wouldn't show you what your standards ought to be?

Mr. KENDALL. It would tell you whether or not you've had a perceptible change, and that's one of the keys to it.

If you go from 19 to 18, that's a barely perceptible change.

Senator SESSIONS. Would a dry, windy year in the west put more haze than how many automobiles out there? Are those factors that have been analyzed accurately?

Mr. KENDALL. That's one of the issues that I have with the original proposal. I disagree with the assumption that you can define natural conditions at that level and then drive yourself toward it. I don't think our science is there yet. I don't think it is unreasonable to expect it will be within 10 years, but it is not here today.

With respect to reasonable progress, the Commission, when they were looking at the whole concept of emission management strategies, set a process in place that took almost a year and a half and many public workshops to define the criteria for evaluating emission management strategies.

Now, it isn't just cost, it isn't just this thing. We're talking about social and cultural effects, administrative ease and effectiveness, a whole bunch of things, and all of them—you know, they're not all the same. So human brains have to sit around a table and balance

these things and come to a consensus about what reasonable progress is, and I think that's the way reasonable progress should be defined, not by a metric, but by a consensus collaboration on a group of criteria that the members agree are the criteria of consideration.

Senator SESSIONS. I'd ask—Senator Ament had a comment on that.

Mr. AMENT. Thank you, Senator Sessions.

First I want to say something about visibility baselines. That's a particular concern to us with the Forest Service talking about more and more prescribed burns. Recently we've had a couple of Forest Service burns out of control and news broadcasters talking about, "The haze you see in the air is prescribed burns." I think that is of particular importance to us.

Attribution? I think that's another big issue.

As you heard Mr. Kendall say, we are faced—and, in fact, Mr. Chairman, I think you'd be amused. I'd like to know the contribution the green Forest Service pickups put in the air as they drive up and down, hundreds of them every day, scouting around whether or not we're going to clean up this blow-down over there near the Zirco Wilderness Area.

But I think there are so many sources—the blow-in sources, the sources of all the mobile sources, as well. I really feel that we don't have a good handle on how we attribute what each particular segment contributes to our haze problem.

Deciviews? I ran a bill in Colorado to try and set that so we could have something to tie our hands to, and met with all kinds of problems from my friends at the Federal level and the environmental groups.

Senator INHOFE. Senator Ament, along that line, I think I heard you say that you passed two pieces of legislation or one that the—two that the Governor vetoed. I'd like to have you—I'm a little familiar with—since many years ago I attended the University of Colorado, I have been following the politics there, and I'd like to know if you could give us a short synopsis of the type of legislation you passed that the Governor vetoed.

Mr. AMENT. We tried to get a handle on how we could be the first, if you will, to try to get something on visibility. As you may know, we even passed a QRV bill in Colorado. That took 2 years.

But anyway, back to the visibility kinds of issues and getting the Federal Government—again, a bill passed that the Federal Government is going to have to abide by our rules and regulations is certainly a task that we failed in after it passed the General Assembly by not being able to convince the Governor's office they ought to sign it.

Probably the biggest actors in the defeat of these two air bills was the Forest Service. The Forest Service and the United States Park Service were the ones that I think aided the environmental community in placing around the Governor's office—I happened to be in the Governor's office when I was arguing before to pass this bill—flip charts around the entire office, an office nearly as big as this room—flip charts on why these bills ought to be defeated, and it was very disconcerting, you know, that here we had spent a lot of time researching the issues to put a Colorado thing in place the

exempt flexibility, include everybody in the talk, and then have our friends put us down. In short, Forest Service and Park Service were very effective in that.

Senator INHOFE. Well, you know, essentially, then, as I understand the legislation you passed, it would allow the State of Colorado to take care of some of these problems, as opposed to the Federal Government?

Mr. AMENT. Absolutely.

Senator INHOFE. I'm looking at it now politically. Governor Romer vetoed that, so he's saying, "No, we think that the Federal Government can do a better job than the State of Colorado"?

Mr. AMENT. That's right. He thinks that we—I think Governor Romer actually felt that—in fact, I think Governor Romer actually caved in to the other side of that argument saying, "Forget all these issues that you brought up about sources, burns, blow-in, and so on and so forth, and a Colorado plan. Let's let the Federal Government do it for us."

Senator INHOFE. It would seem to me politically that would be kind of a difficult position to defend in your State.

Is the Governor term limited?

Mr. AMENT. The Governor is serving his last year.

Senator INHOFE. Okay. I see.

Mr. Woodley, you had made a comment about unfunded mandates, and I always perk up when I hear that, having been the mayor of a major city for three terms. A lot of people are not aware of the fact that it's not crime in the street, it's not welfare, the greatest threat to us at that time was unfunded mandates, and it is something we're trying to address here, and I think you are aware of that.

Describe what you mean by unfunded mandates and try to quantify that, if you could.

Mr. WOODLEY. The Clean Air Act, of course, enables the Environmental Protection Agency to require State implementation plans under certain circumstances, and that's essentially what this rulemaking does. Any State that does not file and have approved by EPA within the time limit set, their State implementation plan is subject either to discretionary or, over a period of time, mandatory sanctions, which include the cut-off of all highway funds and various other quite draconian measures that are described as sanctions in the context of the act.

These make the SIP process mandatory on the States, as a practical matter, and this process that we've described, as you've heard it, will be exceptionally resource intensive.

The idea of establishing the monitors necessary to study the air quality to the extent of describing even the baseline will require significant resources on the part of our agencies well into the hundreds of thousands of dollars, and over time in the millions of dollars. Of course, that is the effort—those are the efforts that will be required by the States. The efforts that will be required on the part of the private sector are, doubtless, even greater than that.

And so now to what extent they will be required in addition to what we are required to do by the other health-based standards is an open question, but I would expect that the health-based standards, by themselves, will not fully address this issue and that the

private sector will be called upon to make substantial expenditures under the best available retrofit technology standard.

And yet, I have not heard suggested that these efforts will be, in fact, funded by the Federal Government in any way, shape, or form, and so we are, as I described it, in the case of a classic unfunded mandate.

Senator INHOFE. For the record, we will be sending questions for the record to each of the five of you, and we would like to have you—we'll have, I guess, 1 week. We'll put a 1-week limit to submitting questions for the record.

The question I want you to answer is to try to give us, as nearly as you can, divided down the types of costs and what the total amount you feel it will be. I know it is a very difficult thing to do, but I'd like to talk in those terms, because it is significant.

Mr. WOODLEY. Mr. Chairman, I'm fortunate in having with me John Daniel, our leading air quality expert in our Department of Environmental Quality, and he heard the chairman's question and will be working on it tomorrow.

Senator INHOFE. Thank you.

Mr. SEITZ. Senator, for the record, you're aware that the Agency is funding 100 percent of the air quality network associated with this program.

Senator INHOFE. Senator Sessions?

Senator SESSIONS. Well, Secretary Woodley, please give my best to your Governor. He was an outstanding attorney general and in short order was a big leader in the National Association of Attorney Generals.

Well, I'll be frank with you and I'll ask Secretary Woodley, because I suppose he has some of these same issues, the timber industry in Alabama may be the most significant, I believe, financial industry that we have, combination of paper companies and just the magnificent natural growth of timber.

Controlled burns are a part of good timber management. Indeed, long-leaf pine is not healthy without burning, and it is what Forest Service and others want to see more return to the natural long-leaf pine forest in the south.

So it troubles me that a whole State dependent upon an industry may be, because of some aesthetic rule, jeopardized and made noncompetitive, because we have a very competitive world market now in paper, and it is undermining—it threatens some of our plants and one I know has closed.

Do you see any sense at which this interest in haze may provide such a cost on industry that it could hurt us economically and provide little health or even aesthetic benefits for the State or region? Mr. Kendall, you may want to comment on that, too.

Mr. SEITZ. I think it is a very valid point. In these cost/benefit analysis, I'm not aware of them having been made.

Senator SESSIONS. Apparently nothing was ever done in that regard, no cost/benefit when this legislation was passed. Is that——

Mr. SEITZ. That is incorrect. There was a regulatory impact analysis done at the time the regulation was proposed, Senator.

Senator SESSIONS. The regulation was proposed, not the legislation?

Mr. SEITZ. The Clean Air Act. I cannot answer that.

Senator SESSIONS. On the haze issue?

Mr. WOODLEY. Senator, I can tell you that we're very concerned, certainly, that we maintain visibility. The Blue Ridge Mountains, where our class one areas are located, are a beautiful area in this country, rich in history, and we are as interested as anyone in preserving the quality of the public's experience, of our citizens, and of the many thousands of visitors we receive.

That's a very interesting point, though, that they call it the Blue Ridge. They are—I was there on Tuesday. They are, in fact, green. They're called the "Blue Ridge" because the earliest settles of this land of the English settlement, when they first saw them from a distance, saw them through a natural haze that gave them a distinct blue color. You can still see that today if you go there.

So the haze that exists is, to a large degree, something that has been, in the east, at least, a part of our natural life and natural world for hundreds of years.

Senator INHOFE. Well, the Great Smokey Mountains, that was a natural haze, also.

Mr. WOODLEY. It is, indeed. I'm not suggesting—I don't mean to suggest for a moment that we cannot improve and should not improve; I'm suggesting that we do it in a reasonable, timely, cost-effective way that does not place undue unfunded mandates on our States and that is timed to coincide with the health-based standards that we're working on, and also that allows regional efforts to be undertaken in a flexible way.

Senator SESSIONS. Senator Ament?

Mr. AMENT. Senator sessions, if I might, this is a real big issue in the west, and particularly Colorado, where we're trying to further the forest industry, health problems, the whole thing, but the industry, the saw mills and so on.

What we have tried to do—in fact, passed a resolution that asked for mechanical harvesting of this before these burns are put in place, and it seems to fall on deaf ears with our Federal partners.

If would could mechanically harvest and put that wood to beneficial use, then do the burns, then we wouldn't have as big and hot a fires and we wouldn't have the risk of catastrophic events and we wouldn't pollute the air so much.

Senator INHOFE. Senator Sessions, I think we're going to have to dispense with this panel because we have that deadline, as I announced at the very beginning of this hearing.

I would say that you will be receiving questions from Members who are not here whose staff is here, and I appreciate very much you folks coming. Thank you.

If the second panel would—let's make it the third panel—the second panel was to be Senator Leahy, who is here now. Senator Leahy, it might expedite things if you would join us up here and then participate as a member of this committee, and we're going to be expediting this because of the briefing that is coming up at 4, trying to get this panel concluded by that time if at all possible.

The third panel will consist of Dr. William Farland, Director of National Center for Environmental Assessment in Environmental Protection Agency; Dr. Barry Johnson, assistant administrator, Agency for Toxic Substances and Disease Registry; Dr. Gary Myers,

professor of neurology and pediatrics; Dr. Mark Smith, deputy director, Office of Research and Standards, Massachusetts Department of Environmental Protection; Mr. Tim Eder, director of Great Lakes Natural Resource Center of the National Wildlife Federation; and Dr. Leonard Levin, program manager for Air Toxics Health and Risk Assessment, Electric Power Research Institute.

And at this time, before our opening statements, I would recognize Senator Leahy for his statement. We'd ask that the committee room remain silent.

STATEMENT OF HON. PATRICK J. LEAHY, A UNITED STATES SENATOR FROM THE STATE OF VERMONT

Senator LEAHY. Thank you, Mr. Chairman. I appreciate the courtesy very much. I'd like to thank both you and Senator Chafee for convening this hearing.

I've spoken many times on the floor over the past few years about my concerns about the ongoing threat of mercury pollution to the lands and rivers and lakes of Vermont, and I think that your hearing is an important step in the journey to finally address the scourge of mercury pollution.

It has not been an easy journey, even this part. In the first Congressional session of this Congress, I worked with many in the Senate and in the House to introduce the Senate resolution that called on the Administration to release its long overdue mercury study report to Congress. That is the report that was mandated by the Clean Air Act of 1990.

Earlier this year, I introduced S. 1915, the Omnibus Mercury Emissions Reduction Act of 1998. That used the mercury study as the basis for its legislation. In fact, if we enacted this bill, it would significantly reduce the risk the this powerful neurotoxic poses to the health and development of pregnant women, women of childbearing age, and children.

Most recently, Chairman Chafee and I have worked on the fiscal year 1999 appropriations process to support EPA's efforts to begin collecting mercury emissions data from power plants and avoid strong opposition to report language on the EPA appropriations bill that would hamper EPA from doing that.

Mr. Chairman, I mentioned all of this because Vermonters share a deep and abiding concern for the environment. This is not a partisan issue in our State. We have enacted some of the toughest environmental laws in the country, but, despite these laws, we face threats from outside our border. Mercury is one of the biggest ones as it drifts into our waterways.

When I was growing up and I spent summers on Lake Champlain, I never had to worry about the fish that I caught or how to eat them. Actually, I only had to worry about the fact that I sometimes wasn't too good at catching them in the first place. But now the lake has fish advisories for walleye, lake trout, and bass due to mercury.

I have a new grandchild, and I hope some day to be taking him fishing there. I don't want to have to explain to my grandson why he can't eat the fish he catches.

What I tell my grandson in the future is largely a function of the direction we take in Congress over the next few years to protect the

environment. Are we going to look the other way, or are we going the build on the vision and the courage of two former leaders of this Committee? Senators Stafford and Muskie, like Chairman Chafee and others in the committee today, have shown bring us to a higher level of accountability and protecting our environment.

We should be proud of the great strides we've made to reduce levels of many air and water pollutants, but we have to address the environmental threats as so far a few easy solutions.

How do we reduce emissions in mercury and other pollutants from coal-fired power plants without significantly increasing our utility prices? When the 1970 Clean Air Act was written, we didn't understand what was involved. Now we do have a report and it gives Congress the ability to bring this under control.

The mercury study report to Congress shows troubling levels of mercury. I might point out, Mr. Chairman, on this map you can see how the mercury has come really basically into the eastern side of the United States, very heavily in some parts of the United States, like around the Chesapeake Basin area up into my own State.

The report estimates at any time there are more than 1.6 million pregnant women and their fetuses, women of child-bearing age, and children who are at risk of brain and nerve development. It shows that year after year sources in the United States emit at least 150 tons of mercury to the environment, and then, once it is released, it doesn't behave like many pollutants.

This is kind of a fussy chart, but basically it shows how it goes up in the air, it doesn't biodegrade, it comes down into water and into fish, and then from fish to humans. If you are a child or you're just developing, or if you are a pregnant woman, you are going to have even a greater risk from this.

We invest a lot of time and energy and law and fiscal resources in our children, but we're not protecting them really even in the womb in this.

If you look at this last chart, Mr. Chairman, or the next-to-the-last chart, this shows where we were in 1993 on fish advisories, and then right below it where we were just 4 years later, with 1,675 fish advisories.

We have a lot there, Mr. Chairman. We know that it's going to take a lot to do this. We have to make a dent in the 52 tons of mercury emissions each year that we now have.

EPA report estimates it will cost $5 billion per year on these power plants cleanup. It seems like a lot of money, but that's out of a $200 billion profit.

So I would put the whole statement and letter, Mr. Chairman, and I ask unanimous consent that a copy of the letter to Senator Chafee and the members of the subcommittee dated today and signed by 88 environmental organizations also would be made part of the record.

Senator INHOFE. Without objection.

Senator LEAHY. I thank you for doing this. I think this shows the concern we have, and it is the number of reports and advisories just is going up dramatically, and if we are going to protect our fish, our streams, our water, this is something that we must look at.

Senator INHOFE. I thank you, Senator Leahy, for your intense interest in this, and we do welcome you on the dais here to participate.

[The prepared statement of Senator Leahy and the letter signed by environmental organizations follow:]

Senator INHOFE. I'm going to ask now that you really adhere to this 5 minutes in opening statement, and if you would prefer—and I would prefer it—if you want to submit your statement for the record, you may. We do have to end this at 4 for the reasons I described when you first came in. So if you could try to accommodate us, we'd appreciate it very much. Your entire statement will be made a part of the record.

Dr. Smith?

STATEMENT OF C. MARK SMITH, DEPUTY DIRECTOR, OFFICE OF RESEARCH AND STANDARDS, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, BOSTON, MASSACHUSETTS

Dr. SMITH. Good afternoon, Mr. Chairman, Senators, and staffers. Thank you for the opportunity to testify today.

My name is C. Mark Smith. I'm the deputy director of the Office of Research and Standards of the Massachusetts Department of Environmental Protection. I'm also the chair of our department's mercury work group and the Massachusetts delegate to the New England Governors and Eastern Canadian Premier's Mercury Task Force.

I'm testifying today as a toxicologist, as a State environmental regulator, and also, and perhaps most importantly, as the father of a 5-year-old daughter who just started kindergarten last week and a 5-month-old son who just started crawling around last week, which introduces a whole bunch of new risks in my household. I'm really very concerned about mercury from all three of these perspectives.

There are three main points that I want to try to make today.

The first point is that there is substantial and sufficient scientific evidence on the risks and levels of mercury in the environment, especially in the northeast, to warrant aggressive actions to reduce mercury pollution.

Second, I want to emphasize, as Senator Leahy has already done with his maps quite well, that we have a significant mercury problem in the northeast; mercury levels in the environment of the northeast are too high.

The third point that I'd like to make is that mercury can be transported once it is released into the environment for long distances, and what we really have is a national problem, not just a regional problem. We're making very aggressive efforts in the northeast to deal with the problems that are in our area with respect to emissions, and we really feel that additional efforts are needed to do that nationally and, ultimately, internationally.

With respect to the scientific basis for action, there is a remarkable degree of consensus within the northeast that I really want to emphasize. Essentially all of the environmental protection agencies and public health agencies in all of the northeast States and eastern Canadian provinces have looked at this mercury problem very

closely, and we've all come to the exact same conclusions about this: that the science really is sufficient to conclude that there is a problem in our area with respect to mercury. So this isn't just one State or just a few scientists who have looked at this problem.

The four or five points that make mercury really problematic is that mercury is very toxic to people, and also let's not lose sight of the fact that it can also be toxic to wildlife like eagles and loons, otters, and other fish-eating mammals.

Second, it can affect the nervous system and brain, perhaps permanently. It is our children that are most at risk. Depending upon the outcome of various debates about the precise levels of risk associated with mercury, a woman who consumes as little as half an ounce of fish daily contaminated at a level of half a part per million of mercury potentially puts her fetus at risk of adverse outcomes.

And the third point is that we have levels of mercury in water bodies in Massachusetts that are well in excess of that level and can exceed one part per million and range all the way up to five parts per million.

There has been considerable debate recently about the exact magnitude of mercury risks, and many folks have argued that perhaps mercury is less toxic than we previously believed. This is a huge scientific debate that's going on right now that I can't address in detail; however, myself and many other toxicologists have concluded that the data that is available right now, and particularly from the Seychelles Island study, really is not a sufficient basis to relax our concerns about mercury at this point.

Also, I want to emphasize again that no matter what the outcome of this debate about the toxicity of mercury, the levels of mercury in fish in the northeast are sufficiently high that they would be of public health concern, no matter what we ultimately conclude about the interpretation of these studies.

With respect to mercury levels in the northeast, I want to emphasize that we have a huge database. We have samples from over 4,000 fish, from over 700 water bodies in the northeast. The average levels of mercury in many game fish—sport fish that people like to catch, including bass and pickerel and perch—exceed 0.5 parts per million, and in many water bodies levels exceed one part per million, on average, and in individual fish up to five parts per million.

We have a very extensive database on this issue. On the basis of that data, all the New England States and the eastern Canadian provinces have issued fish advisories warning people about the hazards associated with eating fish because of mercury.

In Massachusetts alone, we have more than 50 water bodies where the levels of mercury are high enough to be of risk to adults like you and I, and we have a State-wide advisory that has been put in place warning pregnant women to limit their consumption of fish because of mercury contamination and risk to the fetus.

With respect to regulations, we have a very extensive consensus within the region and a very aggressive bilateral regional action plan has been signed by the New England Governors and eastern Canadian premiers committing the region to very aggressive steps to reduce mercury pollution. We really think these need to be extended nationally.

Senator INHOFE. Thank you, Dr. Smith.
Dr. SMITH. Thank you.
Senator INHOFE. Dr. Johnson?

STATEMENT OF BARRY L. JOHNSON, ASSISTANT SURGEON GENERAL, ASSISTANT ADMINISTRATOR, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, ATLANTA, GEORGIA

Dr. JOHNSON. Good afternoon. I'm Barry Johnson, the assistant administrator for the Agency for Toxic Substances and Disease Registry, which is a component of the Department of Health and Human Services.

The subcommittee invited us to testify on mercury pollution. Our agency has worked on a number of mercury issues, most of which are captured in our mercury toxicological profile.

The Superfund legislation directs our agency to develop toxicological profiles for priority substances released from hazardous waste sites. Our priority list of hazardous substances is developed jointly with EPA and updated every 2 years. Mercury is No. 3 on the 1997 list of priority substances.

Further, mercury has been the single most frequently encountered hazardous substance in our emergency response program for the last 8 years.

For this reason, ATSDR and EPA jointly developed and released a health alert in the summer of 1997 that has been widely distributed to schools, States, and other potential targets of mercury spills.

We first published a toxicological profile on mercury in 1989. This document was updated in 1994, and a second update was released in a draft version in October, 1997.

In October, 1997, we released, as I said, for public review and comment our current draft profile. The document remains in draft pending further discussions with EPA, other Federal agencies, the States, and the public.

An upcoming inter-agency workshop in November will be a key forum for resolving some remaining points of science and public health.

Each of our toxicological profiles contain what are called ''minimal risk levels,'' MRLs, which are estimates of what level of daily human exposure to a hazardous substance is likely to be without appreciable risk of adverse noncancer health effects over a specified duration and route of exposure.

The substance-specific estimates are intended to serve as screening levels, not for regulatory purposes.

ASTDR's MRL—minimal risk level—for chronic, oral exposure to methylmercury in our October, 1997, draft profile is derived from a study conducted in the Republic of Seychelles by University of Rochester investigators. That study reflects multiple generations of human exposure to organic mercury through fish consumption as the primary route of exposure. Because of the long-term nature of this exposure, the large sample size, and the rigorous study design, this data set was used as the primary basis for our MRL derivation for methylmercury.

We derived an MRL for chronic oral exposure to methylmercury of 0.5 micrograms of mercury per kilogram of body weight per day.

MRLs for both elemental mercury and organic mercury are also presented in our draft document.

In our 1997 profile, we looked at the uncertainty in the available methylmercury data. Essentially, this is a question of how much confidence do we have in the data.

Our evaluation led us to select an uncertainty factor of one, which means we ascribed in good confidence to the data. This is not to suggest that there is no uncertainty remaining about any threshold for the health hazards of methylmercury.

In fact, ASTDR anticipates further discussions with our Federal colleagues and the public on the subject of what uncertainty factor should be used.

Since October, 1997, there have been several additional scientific publications on the human health effects of methylmercury, particularly in children. For example, results of the 66-month testing of children in the Seychelles are now available.

Further, a study of the Faroe Islands population published in December 1997 will need to be examined by ASTDR in the context of our draft toxicological profile.

We continue to work with other Federal agencies to reach a consensus on mercury issues. A key meeting of an interagency group will be held November 18 through 20 of this year, convened by the Committee on Environment and Natural Resources. We consider this meeting to be an important step toward resolving remaining scientific issues.

Mr. Chairman, a challenge for health officials is to balance the known public health benefit of consuming more fish in the diet and the known dangers of excess mercury exposure.

To mitigate adverse health effects of excessive exposure to mercury, our agency supports efforts to reduce or eliminate exposure to mercury in the environment. Such efforts must be pursued through pollution prevention strategies, including health education for both health care providers and the citizens who may be at risk due to high levels of exposure to mercury.

Mr. Chairman and members of the subcommittee, I would be pleased to answer any questions you may have.

Senator INHOFE. Thank you, Dr. Johnson.

Dr. Farland?

STATEMENT OF WILLIAM H. FARLAND, DIRECTOR, NATIONAL CENTER FOR ENVIRONMENTAL ASSESSMENT, ENVIRONMENTAL PROTECTION AGENCY

Dr. FARLAND. Mr. Chairman, members of the subcommittee, I'm William Farland, director of the National Center for Environmental Assessment in USEPA's Office of Research and Development.

I'm pleased to have this opportunity to contribute to the subcommittee's discussion of science issues involved in assessing health and ecological impacts of mercury exposure. I've submitted more extensive testimony for the record.

Mercury is a basic element. It has neither created or destroyed, and it has always been a component of the earth's dynamic systems.

What has changed with time and what has caused increasing concern about mercury and mercury exposure is the addition of the

human component to the plant's complex systems. Mercury cycles in the environment as a result of natural and human so-called "anthropogenic" activities.

The amount of mercury mobilized and released into the biosphere, unless biologically available within the environment, has increased since the beginning of the industrial age as a result of increasing anthropogenic activities.

This has raised concern about the potential for public health and ecological impacts.

The scientific community knows a lot about human health and ecological effects of mercury and mercury exposure, and has agreed, in spite of remaining scientific uncertainties, that mercury is an important environmental problem.

The U.S. Environmental Protection Agency has been at the forefront of the science issues and control activities regarding mercury.

One important example of the agency's science assessment activities is the 1997 Mercury Study Report to Congress. In my written testimony, I've provided details regarding the impetus for the report, its content, and the process used for its extensive peer review.

As the state of the science for mercury is continuously and rapidly evolving, this report should be viewed as a snapshot of our current understanding of mercury.

The report also identifies areas where further research is needed to provide a quantitative risk assessment.

I've provided details on the agency's near- and long-term plans for mercury-related research. I've also highlighted efforts underway with our Federal colleagues and the outside scientific community to identify scientific common ground on this issue.

I'd like to focus my oral remarks on a few specific topics.

Mercury emissions and deposition. In my testimony I discuss in some detail how mercury circulates in the environment, how mercury in the air is deposited on land, water bodies, and the nature of some of the scientific uncertainties associated with this cycle.

We're often asked how much mercury are we talking about when we say that human activity causes release into the environment. The report says that the best point estimate for annual anthropogenic U.S. emissions of mercury based on 1994 and 1995 data is 158 tons. Roughly 87 percent of these emissions are estimated to be from combustion sources, including waste and fossil fuel combustion.

Computer modeling of long-range transport of mercury suggests that about one-third, or over 50 tons, of U.S. anthropogenic emissions are deposited within the continuous 48 States. The remaining two-thirds is transported outside the U.S. borders, where it diffuses into the global cycle.

The computer simulation suggests that another 35 tons of mercury from the global cycle is deposited in the U.S., for a total deposition of roughly 87 tons annually, over 60 percent of which is coming from U.S. anthropogenic sources.

With regard to public health impacts, epidemics of mercury poisoning following high exposure to methylmercury in Japan and Iraq demonstrated that neurotoxicity is the health effect of greatest concern and that effects on the fetal nervous system occur at lower exposures than the effects on the adult nervous system.

Minimally affected mothers have given birth to severely affected infants. Dietary methylmercury is almost completely absorbed into the blood and distributed into all tissues, including the brain, and also readily passes through the placenta to the fetus and fetal brain.

To describe the implications of chemical exposures on human health, including the impacts of methylmercury, the Agency uses the concept of a reference dose. The reference dose is an amount of methylmercury which, when ingested daily, over a lifetime, is anticipated to be without adverse health effects to humans, including sensitive sub-populations.

At the reference dose or below, exposures are expected to be safe. The risk following exposures just above the reference doses, is uncertain that it is clear that risk increases as exposures to methylmercury increase significantly above the reference does.

EPA has, on two occasions, published RfDs for methylmercury which have represented the agency consensus at the time. The original RfD of 0.3 micrograms per kilogram of body weight per day, based on effects seen in adults, was determined in 1985 by EPA's Agency-wide consensus work group. The critical effect was nervous system damage in Iraqi adult populations exposed to methylmercury through consumption of contaminated grain.

The effect seen at the lowest dose were changes in sensation or numbness.

The current RfD of 0.1 micrograms, based on effects seen in children, was established as agency consensus in 1995. The revised RfD was estimated by extrapolating from the high-dose exposures that occurred in the Iraqi incident to impacts on the most sensitive individuals in that population—the developing fetus.

At the time of the Mercury Study Report to Congress, it became apparent that considerable new data on the health effects of methylmercury in humans were emerging. However, as many of these new data had neither been published nor yet been subject to rigorous review, EPA decided that it was premature to make a change in the 1995 methylmercury RfD at that time.

The decision was supported by the Agency's Science Advisory Board, a public advisory group providing external scientific advice to the Administrator, and I've included the text of their specific advice regarding the use of these emerging studies in my written testimony.

Senator INHOFE. Thank you very much, Dr. Farland.

Dr. Myers?

STATEMENT OF GARY MYERS, PROFESSOR OF NEUROLOGY AND PEDIATRICS, ROCHESTER, NEW YORK

Dr. MYERS. Mr. Chairman, thank you for the opportunity to present the views of our research group.

My name is Gary Myers. I've been working with the research group at the University of Rochester for over 25 years and have taken part in both the Iraq and the Seychelles studies.

In the 1950's, industrial pollution in Japan resulted in high levels of methylmercury in ocean fish and several thousand human poisonings from consuming contaminated fish. The exact level of

exposure was never determined, but it was thought to be very large.

Fish in Japan had levels as high as 40 parts per million, compared with average levels in the U.S. of below one, or occasionally as high as two or three.

Not a single case of poisoning from the consumption of fish has been reported since that epidemic in 1960.

In the 1970's, another epidemic took place, a mercury poisoning epidemic in Iraq where people ate seed grain coated with a methylmercury fungicide. We studied the children of about 81 women who were pregnant during this outbreak, and we concluded that there was a possibility that exposures as low as 10 parts per million in maternal hair could be associated with adverse effects on the fetus. This value is 10 times the average value in the U.S., but it is a value that women who consume fish frequently can achieve.

In aquatic environments, bacteria convert inorganic mercury to methylmercury and then it enters the food chain. People who consume large amounts of fish can have up to 10 parts per million in their hair.

The toxic effects of methylmercury from fish consumption are not scientifically proven, in our opinion. We, therefore, decided to investigate what we consider a sentinel population for the U.S.

The Seychelles study started in 1987. It is a collaborative program between the University of Rochester and the Republic of Seychelles, funded by the National Institutes of Environmental Health Sciences and the Food and Drug Administration, along with the governments of both Seychelles and Sweden.

Our study was designed to determine whether prenatal exposure to methylmercury from consumption of a fish diet is associated with developmental effects. We thought that was an issue that could be studied directly by looking at fish-consuming peoples.

Our original hypothesis was that, indeed, methylmercury, at levels achieved by regular maternal consumption of fish, would be associated with adverse effects on child development.

The Seychelles was chosen because the average Seychellois eats fish twice a day. In addition, the average methylmercury of fish in Seychelles is 0.3 parts per million, a value that is very similar to ocean fish purchased commercially in the United States.

There is no mercury pollution in Seychelles, and there are a number of things which make a low-level exposure study easier to do.

The study design was carefully planned, and I've outlined it in the handout. I'll only make a point of two things.

To minimize the possibility of bias, we made a number of decisions before the study began, a critical element in scientific studies.

Fist, the study is double blind. No one in Seychelles or on the clinical team has any idea about the level of any individual child's exposure.

In addition, we established a data analysis plan before we collected the data to minimize the possibility that the data would simply be analyzed until we found the expected effect.

The Seychelles child development study involves over 700 mothers and children who I enrolled during the year I lived on the Island of Mahi. They have been evaluated regularly for over 5 years

now. The results of the Seychelles child development study so far—and analyses have been through five-and-a-half years of age, a number that is quite fairly far along for most toxicological studies—indicate no adverse developmental effects from prenatal methylmercury exposure in the range commonly achieved by consuming large amounts of fish.

We have also examined the association between the children's post-natal exposure and the test outcomes at five-and-a-half years. Several of those outcomes were slightly better in the children with higher mercury. Clearly this is not mercury, but mercury may simply be a marker for fish consumption and other nutrients in fish may be very important for brain development.

In summary, our studies in Iraq raised the possibility that methylmercury exposure might adversely affect development, but we do not believe that the Seychelles child development study has demonstrated an adverse association through five-and-a-half years of life.

We consider the Seychelles a sentinel population for the U.S., since they consume large amounts of fish. The methylmercury content of the fish is similar to that of commercially-available fish in the U.S., and the health and welfare of the people are quite similar.

Fish is an important source of protein in many countries, and large numbers of mothers around the world rely on it for proper nutrition.

The nutrients that fish contain may be important for brain development. For older individuals, fish appears to have cardiac and mental health benefits. Fish consumption is increasing in countries, including the U.S. We believe it would be unwise to limit commercial fish consumption without convincing scientific evidence that exposure at the levels seen with fish consumption is harmful.

Senator INHOFE. Thank you, Dr. Myers.

Mr. Eder, you are next. I do apologize. I understand you got a late notice. You were invited by the minority, but you didn't even have time to get your statement in well in advance. So it wasn't your fault, it was ours, and you are recognized.

STATEMENT OF TIM EDER, DIRECTOR, GREAT LAKES NATURAL RESOURCE CENTER OF THE NATIONAL WILDLIFE FEDERATION, ANN ARBOR, MICHIGAN

Mr. EDER. Well, not a problem, and I apologize to you and the committee. We had a further problem with Federal Express today getting copies of our statement shipped down here. I guess we can't always——

Senator INHOFE. Since we're on C–SPAN right now, I'm sure they appreciate that. Go ahead.

[Laughter.]

Mr. EDER. Well, Mr. Chairman, on behalf of our members and supporters around the country, the National Wildlife Federation is pleased to be here and to have this opportunity to present testimony in support of the legislation sponsored by Senator Leahy, S. 1915, and on the need for Congressional action to address the problem of mercury contamination in waters of the United States.

I'd like to begin today by summarizing the three points I will be emphasizing in my comments, and I have provided written testimony to the committee.

First, mercury is a serious environmental problem requiring Congressional action. Because the largest single source of mercury pollution, coal-burning utilities, continues with no requirements to reduce or eliminate mercury pollution, Senate bill 1915 is needed.

Second, more than enough is known about sources of mercury and its toxic effects, especially on people, to warrant taking action now. The debate over the conclusion of the Seychelles and Faroe Island studies is an important scientific discussion, but it should not be used as an excuse to delay action.

Third, solutions to this problem—pollution control technologies and switching to cleaner sources of energy—are available. Some in the utility industry are claiming that no solutions exist or that they are too expensive. These arguments are flawed, as we will illustrate in our remarks today.

First, our testimony provides a snapshot of mercury contamination problems around the country and the magnitude of this problem. We cite, for example, studies of elevated levels of mercury in fish in Chippewa Indians from Wisconsin. There, researchers have concluded that, though effects are unlikely in the adults, there may be levels associated with a slightly increased risk of neurological effects in infants.

We also include research on mercury contamination in several species of wildlife in the Florida Everglades, including panthers, double-crested cormorants, alligators, and bald eagles, studies of wood storks, endangered wood storks in southeastern Georgia, and the list goes on.

Second, we believe that more than enough is known about the effects of mercury in people to warrant taking action now.

A concern of NWF and most health agencies in the U.S. stems from the effects of mercury exposure on children when they are exposed in-utero as a result of their mothers' consumption of contaminated fish.

NWF's members are people who fish. Many of us come from rural parts of this country, where hunting and fishing are important parts of our culture and our history. For people like me, fishing is something that we do mostly for recreation, but for our members and many other people, hunting and fishing is a way of putting food on the table.

The two long-term studies have been examining the effects of fish consumption and mercury levels on children exposed in the womb. You just heard about the Seychelles Islands study. Another study of pilot whale consuming people in the Faroe Islands in the North Atlantic found mercury-related deficits in language, attention, and memory in 7-year-old children exposed to mercury in the womb.

Both of these studies are important because they are being used to guide our Federal agencies in the establishment of minimum risk levels and, subsequently, fish consumption advisories.

Much media attention has focused on the Seychelles study. We believe, however, that the Seychelles study has limitations. These limitations include the following:

First, neurological development tests in the Faroe Islands population have been recognized as being more sensitive in detecting subtle cognitive and motor disturbances than the tests used thus far in the Seychelles study.

As pointed out by one scientist with EPA, while evaluation with these more subtle tests are planned, current findings from the Seychelles should be regarded as interim.

In an earlier analysis from the Seychelles group, several cases of high mercury exposure and effects were excluded as outlying points, even though such data could show real effects in more children due to mercury exposure.

Third, the researchers in the Seychelles study reported improved scores on several of the tests at higher mercury and fish consumption levels, suggesting that there was a benefit from higher fish consumption.

This may be true, and it may be linked with the benefits of eating fish. However, we suspect or we suggest that part of the explanation for this could be the relatively low concentrations of mercury in the fish consumed by the Seychelles group. The difference there that is relevant for the U.S. population is that in the U.S. sport anglers and others are likely to consume fish contaminated at much higher levels, although perhaps less frequently.

As an example, fish contaminant levels in the Seychelles study were at roughly .05 to .25 parts per million, whereas mercury concentrations in walleye in Wisconsin typically averaged between 0.5 parts per million, or two to ten times higher.

The third point is that solutions are available and are not as expensive as is being claimed. The EPA has moved forward in recent years to address many of the most important sources of mercury pollution. There are solutions available to control mercury from coal-burning power plants. Our testimony provides evidence of these solutions and evidence to suggest that the costs of complying with these new controls are not as high as might be suggested.

Thank you, Mr. Chairman.

Senator INHOFE. Thank you, Mr. Eder.

Dr. Levin?

STATEMENT OF LEONARD LEVIN, PROGRAM MANAGER, AIR TOXICS HEALTH AND RISK ASSESSMENT, ELECTRIC POWER RESEARCH INSTITUTE, PALO ALTO, CALIFORNIA

Dr. LEVIN. Thank you, Mr. Chairman.

As a global pollutant, the impact of mercury on the human environment is an issue not only of health but of welfare. The issuance of mercury fish advisories by a number of States has coincided with a cascade of information on the health value of fish for longevity and development.

Scientific studies on mercury's health impacts on children have the capacity to identify health risks or their absence at levels that are far more sensitive than past studies.

Our changing understanding of where mercury originates nationally and globally, combined with the new health data, force us to reexamine our understanding of mercury in the environment.

EPRI research on these questions has been underway for 15 years, and the research results have been shared cooperatively

with the U.S. Environmental Protection Agency, the Department of Energy, and the public over that time.

I'd like to address three key questions.

First, what role do U.S. industrial emissions of mercury play in the overall emission picture?

Second, how might changes in the input of mercury to the atmosphere be reflected in mercury levels in fish?

Third, at what levels of exposure might mercury pose a health threat?

New mercury that is added to U.S. waterways currently appears to come primarily from deposition from the atmosphere. Studies of the Great Lakes show that 75 to 85 percent of the mercury each year is due to atmospheric deposition. The mercury in the atmosphere originates from both domestic and international industrial sources, as well as background emissions from both natural and legacy deposits of mercury.

EPA, EPRI, and others have evaluated emissions from current U.S. industrial sources, which total about 150 to 200 tons a year for the continental U.S., as has been mentioned already.

In addition, these background deposits of mercury are also emitting to the atmosphere. Many more products were made of mercury in the industrial environment in the mid part of the century, up until about the 1960's, than are now currently used. These legacy sources of mercury have the capacity to move into the environment, as well.

Until recently, we had no way of measuring these amounts. Now we have new measurements done by the University of Nevada, Oak Ridge National Laboratory, and many others that allow us to calculate the contributions of background areas of mercury to the emissions in the United States.

It appears that these natural and legacy sources together might total about as much as current U.S. industrial sources combined do, although distributed somewhat differently.

Since the mid-1960's, there has been, as I said, about an 85 percent drop in the industrial use of mercury. This industrial mercury has gone into waste streams and eventually into soils and waterways. However, museum specimens and current catches of fish don't reflect any significant decline in the levels of mercury in the environment over this time period. This is an indirect indication of the long cycling time of mercury through natural reservoirs such as lake bottom sediments and soils. The mercury does not go away, but eventually may be available for input to the aquatic life cycle.

Even more far-reaching findings may be emerging from the ongoing basic studies of mercury health effects on children. Other speakers today have discussed these findings in more detail. I will touch on only a few points.

The new health data from studies in the Seychelle Islands and the Faroe Islands—studies that are continuing—are the outcome of well-designed comprehensive assessments of children exposed to mercury via fish consumption, the root of concern for United States' residents.

Two independent analyses of the Seychelles' data to date have concluded that the intake of mercury from fish may be safe at lev-

els that are somewhat higher than what are currently thought to be safe limits.

These findings, if they're supported in later analyses, imply that a given mercury level in fish may be less of a threat to human health than formerly believed. The potential consequences of these findings are quite significant.

Public presentation by the head of a regulatory department of one State last December indicated that mercury fish advisories in that State would essentially disappear if the new safe levels that have been derived would apply. This is expected to hold in many other States, as well.

These studies are 3 to 4 years from completion of data collection, analysis, and interpretation. Conclusions drawn about mercury as a threat to the U.S. population should await completion of these investigations. We do not know how the findings will come out, of course, and, in particular, whether the health studies will, in the end, call for less or more stringent mercury exposure standards. But it is clear that the studies, when complete, will better inform any deliberations about the need for and the focus of mercury management decisions.

For this reason, well-informed decision-making might await completion of the studies that are underway and planned.

That concludes my remarks.

Senator INHOFE. Thank you very much, Dr. Levin.

Again, I apologize that we are going to have to wind this up, but you will be receiving in the next 7 days questions for the record, and I think it is very significant that you get this.

Let's start with Dr. Farland. I'm pleased that the Administration is calling for a meeting in November of interagency review of the latest studies of the effect on the human exposure to mercury.

I would assume that, since the EPA and a number of other Federal agencies are involved in the review, that there is still uncertainty in the science and a difference of opinion in allowable levels of mercury in fish and the threshold at which there is no observed adverse effect for mercury. Is that accurate?

Dr. FARLAND. There will always be uncertainties in the science. As it is presented, we're going to be extrapolating from populations outside of the U.S. In most cases, we're really dealing with emerging science and uncertainties related to those types of extrapolation.

There will continue to be uncertainty. We hope to reach some additional consensus, given the new data, though, in that November meeting.

Senator INHOFE. Well, closely related, Mr. Eder, I asked my staff to find the statement you just made in your written statement and they couldn't find it. You said something to the effect that the science, even though the science has not arrived to that point yet, there's no reason to delay action or something. Could you repeat that statement, because I think that's what this hearing is all about.

Mr. EDER. Well, I think the point is simply that we're not taking action today to control the most important source of mercury pollution to the environment, and that is from coal-burning utilities. We have—the U.S. EPA has put new regulations in place on inciner-

ators, and other control measures are in the works for other sources of mercury. However, there is nothing being done to reduce or control mercury being emitted from the burning of coal.

The fact that we have fish consumption advisories in 40 States and 15 of those States are State-wide advisories, and the data indicate that the problem is not getting better, the concentrations——

Senator INHOFE. What I'm saying—we're running out of time here—based on today's data, what is it that you think we can go ahead with and not delay that was in your statement?

Mr. EDER. Well, specifically, the proposals in Senator Leahy's legislation call for a time line of a 95 percent reduction in mercury emissions from several of the most important sources, including coal-burning utilities, and I think that the's an appropriate step forward.

Senator INHOFE. I think, Dr. Myers, you've answered this in your opening statement, but I want to make sure that we get this in the record accurately.

Does your study of the Seychelles support the statement of Dr. Smith—and I'm going to quote the statement so you remember it here—"that no matter what the outcome of the debate on mercury toxicity, that a pregnant woman eating as little as 0.4 ounces of fish a day containing 0.5 parts per million of mercury puts her fetus at risk."

Dr. MYERS. Our study really does not support that statement at this time.

Dr. SMITH. If I could just add, that's not quite what I said, but——

Senator INHOFE. I thought I was quoting. If not, then that was—I thought that was taken from your written——

Dr. SMITH. Yes. It is kind of mixing two statements. One statement basically to the effect that we have enough information to take aggressive actions.

Senator INHOFE. All right.

Dr. SMITH. The other statement was that a woman consuming that amount of fish could put her fetus at risk at the lower end of the exposure of range of concern.

Senator INHOFE. What we are trying to get to here is we're right now talking to experts and scientists, and I'm glad that we did this when we opened up the NAAQS issue. However, we didn't go far enough before we took the next step, and I intend to make sure that we, at least in those people who are not professionals, such as us on this side of the table, that we can fix in our mind some reasonable explanation for the differences that science has in these important issues.

I quite often characterized our approach to the NAAQS problem as, "Ready, fire, aim," and I don't want that to happen in this case.

Dr. Myers, could you explain the differences in the populations studied between the Iraqi study and the Seychelles?

Dr. MYERS. The Iraq study was a poisoning from eating methylmercury coated seed grain. It was an incredibly high poisoning with hair levels as high as 2,000 parts per million, as opposed to one part per million in the U.S. They were quite different populations.

And from the study we concluded that there was a theoretical but small possibility that levels as low as 10 parts per million could cause effects. That's why we went to the Seychelles to do a more careful study.

In our opinion, the Seychelles is the best study that we've been able to do related to low-level mercury poisoning.

Senator INHOFE. All right. I'm going to have two questions that will come—I'd ask you to respond for the record, but you might be thinking about because these are critical in our evaluation. One would be—I'll send these to you. You don't have to write them down. Do you agree that the fish consumption studies, rather than the Iraqi grain studies, more closely resemble the situations here in the United States that health agencies should be concerned with?

And, second, what specific information is needed in order to have a better scientific understanding of mercury and its health and environmental impact?

Again, I will once more apologize to you for the somewhat of a crisis that came up right at 4. It is 4, and I have to meet that crisis.

I thank you very much for coming. You will be receiving questions for the record.

[Whereupon, at 4:01 p.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

[Additional statements submitted for the record follow:]

STATEMENT OF HON. SENATOR BOB GRAHAM, U.S. SENATOR FROM THE STATE OF FLORIDA

Mr. Chairman, Senator Leahy, members of the committee. I am pleased today to have the opportunity to learn more about the scientific issues surrounding the establishment of a suggested reference dose for human exposure to mercury.

I would like to take a moment to explain my interest in this issue to the committee, and express my hope that during the 106th Congress this committee will further review of the "state of the science" on mercury pollution and conduct an in-depth analysis on appropriate policy actions.

In the state of Florida, there are no fish consumption or limited fish consumption advisories throughout much of the state. The South Florida region in particular is threatened by mercury deposition. For example, in the Florida Everglades, which is widely recognized as a "national treasure" being the only ecosystem of its kind in the United States, mercury levels in sediment has increased about 5 times over the last 100 years.

It is unclear exactly what the cause of these high levels are. Over the same 100 year period, mercury in global air has increased only 2–3 times. Contributing factors to the high mercury levels in the Everglades are the peat sediments and algae mats that blanket this area and provide an ideal environment for transformation of soluble mercury into methylmercury. The shallow, slow moving water in this portion of the state provides minimal dilution for mercury levels.

Research is continuing on the effects of these high levels. The state of Florida has "no consumption" or "limited consumption" advisories in many areas, including the Everglades, Big Cypress and Florida Bay. There is evidence demonstrating that endangered species such as the Florida panther are being effected—in moderately and highly exposed panther populations research shows reduced litter size.

As you can see, there is great interest in my state in mercury pollution. I am pleased that this committee is beginning to look at the science related to the human health effects of mercury. I look forward to future work on the efforts we begin here today. Thank you,. Mr. Chairman.

STATEMENT OF JOHN S. SEITZ, DIRECTOR, OFFICE OF AIR QUALITY PLANNING AND STANDARDS, OFFICE OF AIR AND RADIATION, ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman, members of the subcommittee, thank you for inviting me again to discuss the Environmental Protection Agency's (EPA's) proposed rule to improve visibility and reduce regional haze in our national parks and wilderness areas.

As you know, EPA revised the national ambient air quality standards (NEARS) for ground-level ozone and particulate matter in July 1997. These updated standards have the potential to prevent as many as 15,000 premature deaths each year, and up to hundreds of thousands of cases of significantly decreased lung function and aggravated asthma in children. In the review of the standards, EPA concluded that the most appropriate way to address the visibility impairment associated with particulate matter (PM) would be to establish a regional haze program in conjunction with setting secondary PM standards equivalent to the primary standards. EPA proposed new regulations addressing regional haze in July 1997.

As I testified before this subcommittee last April, virtually all of our national parks and wilderness areas are subject to some degree of visibility impairment due to regional haze. This fact has been extensively documented by monitoring conducted since 1978 by the EPA, the National Park Service, the United States Forest Service, and other agencies. Haze, which obscures the clarity, color, texture, and form of what we see, is caused by natural and man-made pollutants emitted to the atmosphere through a number of activities, such as electric power generation, various industrial and manufacturing processes, car and truck emissions, burning activities. These emissions are often transported long distances affecting visibility in certain parks and wilderness areas that have been identified by Congress for protection under the Clean Air Act. These areas are known as Class I areas.

As you are aware, the causes and severity of regional haze vary greatly between the East and the West. The average standard visual range in most of the Western U.S. is 60 to 90 miles, or about one-half to two-thirds of the visual range that would exist without man-made air pollution. In most of the East, the average standard visual range is 15 to 30 miles, or about one-sixth to one-third of the visual range that would exist under natural conditions. One of the major challenges associated with this problem is that these conditions are often caused not by one single source or group of sources near each park or wilderness area, but by mixing of emissions from a wide variety of sources over a broad region.

Background

The Clean Air Act established special goals for visibility in many national parks, wilderness areas, and international parks. Section 169A of the 1977 Amendments to the Clean Air Act sets the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollutions as a national goal for visibility. This section also calls for EPA to issue regulations to assure Reasonable progress toward meeting the national goal. EPA issued regulations in 1980 to address the visibility problem that is "reasonably attributable" to a single source or group of sources. These rules were designed to be the first phase in EPA's overall program to protect visibility. At that time, EPA deferred action addressing regional haze impairment until improved monitoring and modeling techniques could provide more source-specific information, and EPA could improve its understanding of the pollutants causing impairment.

As part of the 1990 Amendments to the Clean Air Act, Congress added section 169B to focus on regional haze issues. Under this section, EPA is required to establish a visibility transport commission for the region affecting visibility in the Grand Canyon National Park. EPA established the Grand Canyon Visibility Transport Commission in 1991 to examine regional haze impairment for the 16 mandatory Class I Federal areas on the Colorado Plateau, located near the Four Corners area of New Mexico, Colorado, Utah and Arizona. After several years of technical assessment and policy development, the Commission issued its final report in June 1996. The Commission's recommendations covered a wide range of control strategy approaches, planning and tracking activities, and technical findings which address protection of visibility in the Class I areas in the vicinity of the Grand Canyon National Park.

Under the 1990 Amendments, Congress required EPA to take regulatory action within 18 months of receiving the Commission's recommendations. EPA proposed the regional haze rules in July of last year in conjunction with the final national ambient air quality standards for particulate matter. In developing the proposed regulations, EPA took into account the findings of the Commission, as well as those from a 1993 National Academy of Sciences Report.

In 1990, the National Academy of Sciences formed a Committee on Haze in National Parks and Wilderness Areas to address a number of regional haze-related issues, including methods for determining the contributions of man-made sources to haze as well as methods for considering alternative source control measures. In 1993, the National Academy issued a report entitled, ''Protecting Visibility in National Parks and Wilderness Areas'' which discussed the science of regional haze. Among other things, the Committee concluded that ''current scientific knowledge was adequate and available control technologies exist to justify regulatory action to improve and protect visibility.'' The Committee also concluded that progress toward the national goal will require regional programs operating over large geographic areas. Further, the Committee felt strategies should be adopted that consider many sources simultaneously on a regional basis.

In addition to the findings of the Grand Canyon Visibility Transport Commission and the National Academy of Sciences, EPA also took into consideration recommendations and discussions related to regional haze from the Clean Air Act Advisory Committee's Subcommittee on Ozone, Particulate Matter, and Regional Haze Implementation Programs established under the Federal Advisory Committee Act (FACA) in developing the proposed regional haze rule. The subcommittee included wide representation from states, local and tribal governments, industry, environmental groups and academia. This subcommittee met regularly over two-and-one-half years to consider a variety of implementation issues associated with the revised national ambient air quality standards and the proposed regional haze rule. It also focused discussions on how best to develop more cost-effective, flexible strategies for implementing these requirements.

EPA's Proposed Regional Haze Rule

EPA's proposed regional haze rule is designed to establish a program to address visibility impairment in the Nation's most treasured national parks and wilderness areas. In this rule, EPA is proposing to improve visibility, or visual air quality, in 156 important natural areas found in every region of the country. These areas range from Grand Canyon, Canyonlands, and Rocky Mountain National Park in the southwest; to Yellowstone, Glacier, and Mt. Rainier in the northwest; to Shenandoah and the Great Smokies in the Appalachians; to Yosemite, Sequoia, and Point Reyes in California; to Acadia, Lye Brook, and Great Gulf in the northeast; to the Everglades and Sipsey Wilderness in the southeast; to Big Bend, Wichita Mountains, Badlands, and the Boundary Waters in the central states. More than 60 million visitors experience the spectacular beauty of these areas annually. The proposed regional haze rule, in conjunction with implementation of other Clean Air Act programs, will significantly improve visibility in these areas. Further, EPA expects visibility to improve well beyond these areas, across broader regions of the United States.—Mr. Chairman, in my previous testimony before this subcommittee last April, I provided a detailed description of the EPA's proposed rule on regional haze and so I will not repeat this information here today.

Status of EPA's Regional Haze Rule and Recent Notice of Availability of Additional Information

EPA Administrator Browner signed the proposed haze rule on July 18, 1997. At that time, we made the proposed rule and other related materials available to the public on the Internet and through other means. The proposed rule was published in the Federal Register on July 31, 1997, and last September, I chaired an EPA-sponsored public hearing in Denver, Colorado. In response to requests by the public, we extended the initial public comment period by about 6 weeks, to December 5, 1997. We held numerous sessions across the country to discuss the regional haze proposal, including a national satellite broadcast for all state and local air pollution agencies during which we discussed the proposal and answered questions from the viewers. I have also actively participated in meetings of the Western Regional Air Partnership (WRAP), a follow-up organization to the Grand Canyon Visibility Transport Commission that is co-chaired by Governor Shutiva of the Pueblo of Acoma and Governor Leavitt of Utah. The WRAP is a voluntary organization established by several states and tribes which EPA will be working with to address western visibility issues.

Recently two significant events have influenced our efforts to finalize the regional haze regulations. First, in June, President Clinton signed the Transportation Equity Act for the 21st Century (TEA–21) which, among other things, included a provision to ensure that states' control strategies and plans for regional haze are harmonized with those required for $PM_{2.5}$. More specifically, this aspect of TEA–21 requires states to submit their regional haze implementation plans within 1 year after EPA designates an area of the country as Attainment'' or ''unclassifiable'' for $PM_{2.5}$, or

at the same time that $PM_{2.5}$ state implementation plans are due for areas that EPA designates as "nonattainment" for $PM_{2.5}$. This provision of TEA–21 reinforces EPA's expressed intent in the proposed rule to coordinate the state plan revisions to address regional haze with those required to meet the $PM_{2.5}$ standard. EPA intends to incorporate the deadlines of TEA–21 into the final rule in a way that promotes regional planning efforts across regions that include areas designated attainment and those designated nonattainment. Second, EPA received a letter on June 29, 1998 from Governor Leavitt, on behalf of the Western Governors' Association (WGA), that specifically addresses how EPA should treat the Commission recommendations within the national rule. The WGA developed the letter in conjunction with several stakeholders involved in the Commission. EPA was not a part of this process. In the letter the WGA requested that EPA reopen the comment period for 30 days.

In response to these two events, both of which occurred after the extended comment period closed, we published a Notice of Availability of additional information on September 3, 1998 providing an additional 30-day period for the public to comment on two aspects of the Agency's regional haze proposal. Specifically, the Agency is requesting public comments on: (1) how EPA should interpret TEA–21 legislation to best coordinate state planning for $PM_{2.5}$ and regional haze; and (2) the Western Governor Association's proposal on changes to EPA's proposed regional haze rule to address the recommendations of the Grand Canyon Visibility Transport Commission. In addition to providing the full text of the Western Governors' Association letter on EPA's Internet site, we have also provided sample text illustrating how the Western Governors' Association's recommendations could be reflected in regulatory language. It is important to note that EPA is not reopening the comment period for any other issues related to the proposed regional haze rule. Following the close of this comment period and our careful review of the comments, we intend to issue a final regional haze rule this Fall.

Conclusions

In summary, we believe that EPA's new proposed regional haze rule, when finalized, will establish a framework to improve visibility in our Nation's parks and wilderness areas, as the Congress intended in the Clean Air Act. Over the past several years, we have been busy reviewing public comments and considering options for addressing the concerns of various commenters. At the request of various interested parties, including the Western Governors Association, STAPPA/ALAPCO, NESCAUM, and industry and environmental groups, we have held additional meetings to discuss issues related to the rule. In addition, we have reopened the comment period for public consideration of the rule's incorporation of the TEA–21 deadlines and the Western Governors Association's suggestions for including the Grand Canyon Visibility Commission's recommendations. I want to be clear that we still have not made final decisions on these matters. Our goal is to ensure that these new requirements are implemented in a common sense, cost-effective and flexible manner. We intend to continue working closely with state and local governments, other Federal agencies and all other interested parties to accomplish this goal.

Mr. Chairman, this concludes my written statement. I will be happy to answer any questions that you might have.

ENVIRONMENTAL PROTECTION AGENCY,
Office of Air Quality Planning and Standards, December 17, 1998.

Committee on Environment and Public Works,
U.S. Senate,
Senate Office Building,
Washington, DC 20510.

DEAR MR. CHAIRMAN: This is in response to the letter of October 27, 1998, from Senator Inhofe and Senator Graham on behalf of the Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety. The letter included a number of questions that were submitted by Members of the Committee for the hearing record. As indicated in the letter, I am directing the attached responses to your attention. We believe that our responses demonstrate that the regional haze program will provide States with substantial flexibility in developing appropriate long-term strategies to improve visibility. We have answered all of the questions except for question 15b, which addresses smoke management agreements. We are still in the process of gathering information from other agencies in order to fully respond to this question. We expect that a response to this question can be provided to you by December 15.

I appreciate this opportunity to be of service and trust that this information will be helpful to you.

Sincerely,

JOHN S. SEITZ, *Director,*
Office of Air Quality Planning and Standards.

RESPONSES OF JOHN S. SEITZ TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. In Governor Leavitt's letter to Administrator Browner transmitting the Western Governors Association (WGA) proposal, he stated "We ask that in using the document you respect the carefully balanced compromise it represents. Selective use of portions of the document could easily undermine the significant 'give and take' involved in reaching our final draft." However, EPA's translation document published in the Federal Register appears to omit numerous elements identified in the WGA proposal as needing to be addressed in the preamble to the rule.

Question 1a. What elements of the WGA proposal including elements proposed by WGA for inclusion in the preamble to the final rule did EPA include in the transition document? Please provide citations from the text of the Federal Register notice for each of these elements.

Question 1b. What elements of the WGA proposal including elements proposed by WGA for inclusion in the preamble to the final rule did EPA omit from the transition document?

Response to 1a and 1b. After receipt of Governor Leavitt's letter transmitting the WGA's proposal, EPA published a notice in the Federal Register informing the public of the availability of the WGA proposal in the docket to the rulemaking and on the Internet. [63 FR 46952. September 3, 1998]. As stated in the notice, EPA provided draft language to illustrate how the WGA's proposal might be translated into regulatory text. We did this to help inform the public debate on the WGA proposal. However, as further noted in the Federal Register, we did not attempt to "translate" any of the WGA preamble recommendations into illustrative preamble language. The Federal Register contains the following language regarding the suggestions for preamble language in the WGA letter:

"The WGA letter contains numerous suggestions for preamble discussions to accompany the final regional haze rule. These preamble suggestions include clarifications of the rationale for certain conclusions, explanations to clarify WGA's regulatory language suggestions, and discussions of a number of WGA's suggested policy interpretations for implementation of the final rule. At this time, the EPA has not drafted specific preamble language in reaction to these suggestions. We do, however, request comment on the concepts and suggestions that WGA recommends that EPA include in the preamble to the final rule."

The Federal Register notice thus explicitly referred to the preamble suggestions in the WGA proposal, made the WGA's preamble suggestions available in the docket to the rulemaking and on the Internet, and specifically asked commenters to critically review the concepts and suggestions made in the WGA recommendations.

Question 2. The WGA's proposal includes "5 year milestones" for visibility improvement. The EPA translation document converts these milestones into annual emission reduction targets.

Question 2a. Can you point to any section of the WGA proposal that describes an annual milestone or target?

Question 2b. Why did EPA unilaterally alter this key provision of the WGA proposal in the translation document?

Response to 2a and 2b. We did not intend to alter this provision of the WGA proposal.

We agree that the definition of "milestone" in paragraph 309(b)(5), together with the use of that term later in the translation document, could be read to mean that milestones must be developed for each and every year, rather than comparing the emissions for every fifth year with 1990 levels. Our use of the term "annual" was meant to convey that States would compare the annual emissions for that particular year (not every year) with the 1990 baseline, and not that milestones should be set for each year.

Question 3. EPA's translation document includes a requirement for renewable energy that does not appear to be part of the WGA proposal.

Question 3a. Can you point to any section of the WGA proposal that includes a renewables requirement?

Question 3b. Why did EPA unilaterally amend the WGA proposal by creating a renewables requirement in the translation document?

Response to 3a and 3b. The WGA proposal does address a renewable energy requirement which was taken verbatim in our translation document. In section II.G of the WGA proposal, the WGA recommends that SIPs be required to include the following:

"A planning assessment describing the programs being relied on to achieve the State's contribution toward the Commission's goal that renewable energy will comprise 10 percent of the regional power needs by 2005 and 20 percent by 2015, and a demonstration of the progress toward or achievement of the renewable energy goals in the years 2003, 2008, 2013, and 2018, including documentation describing the potential for renewable energy resources, the percentage of renewable energy associated with new power generation projects implemented or planned, and the renewable energy generation capacity and production in use and planned in the State. To the extent that it is not feasible for a State to meet its contribution to the regional renewable energy goals the State must, in the planning assessments, identify the measures implemented to achieve its contribution and must explain why meeting the State's contribution was not feasible."

In paragraph 309(d)(8)(vi) of EPA's translation document, we provided the following illustrative regulatory text:

"(vi) A planning assessment describing the programs being relied on to achieve the State's contribution toward the Commission's goal that renewable energy will comprise 10 percent of the regional power needs by 2005 and 20 percent by 2015, and a demonstration of the progress toward or achievement of the renewable energy goals in the years 2003, 2008, 2013, and 2018, including documentation describing the potential for renewable energy resources, the percentage of renewable energy associated with new power generation projects implemented or planned, and the renewable energy generation capacity and production in use and planned in the State. To the extent that it is not feasible for a State to meet its contribution to the regional renewable energy goals, the State must, in the planning assessments, identify the measures implemented to achieve its contribution and must explain why meeting the State's contribution was not feasible."

Thus, the translation text repeats verbatim the WGA's recommendation on the subject of renewable energy. Please note that neither the WGA proposal (nor our translation) mandate that the 10 percent and 20 percent targets be met if it would not be feasible to do so. As a result, we do not believe that it is accurate to describe these targets as a "requirement" for renewable energy.

Question 4. Senator Burns submitted a number of questions to EPA following an April 30th hearing on EPA appropriations (the "Appropriations questions"). In response to those questions, EPA said it plans to publish its 5 year update report under section 169B(b) on progress on improving visibility later this year. EPA also said that it does not believe that it is obligated to predict future trends in visibility due to other parts of the Clean Air Act (CAA) as part of the 169B(b) report, but that it may do so as a matter of discretion. The testimony at the October 1 hearing made clear that accurate projections about future trends in visibility impairment due to other sections of the CAA will be crucial to States as they try to develop implementation plans under the regional haze rule.

Question 4a. Will EPA commit to the committee that EPA will update its projection of future improvements in visibility due to other parts of the Act?

Question 4b. When will EPA publish its update projections?

Question 4c. Will EPA commit to the committee that these projections will be available prior to the date on which States are required to fulfill any obligations under the regional haze rule?

Response to 4a, 4b, and 4c. Section 169B requires a one-time report on progress and improvements in visibility that are likely to result from implementation of the Clean Air Act Amendments of 1990 other than the provisions of section 169B. Section 169B further requires subsequent reports to assess actual progress and improvements in visibility but does not call for further analyses of the progress and improvement in visibility due to other Clean Air Act provisions. The EPA is currently engaged in developing a 5-year report on progress and improvements in visual air quality, which we hope to make available later in this fiscal year.

We agree that it is important for States to understand the impacts on visibility of other Clean Air Act requirements, such as the programs for meeting the national ambient air quality standards for fine particulate and ozone. We feel the best way for these visibility improvements to be estimated is for EPA and States to work together in regional planning efforts in which regional haze analyses are coordinated

with and integrated with those regional analyses for other programs. We believe that more accurate assessments would result from such efforts than through a single national assessment by EPA. The EPA believes that completing such analyses is a key step in developing additional strategies, as necessary, under the regional haze program. The new SIP submittal requirements for regional haze should allow adequate time for these projections and strategies to be developed by States.

Question 5. Another of the Appropriations questions to EPA asked what research needs to be performed to support the States to implement the visibility program. The EPA answered that "No research is needed before the States can begin to implement the visibility protection program." The EPA cited the 1993 NAS report for the proposition that "Current scientific knowledge is adequate and control technologies are available for taking regulatory actions to improve and protect visibility."

Question 5a. Does EPA believe that it has sufficient data to justify a regional haze regulation providing for the presumptive use of visibility goals based on the deciview metric and imposition of best available retrofit technology (BART) on certain stationary sources?

Response. Yes, EPA believes that there is sufficient technical information available to justify implementation of a regional haze regulation. Our position is supported by the conclusion from the 1993 NAS report cited in your question above, as well as other important reports on visibility. For example, the 1990 report of the National Acid Precipitation Assessment Program (NAPAP) states that: "The fundamental physics relating light extinction (and other optical parameters) to atmospheric gases and particles is well established. . . . In fact, even before the past decade of visibility research, visibility was called the 'best understood and most easily measured effect of air pollution' (Council on Environmental Quality, 1978)." (Trijonis, John C., NAPAP Report 24, Visibility: Existing and Historical Conditions—Causes and Effects, October 1990). Moreover, because EPA has not proposed an enforceable deciview standard or proposed a level of control which constitutes BART, but rather has proposed to leave it to States to determine based on factors set out in the Act, any additional data needed will be developed by the States as they proceed with the development of their plans.

Question 5b. Outside of the 16 areas studied by the Grand Canyon Commission, does EPA currently have data on sources of regional haze visibility impairment, atmospheric processes, monitoring, emission control strategies, and source-receptor models sufficient to allow States to overcome the presumptions on the deciview goal and BART should a State choose to attempt to overcome the presumption?

Response. Yes, EPA believes that data and tools are available now for characterizing visibility impairment and analyzing strategies to improve visibility outside the 16 areas studied by the Grand Canyon Visibility Transport Commission (GCVTC). Many class I areas outside the GCVTC region have monitoring in place now. The chemical composition data available from 10 years of monitoring by the IMPROVE network has been used to characterize the contributions of various pollutants and sources to visibility conditions in class I areas. Regional scale grid-based modeling of acid deposition and visibility in the eastern U.S. has been in place for a number of years. The EPA is working to provide additional data and tools over the coming years for implementation of the regional haze and $PM_{2.5}$ programs. For example, 78 additional monitors will be added to the IMPROVE network within the next 2 years. In addition, efforts are under way to enhance $PM_{2.5}$ emission factors, emission inventories, and regional scale models for future strategy assessments.

Question 5c. Will EPA commit to the committee that no State will be required to meet any obligations under the regional haze rule prior to the date that these data are available?

Response. Since data and tools currently exist and since the expansion of the IMPROVE visibility monitoring network is already underway, EPA does not believe it will be necessary for any State to meet regional haze obligations before sufficient data are available. Consistent with TEA–21, EPA intends to enable States to coordinate the development of strategies under the NAAQS and regional haze programs.

Question 6. Another of the Appropriations questions asked when EPA plans to publish its final findings on visibility research. The EPA's answer was that it has no plans to publish its final findings, but that "much information is routinely included in EPA's periodic revisions to the criteria documents." The proposed regional haze rule places the burden of proof on the States to overcome EPA's presumptive SIP requirements.

Question 6a. Isn't it incumbent on EPA to do everything it can to assist the States to meet that burden by doing all of the necessary research and making it easily available to the States?

Question 6b. Will EPA commit to the committee to publish its final findings on visibility research by a date certain, and if so, when?

Question 6c. Will EPA commit to the committee that no State will be required to meet any obligations under the regional haze rule prior to the date that these findings are published?

Response to 6a, 6b and 6c. The EPA is committed to supporting State efforts to implement the regional haze program. To date, EPA, the Departments of Interior and Agriculture, and other organizations have developed a significant body of scientific and technical information on visibility impairment in national parks and wilderness areas. The EPA is currently developing technical tools and guidance in a number of areas that will help the States analyze strategies for improving visibility. As noted several years ago in the NAS and NAPAP reports, the science of visibility is sufficiently well understood to move forward with a regional haze program. As EPA previously discussed in our response to the Appropriations questions, section 169B(a)(2) of the Act required EPA to produce only an interim findings report on visibility research. The EPA does not intend to publish a "final" findings report, but will continue working with the States to develop appropriate technical tools for implementation of the regional haze program.

Question 7. In its answer to another of the Appropriations questions, EPA said that its regulations on complying with the national ambient air quality standards allow States to "exclude high values that occur as a result of certain natural events such as wildfires and dust storms." However, those regulations do not address how similar events will be handled under the regional haze rule.

Question 7a. Under the regional haze rule, will States be able to exclude data from their calculation of the average visibility on the best 20 percent of days and the average visibility on the worst 20 percent of days any days on which visibility is impacted by emission from wildfires and dust storms as allowed under the NAAQS rules, or emissions from man-made fires?

Response. The proposed regional haze rule, consistent with the national goal set forth in section 169A of the Act, is directed toward eliminating visibility impairment caused by "manmade" air pollution. Natural events are neither the focus of the Act nor the focus of the rule. Although EPA does not intend to exclude data from the visual air quality data base, EPA will not require other sources to seek further emission reductions to compensate for natural events.

Question 7b. If not, how and to what extent will States be able to exclude visibility impairment from each of the following classes of events from their calculations: wildfires, dust storms, prescribed burns on Federal lands, prescribed burns on private and State owned lands, and emissions from foreign sources.

Response. Wildfires and dust storms are clearly natural events which should be accounted for in determining natural conditions. Emissions from prescribed burning may have both a natural and a man-made component. Some prescribed burning is conducted for reasons other than restoring the natural fire cycle and reducing the risk of wildfire. The effects of such burning should be addressed if it hinders reasonable progress. The EPA intends to address these issues at the time it revises the Interim Air Quality Policy on Wildland and Prescribed Fires after the regional haze program is finalized.

Regarding international emissions, EPA staff will continue to work with their counterparts in Mexico and Canada to identify and address transboundary sources of manmade visibility impairment. EPA will not impose control obligations on domestic sources to address impairment that is caused by international transport.

As noted above, EPA does not plan to exclude the data from such events from the visual air quality data base. EPA does, however, intend to distinguish between that which is natural and that which is only manmade, in assessing the degree of visibility improvement that may be needed to reach the national goal. Thus, in implementing the regional haze program, EPA expects States to consider the causes of manmade visibility impairment and develop strategies which are responsive to those contributions.

Question 8. In its answer to another of the Appropriations questions, EPA said it is "working with Federal land managers to identify ways to account for and discount, for visibility analysis, impairment from prescribed fire which is equivalent to that which would have occurred naturally and therefore would not be considered "man made." This degree of impairment would thus not affect State obligations to provide for reasonable progress in their SIPs." This answer suggests that States are

going to be responsible for that portion of the emissions from fires that are "man-made," including that portion of the emissions from prescribed fires attributable to the mismanagement of Federal lands by Federal land managers.

Question 8a. For purposes of compliance with the regional haze rule, does EPA intend to distinguish between that portion of visibility impairment from prescribed fires attributable to the "natural" amount of fuel in the forest, and the portion of impairment from the excess fuel due to forest mismanagement, i.e., the "man-made" portion?

Response. In section 169A(a)(1) of the Clean Air Act, Congress "declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution." As noted above, EPA does not plan to exclude the data from prescribed fires from the visual air quality data base, but EPA intends to distinguish, in assessing the degree of visibility improvement that may be needed to reach the national goal, between that which is natural and that which is manmade. The EPA intends to address this issue at the time it revises the Interim Air Quality Policy on Wildland and Prescribed Fires after the regional haze program is finalized. Moreover, EPA intends to work with FLMs and States to minimize the impacts of prescribed burning and ensure that the impacts of fire are properly reflected in the establishment of Reasonable Progress goals.

Question 8b. What current or planned monitoring, reporting activities, and source receptor relationships can you point to that would allow EPA or States to make such a distinction?

Response. In refining estimates of manmade versus non-manmade impairment, there are a number of available technical tools, such as chemical composition analysis of IMPROVE monitoring data, the tracking of fire events, and fire emissions modeling tools.

Question 8c. Are States going to be responsible for the visibility impairment attributable to the "man-made" emissions resulting from the mismanagement of Federal lands by Federal land managers?

Question 8d. If there is an increased use of prescribed fire over current conditions with a resulting increase in the man-made portion of prescribed fire emissions which affects a particular State, will that State be forced to find additional emissions reductions beyond what it might currently need from other sources, such as private sector and State-owned sources, in order to achieve its target for progress on visibility impairment?

Response to 8c and 8d. The proposed regional haze rule calls for States to develop strategies that assure reasonable progress toward the national goal. The proposed rule would provide the States with the flexibility to include any mix of strategies to address emissions of concern. If increases in prescribed fire emissions are of concern to a State, the State should include appropriate strategies in its SIP, such as an effective smoke management program. We note that to address these emissions, EPA has encouraged development of smoke management programs by States in the Interim Policy on Wildland Fire. The EPA also included provisions in the proposed rule that would give the States the flexibility to set alternate progress targets, based on a review of the statutory factors for determining "reasonable progress." For example, if the State did not meet a reasonable progress target for a particular class I area due to increased emissions from fire not considered part of natural conditions, it would not be required to find additional emission reductions from other non-fire sources. However, the State would be required to revise its SIP to either change its strategies to address specific source categories of concern, or to establish an alternate progress target, if a review of the statutory factors showed that such action was appropriate.

Question 9. Another of the Appropriations questions asked EPA how much visibility impairment in class I areas is due to prescribed fire. The EPA stated that it "does not have estimates of how much visibility impairment is due to prescribed fire by each class I area." However, EPA admitted that "Estimates of growth for prescribed fire range up to a 5fold increase in some areas of the Western United States where fire suppression has been based on work completed for the Grand Canyon."

Question 9a. Can you point to any provision of the proposed regional haze rule that assures the States that they are not going to have to reduce their emissions to make up for the increased emissions from prescribed fire if EPA projected 5fold increase occurs?

Response. See response to questions 8c and 8d.

Question 9b. In order to discount any portion of the visibility impairment due to natural fire conditions, EPA first has to accurately track and document their im-

pacts. If EPA can't even tell us how much visibility impairment is due to prescribed fire today, how can we assure States that EPA will track future fire emissions so that States are fully protected?

Response. EPA is currently working with the Federal land managers and States to develop guidance for estimating natural visibility conditions, and EPA will continue to do so after the rule is promulgated. The FLMs already have a number of technical tools and data bases in place to document fire events and estimate emissions associated with different types of fire, various vegetation types, and different ecosystem burn regimes. The FLMs are continuing to develop and enhance these technical resources. It is also important to note that the GCVTC States have recommended that the FLMs and States implement tracking programs for fire emissions as part of their State implementation plans.

Question 9c. Will States be strictly liable for all sources of visibility impairment unless authorized by EPA to exclude classes of emissions or sources?

Question 9d. The private sector in those States is going to have to make up for visibility impairment generated by Federal action on Federal lands. Is this correct? If not, how can you explain the EPA's answer?

Response to 9c and 9d. No. See the response to questions 8c and 8d above.

Question 10. You testified that with the TEA–21 legislation, future visibility transport commissions (VTCs) will have more time than the Grand Canyon Commission (the "Commission") to develop regional solutions for reducing regional haze. Please provide a time-line comparing the time periods for activities of the Commission with a hypothetical VTC that begins operation at some point in the future, showing all deadlines for actions by States under the proposed rule.

Response. In the hearing testimony, EPA was making the general point that under section 169B of the Act, VTCs have 4 years to develop recommendations and to provide them to EPA, while under TEA–21, areas in many cases will have more than 4 years to submit regional haze Sips to EPA. The EPA wants to be clear about the distinction between VTCs and regional planning efforts. The VTC provisions of the 1990 Clean Air Act Amendments have not changed. They require that any VTC created in the future would have the same amount of time (4 years) to develop recommendations to EPA as was provided for the activities of the Commission. It is important to note that the provisions in section 169B of the CAA for visibility transport commissions are limited to assessing regional visibility impairment and do not impose any obligations or confer new authorities on such commissions that would assure actions to improve visibility. For this reason, and because many stakeholders interested in implementation of the NAAQS and regional haze programs recommend integrated planning, EPA is encouraging regional planning efforts. We believe these efforts should be initiated by the States and should be designed to achieve a more comprehensive set of objectives than what visibility transport commissions under section 169B are designed to address, since interstate transport of pollutants and their precursors may also contribute to air quality problems for fine particulate matter, as well as visibility impairment. The point of EPA's testimony was that these regional planning efforts, if initiated in the near future, could have more than 4 years to conduct technical assessments and develop these coordinated control strategies.

[The deadlines for actions in the proposed rule have been superseded by the timing requirements in TEA–21, so this response does not show deadlines for actions under the proposed rule.]

Question 11. You testified that you did not know whether regions outside of the Commission would need special regulatory provisions to implement their regional solutions.

Question 11a. Why should a regional solution reached by other VTCs be denied the special status of a tailored regulatory provisions that appears likely to be afforded the States in the Commission?

Question 11b. Would EPA consider adopting tailored regulatory requirements for other regions?

Response to 11a and 11b. The proposed rule does not deny other States the ability to work with other States in a region to develop tailored regional solutions. Consistent with the schedule provided in the TEA–21 amendments, we are encouraging States to form regional planning efforts to conduct technical analyses and control strategy evaluations in order to develop such regionally tailored solutions, in a way that is coordinated with and integrated with efforts for meeting the NAAQS. Note that these efforts would be more broadly responsive to health as well as visibility protection goals than VTCs. The EPA plans for the final rule to have the flexibility

for States to implement the strategies coming out of the regional planning process through individual State implementation plans.

Because the work of the Grand Canyon Commission preceded the national rule, we believe it is appropriate and useful to codify the recommendations in rule language. This allows EPA to formally acknowledge the early efforts of the Commission, and to assure the participants that their efforts are consistent with the framework envisioned for the national rule. For other parts of the country where the national framework will already be in place during the regional planning process, it will not be necessary to codify the control strategy requirements into the national rule, but instead will be sufficient for these strategies to be made federally enforceable through the SIP approval process.

Question 11c. If EPA is considering adopting other region-specific requirements, why is EPA considering adopting a national rule at this time?

Response. EPA is not pursuing the establishment of region-specific requirements beyond provisions recognizing the efforts of the GCVTC. The EPA is moving forward to adopt a national rule at this time because since adopted in 1977, section 169A of the Clean Air Act has authorized EPA to address regional haze visibility impairment. In section 169A(a)(4) Congress delegated to EPA authority to issue regulations to assure ''reasonable progress toward meeting the national goal.'' As explained in Maine v. Thomas, 874 F.2d. 883.885 (First Cir. 1989, ''EPA's mandate to control the vexing problem of regional haze emanates directly'' from these provisions of the Clean Air Act. While EPA deferred addressing regional haze in its original 1980 regulations it did so because of technical obstacles, not because of a limitation on its legal authority. 45 Fed. Reg. 80084 (Dec. 2, 1980). Indeed, in the 1980 rule EPA expressed its intent to address regional haze in a future rulemaking under section 169A.

The provisions in section 169B of the Clean Air Act, adopted in 1990, grew out of Congress' continued interest in having EPA develop a regional haze program under its section 169A delegated rulemaking authority. One provision in section 169B authorized formation of visibility transport commissions. Congress made it clear that it did not intend section 169B to impinge upon EPA's long-standing obligation to address regional haze visibility impairment. See 136 Cong. Rec. S2878 (daily ed. March 21, 1990) (statement of Sen. Adams) (''[t]he authority to establish visibility transport regions and commissions is a supplement to the administrators [sic] obligation under current law'' and [t]he Administrator may not delay requirements under section 169A because of the appointment of a commission for a region under section (daily ed. Oct. 26, 1990) (statement of Rep. Wyden) (''[in] either the original House language nor the Senate language adopted in conference repealed or lessened EPA's obligations under the 1977 law''). Thus, visibility transport commissions are a potential tool for, but not a prerequisite to, the development of regional haze regulations.

You testified that under the regional haze rule, the deciview target is not an enforceable standard, but that it is only a metric to measure progress. The difference between a standard and a metric is that there are consequences to missing the standard, while there are no consequences to coming up short on a metric.

Question 12a. Is it EPA's position that under the regional haze rule, there will be no consequences to a State or the private sector within a State if the deciview target is missed over a continuing period of time? Please point to a specific provision of the proposed rule to justify this answer.

Response. Under the proposed rule, the one deciview reasonable progress target is a presumptive target. The proposed rule allows States to establish alternative targets where warranted. See 40 CFR section 306(d)(4)(proposed). Thus, the proposed rule provides States with the flexibility to set an alternate reasonable progress target consistent with the requirements set forth in section 169A(g)(1). Given a particular reasonable progress target, if a State were to develop and implement strategies to achieve the target but monitoring results were to show that the target had not been achieved, the consequences would be a requirement that the State review its control strategies and target, and revise one, or both, as appropriate based on consideration of the factors set forth in the CAA.

Question 12b. Could EPA disapprove a SIP because it believes a State's plan will not produce the emission reductions needed to achieve the deciview target?

Response. As explained above, the proposed rule allows States to establish alternate reasonable progress targets where warranted. If a State were to submit a SIP with either a one deciview or an alternate reasonable progress target that could be reasonably met but were to fail to back up the target with adequate strategies adopted into the SIP, EPA could and should disapprove the SIP.

Question 12c. Could EPA impose a FIP on a State after it disapproves a SIP?

Response. Yes. Under section 110(c)(1) of the Clean Air Act, EPA has the authority to promulgate a FIP if EPA disapproves a SIP unless the State corrects the deficiency.

Question 12d. If there are any other consequences of missing the deciview target, please identify them.

Response. As noted above, the consequences of missing a reasonable progress target would depend on the circumstances surrounding the State's failure to meet the target. For example, if a State were to implement all the strategies contained in its SIP but still fails to meet the target, the consequence could be a requirement for the State to determine the reasons for its failure to meet the target and to revise its strategies and/or reasonable progress targets as appropriate. Alternatively, if a State were to miss a reasonable progress target because of failure to implement strategies adopted into the SIP, this could result in a finding of nonimplementation and possibly sanctions.

Question 13. You testified that a regional haze baseline must be established within 5 to 7 years after the rule is published. Is this a baseline for purposes of determining whether the deciview target has been met, or a baseline for measuring classes of fire emissions? How would EPA use this baseline in the out years?

Response. This baseline would establish visibility conditions from which States would begin tracking reasonable progress toward the national visibility goal. The State would establish a goal for improving visibility from baseline conditions over each long-term strategy period. At periodic intervals, the States would be required to compare existing conditions to the baseline to evaluate the overall progress made to date.

Question 14. In amending the Clean Air Act in 1990, Congress authorized the establishment of VTCs to make an integrated assessment of the effects of other provision of the Act, including the ozone and particulate matter provisions, in order to determine whether there was any need for additional specialized regulations to achieve progress on visibility. Your testimony suggested that EPA's notion of integration is the integration of States' efforts to implement EPA's mandated ozone, particulate matter, and regional haze rules.

Question 14a. Doesn't EPA's approach to integrated implementation contradict the congressionally mandated approach of an integrated assessment of the need for any additional regulations?

Response. The EPA does not believe that coordinated implementation between the NAAQS and regional haze programs contradicts section 169B. The provisions in section 169B of the CAA for visibility transport commissions are limited to assessing regional visibility impairment and do not impose any obligations or confer new authorities on such commissions that would assure actions to improve visibility. For these reasons, we are encouraging regional planning efforts. We believe these efforts should be initiated by the States and should be designed to achieve a more comprehensive set of objectives than what visibility transport commissions under section 169B are designed to address, since interstate transport of pollutants and their precursors may also contribute to air quality problems for fine particulate matter, as well as visibility impairment.

Question 14b. Do you believe it would be more cost-effective for VTCs to first make an determination of whether any additional efforts are need on regional haze, and only then for States to look at the integrated implementation of these efforts?

Response. Establishing a VTC that is a separate entity from the regional planning efforts for the other programs does not appear likely to improve the efficiency of the process.

Question 15. In previous testimony before Congress, administration witnesses, including yourself, have relied on the development and implementation of smoke management agreements between the Federal land managers and the States to control or manage the contribution to visibility impairment made by prescribed burns on Federal lands.

Question 15a. Is EPA a party to those agreements or involved in their negotiation?

Response. No, while EPA participated in the development of national policy on fire which would be responsive to air quality goals, EPA is not a party to those agreements nor involved in their negotiation.

Question 15b. I understand that not all regions have smoke management agreements in place. After consultation with the U.S. Forest Service and the U.S. National Park Service, please provide the committee with a region-by-region description of where smoke management agreements are in place and describe the key pro-

visions in the plans that assure that States are able to control the Federal contribution to visibility impairment.

Response. The EPA is working with the USDA Forest Service and the National Park Service to better understand where smoke management agreements are in place, and what are the key provisions of such agreements. The EPA has not received this information for all regions of the country. The EPA will provide you with this information upon its receipt. The EPA expects that an additional response can be provided to you by December 15.

RESPONSES OF JOHN S. SEITZ TO ADDITIONAL QUESTIONS FROM SENATOR BAUCUS

Question 1. During the hearing, Secretary Woodley indicated that the "bluish haze" which envelopes the Blue Ridge and Great Smoky Mountains is natural. Do you agree with the Secretary's statements and its implications for addressing the regional haze to improve visibility in this area?

Response. No. Substantial monitoring by the IMPROVE network shows that sulfates are the dominant contributor to light extinction in this region of the country. Only a negligible amount of sulfates are from natural sources. Thus, much of the haze enveloping the Blue Ridge and Great Smoky Mountains is from manmade air pollution. While there is a degree of haze in this area that is natural, the scientific evidence clearly shows that visibility conditions are much worse under current conditions than would occur naturally. For example, the typical visual range of 15 to 30 miles is only about one-third to one-sixth of the visual range that would exist under natural conditions.

Question 2. How do you respond to Secretary Woodley's suggestion that the regional haze regulations will detract from the nation's efforts to address health-based environmental concerns (i.e., elevated ambient levels of tropospheric ozone and particulate matter)?

Response. We believe that the schedule provided for in the TEA–21 amendments ensures that regional haze technical analyses and control strategy development can be readily integrated into the analyses to address ozone and particulate matter. We do not think that consideration of regional haze will detract from these analyses. On the contrary, these regional efforts will benefit by inclusion of regional haze, because there will be a more complete understanding of the air quality considerations relevant to the decisionmaking process.

Question 3. Some of the witnesses indicated that the proposed regional haze rule ignored the most significant contributors to haze and would not give the States flexibility in developing control strategies. Do you believe that this characterization of the proposed rule is accurate.

Response. No. The rule requires States to consider all sources contributing to impairment in their long-term strategies. We believe that the proposed rule provides for substantial flexibility in two ways. States have the flexibility to develop strategies dealing with any mix of sources that is appropriate for meeting visibility goals. States also have the flexibility to set alternate progress targets, if such targets are reasonable based on a consideration of the statutory factors.

ENVIRONMENTAL PROTECTION AGENCY,
Office of Air Quality Planning and Standards, January 4, 1999.

Committee on Environment and Public Works,
U.S. Senate,
Senate Office Building,
Washington, DC 20510.

DEAR MR CHAIRMAN: This is in response to the letter of October 27, 1998, from Senator Inhofe and Senator Graham on behalf of the Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety, which included followup questions to the October 1 Subcommittee hearing on regional haze. We responded to all but one of your questions in a separate response. I am now providing the response to this remaining question, which dealt with smoke management agreements between States and the Federal land managers (FLM's) and how the provisions of these agreements help protect visibility. The information we have gathered is complete and accurate to the best of our knowledge.

You also asked if Environmental Protection Agency (EPA) is a party to any of these agreements. The information we received indicates that EPA is not a party to any of these agreements, although we certainly encourage the States to develop such agreements in partnership with the FLM's. We believe that the use of smoke

management techniques can significantly reduce the impacts of prescribed burning on ambient air quality and visibility.

In answering your questions, it is important to note first that even though only eight States currently have smoke management agreements with the FLM's, there will be opportunities to develop more such agreements in the near future. The National Forest Management Act requires that forest plans be revised by the Forest Service at least every 15 years. The lands entrusted to the Department of the Interior are subject to a similar process. Forest planning teams actually begin the revision process 3 to 4 years prior to this date, and within the next 2 years nearly two-thirds of our national forests will be actively involved in this process. This presents an opportunity for States to get involved in this public process and to make known to the FLM's their concerns about smoke impacts from prescribed burning. The FLM's strongly encourage the States that they currently do not have agreements with to take advantage of this opportunity to work with the FLM's in developing agreements that will facilitate the protection of air quality and visibility within their boundaries. Additionally, many States have regulations that govern open burning and many of these regulations have smoke management requirements in them that are similar, if not identical, to the type of requirements found in programs run by States that have agreements with FLM's. These regulations, like any other State pollution control regulation, apply to all burners including FLM's. Finally, some States have voluntary smoke management requirements alone or in combination with general open burning regulations. We know of no case where FLM's are not following the requirements of a voluntary program in any State where they apply.

Regarding your specific question about which States have agreements with the FLM's and how they allow States to control the Federal contribution to visibility impairment, we have compiled the following information:

The following States have agreements with Federal Land Managers in place:

Arizona: The State has a regulation under which an umbrella agreement was signed that includes a Federal interagency agreement among the Forest Service, National Park Service, Fish and Wildlife Service, Bureau of Land Management, and the Bureau of Indian Affairs, and a Memorandum of Agreement (MOA) between State agencies and the FLMs. The State agencies include the Arizona Department of Environmental Quality and the Department of Lands. The agreement calls for making the protection of the national ambient air quality standards (NAAQS) and visibility a priority. It requires daily burn approvals, air monitoring, and emissions tracking among other requirements. A State smoke meteorologist is responsible for establishing acceptable burn conditions for the State's airsheds and burn approvals are based on these conditions. Avoiding or minimizing smoke impacts on sensitive areas, such as the Federal Class I Areas, is a major goal of the State's program.

California: California has several Memorandums of Understanding (MOU's) between individual State agencies and National Forests. They are: the California Air Resources Board (CARB) MOU with the Sequoia and Sierra National Forests, the Santa Barbara Air Pollution Control District MOU with the Los Padres National Forest, and the South Coast Air Pollution Control District MOU with the Los Padres, Angeles and San Bernadino National Forests. The State also has mandatory smoke management regulations that apply to all wildland prescribed burning activities (including agricultural burning, grassland burning, and silvicultural burning). The program is implemented at the State level by the CARB and by thirty-five local air pollution control districts to different degrees. Authorizations to burn are required by the burners and there is much competition among the State's many land managers to conduct their burns due to the limited opportunities allowed by State and local program rules. The program is fairly rigorous and the concerns about smoke impacts in the State are many, including nuisance, public health, and visibility protection in sensitive areas. All Federal agencies must comply with California Air Resources Board regulations. In addition, FLMs are held to a conformity process to show that they are complying with the Clean Air Act. A statewide MOU is now being drafted.

Colorado: The State Department of Health-Air Pollution Control Division has a MOU with Federal Land Managers that forms the basis of a statewide smoke management program. The State issues permits to burners and conditions the permits to assure compliance with public health air quality standards, to protect visibility, and to avoid smoke impacts on populated areas.

Before a permit is issued air quality modeling to predict ambient air quality and visibility impacts is required as well as certain fire information and weather conditions.

Montana: The Montana Department of Environmental Quality (DEQ) has a smoke management MOA with the Forest Service, Bureau of Land Management, Bureau of Indian Affairs, and the National Weather Service. A Smoke Management Coordi-

nator located with the DEQ is funded by contributions from each of the land managers who burn more than a certain acreage per year. Burns are authorized on a daily basis based on monitored weather conditions in airsheds throughout the State. The DEQ requires the pre-registration of burn requests from program participants and the post-burn filing of information for tracking purposes. The agreement also requires the use of alternative fuel removal methods when the NAAQS are threatened.

New Mexico: The State Department of Energy, Minerals and Natural Resources and the New Mexico Land Commissioner's office has a smoke management MOA with the Forest Service, National Park Service, Fish and Wildlife Service, and the Bureau of Land Management. Under the agreement FLM's must obtain a permit from the State prior to burning. There must be a burn plan and it must explicitly address visibility impacts. Class I and other sensitive areas are to be protected from smoke impacts. Burns are scheduled when park use is low and alternative treatments are used if feasible. Air monitoring may also be required.

Oregon: The Oregon Department of Environmental Quality and the Division of Forestry have a smoke management MOA with the Forest Service and the Bureau of Land Management. The smoke management program is part of the State implementation plan for visibility protection. Like Washington State, Oregon has a comprehensive and sophisticated program which includes a real-time air quality monitoring in some areas of the State. Some of the requirements are: detailed reporting of acres to be burned, tons of fuel, dates, times, locations.

Utah: The Utah Department of Environmental Quality administers a smoke management program in accordance with an agreement with FLMs and the State's open burning regulations. Land managers must notify the State of their request to burn and supply fire information (fuel type, location, acres, etc.). Burning is restricted under the agreement to days when there are good atmospheric conditions for dispersing smoke. The State may impose permit conditions, including air monitoring, in order to assure compliance with those conditions. The State implementation plan addresses the smoke management agreement for purposes of protecting visibility in the State's Class I Areas, which is a principal concern of the State.

Washington: The Washington Departments of Natural Resources (DNR) and Ecology have a smoke management MOA with the FLM's. It is a mandatory, statewide program that is part of the State implementation plan and requires FLMs' burning activities to be approved by the DNR

Protection of Class I Area visibility is the primary focus of the program which requires fire emission reduction goals and restrictions on burning.

The following States are considering adopting statewide smoke management programs and or regulations:

Nevada: Nevada has had no specific rules or agreements in place for wildland burning but is currently considering adoption of a statewide smoke management program. The Lake Tahoe Basin prescribed fire program does regulate FLM wildland burning in that area of the State and includes consideration of smoke impacts.

Wyoming: The State is in the process of developing a statewide smoke management program consistent with EPA's Interim Air Quality Policy on Wildland and Prescribed Fires, May 1998. All Federal land managing agencies are participating in the development of the program, to be completed in 1999. Currently, a State permit program that has been in place for many years still regulates Federal burning activities through compliance with permit conditions, air quality modeling requirements, etc.

Some States that do not have agreements with FLM's do have regulations that apply to open burning. All burners are subject to these rules, including FLM's. Included in this group States that have either a combination of regulations and voluntary smoke management program, or voluntary smoke management programs alone. The States in question are:

Alabama: The Alabama Forestry Commission's document A Smoke Screening System For Prescribed Fires In Alabama, dated January 24, 1992, states that using the recommended smoke management planning system is the decision of the landowner or contractor supervising the burning operation.

Alaska: The Alaska Department of Environmental Conservation implements a fairly general open burning rule. The State's major concern relates to public health and nuisance issues in impacted communities, primarily from wildfire events. At this time, regional haze issues are not a State priority.

Arkansas: The Arkansas smoke management program is voluntary. As stated in the Arkansas Voluntary Smoke Management Guidelines document published by the Arkansas Forestry Association, dated 1998, "The State Forester has accepted re-

sponsibility for the dissemination and administration of a voluntary smoke management plan for burning related to forestry programs.''

Florida: The 1996 Florida Forest Fire Laws and Open Burning Regulations published by the Florida Department of Agriculture and Consumer Services, Division of Forestry do not specify if the FLM is subject to Florida's smoke management plan. However, Florida statute Chapter 590.12(1)(a) states that it is unlawful for any person to burn any forest, grass, woods, wild land, etc. without first obtaining authorization from the Division of Forestry.

Georgia: Georgia State Air Quality Control regulations Chapter 391–3–1, revised June 1998, do not specify if the ELM is subject to Georgia's smoke management plan. Georgia has not developed its own smoke management guidance but instead uses the National Wildlife Coordinating Group's publication A Guide for Prescribed Fire in Southern Forests as a basis for their plan.

Mississippi: Mississippi regulations (Mississippi Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants, APC-S–1, Amended January 22, 1998) require fires set for forest management purposes to meet certain conditions. However, the document Voluntary Smoke Management Guidelines for Mississippi published by the Mississippi Forestry Commission, revised October 1998 outlines a voluntary smoke management program.

South Carolina: South Carolina regulations (61–62.2 Prohibition of Open Burning) allow fires purposely set to forest lands for specific management practices in accordance with practices acceptable to the Department of Health and Environmental Control. The Smoke Management Guidelines for Vegetative Debris Burning Operations published by the South Carolina Forestry Commission requires a fire plan for each forest, wildlife, and agricultural area to be burned.

Texas: Texas regulations (Subchapter B Outdoor Burning, sections 111.201 through 111–221) authorize ''Prescribed burning for forest, range and wildland/wildlife management purposes, with the exception of coastal salt-marsh management burning.'' Section 111.219 establishes general requirements, regarding notification and smoke management, for outdoor burning. The regulations do not specifically mention FLMs. In its August 1998 State Visibility implementation plan review and report, the Texas Natural Resources Conservation Commission states that the regulation of smoke on a statewide basis ''should prevent future impairment (of visibility in Class I Areas) associated with emissions from prescribed fire.''

Virginia: Virginia's regulations for the control and abatement of air pollution (9 VAC 5, Chapter 40, Part II, Article 40, sections 5600 through 5645) state that open burning may be used for forest management provided the burning is conducted in accordance with the Department of Forestry's smoke management plan. However, the Department of Forestry's Smoke Management Guidelines published June 8, 1998 are voluntary.

Some States have no regulations governing open burning while others have regulations that specify that burning is allowed with little or no restrictions to preserve citizen rights to burn. These State regulations do not appear to contain any measures to protect air quality or visibility. The information we have on these States follows.

The information we have on these States follows.

North Carolina: According to North Carolina's Open Burning Regulation (15ANCAC 2D.1900) fires set to forest lands for forest management, fires set for wildlife management, or fires purposely set to agricultural lands are permissible without a permit. North Carolina has not developed formal guidelines for smoke management.

Tennessee: Tennessee regulations (Chapter 1200–3–4, Open Burning) do not require a permit for ''Fires used to clear land consisting solely of vegetation grown on that land for residential, agricultural, forest, or game management purposes.'' Tennessee has not developed formal guidelines for smoke management.

In addition to any State-Federal agreements or State regulations, the general conformity provisions of the Clean Air Act (Section 1 76(c)), prohibit Federal agencies from taking any action within a nonattainment area that causes or contributes to a new violation of the standards, increases frequency or severity of an existing violation, or delays the timely attainment of a standard as defined in the area plan. Federal agencies are required to ensure that their actions conform to applicable State Implementation Plans. Also, Section 118 of the Clean Air Act requires that the Federal Government comply with all Federal, State, tribal, interstate, and local air quality standards and requirements. The Clean Air Act also gives FLM's an ''affirmative responsibility'' to protect the Air Quality Related Values (AQRVs) of Class I areas from adverse air pollution impacts. The AQRVs are those features or properties of a Class I area which can be changed by air pollution. Mandatory Class I areas were designated under the Clean Air Act and are usually pristine areas of

the country which receive the highest degree of regulatory protection from air pollution impacts.

I appreciate this opportunity to be of service and trust that this information is useful to you.

Sincerely,

JOHN SEITZ, *Director,*
Office of Air Quality Planning and Standards.

STATEMENT OF COLORADO STATE SENATOR DON AMENT, CHAIRMAN, COLORADO AGRICULTURE, NATURAL RESOURCES AND ENERGY COMMITTEE

As chairman of the Colorado Senate's Committee on Agriculture, Natural Resources and Energy, I chair a committee that has jurisdiction over most natural resource and pollution questions in our state. As a farmer and rancher in the northeastern part of Colorado, I have firsthand experience with key natural resource issues as they affect me and my neighbors. I have served in the Colorado Legislature since 1986 and have spent most of that tenure devoted to protecting our environment, our agricultural resources, and the natural resources of the West.

Since 1990, I have watched the Federal Government and particularly the Environmental Protection Agency struggle with the concept of regional haze and air pollution. I am here today to urge the Congress to take whatever steps it can to prevent the EPA from implementing its Regional Haze Rule. They are unsupported by the law. First, during the 1990 Clean Air Act debates, the provisions of today's proposed Regional Haze Rule were specifically debated and rejected by Congress as failed command and control methods, not based on science, and not giving states necessary flexibility. Second, EPA's Regional Haze Rule ignores the most significant contributors to regional haze in the West while imposing hugely expensive "top-down" control strategies on small causes of regional haze which would have a negative impact on large sectors of the economy that will increase costs of electricity to all consumers, manufacturers, and particularly agriculture. Thereby failing the cost/benefit mandated by Congress for aesthetic regulations.

In attrition to these substantial flaws found in the proposed Regional Haze Rule, the EPA is also now proposing an accelerated implementation schedule for stationary source sulfur dioxide controls, ignoring the mandate of Congress found in the recently enacted Inhofe Amendment to TEA–21. I understand the Inhofe Amendment recognized the necessity of flexibility regarding the Grand Canyon Commission implementation timetable. However, EPA has selectively used the June, 1998 Western Governors Association proposal to the Regional Haze Rule to accelerate implementation of the Regional Haze Rule well ahead of not only the Grand Canyon recommendations timetable, but well ahead of the Western Governors Association proposal.

Because of the recognition by the Colorado General Assembly that the EPA and other unelected out-of-state organizations might ignore major sources of air pollution in the West which impact visibility and other aesthetic standards, I sponsored legislation in 1997 (a copy attached), HB 97–1324, which mandates that the State of Colorado maintains regulatory control of measures designed to reduce air pollution producing regional haze. This Colorado Law was enacted primarily to prevent command and control, "top-down', regulation of Colorado air pollution problems which would ignore some sources of air pollution and increase dramatically the cost of operation of other sources without solving the haze problem.

In our state it is common that the legislature review final environmental regulations mandated by our environmental protection agencies so that elected representatives have firsthand knowledge of the science, economics, and anticipated benefits of proposals to help improve our environment. If the Regional Haze Rule is enacted, EPA would supplant and abrogate this duly enacted law with directions from Washington which ignore the will of the people of Colorado and ignore congressional Clean Air debate and statutes. EPA's Regional Haze Rule also selectively ignores about 5 years and almost $9,000,000 worth of Grand Canyon science.

I am sure that you on this committee are familiar with the Grand Canyon Visibility Transport Commission. The Commission of eight Western Governors plus Tribes was closely assisted not only by the EPA but numerous other Federal and state agencies and interested parties from throughout the West. The Commission submitted recommendations to address western regional haze to the Environmental Protection Agency in June 1996. One of the major conclusions of the Commission was that, "emissions from fire, both wildlife end prescribed fires, is likely to have the single greatest impact on visibility at Class I areas through 2040" (Recommendations, p. 85).

We in Colorado are also familiar with the Grand Canyon Commission recommendations. which underscores our concerns about major sources of pollution blowing in and around Colorado. In fact, since 1996 the Colorado Legislature has twice passed legislation designed to hold Federal agencies accountable under the authority granted states by Section 118 of the Clean Air Act for control of pollution from Federal resources. Twice the Federal agencies have lobbied our Governor Romer to veto the bill and twice that interference by Federal agencies has been successful. The result is the General Assembly still has not been able to demand a standard from Federal land managers to minimize emissions from fire and dust on Federal lands. To me, it is only common sense that Federal resources should be managed to minimize emission which cause haze, if such non-health issues are truly a national priority.

I note with dismay EPA has not been helpful in requiring major sources of pollution from Federal facilities or lands to be taken into account in either its Regional Haze Rule or in its daily operations. In fact, it appears to us that the EPA makes excuses and covers up for other Federal agencies when air pollution emanates from those Federal lands that are such a dominant feature of the West. For example, in three previous congressional hearings within the last year, EPA has been confronted with these facts:

- The Grand Canyon Commission science identified emissions from Federal lands fires as a major source of Western haze.
- But, soon after, the Department of the Interior announced a 500 percent increase in burns.
- In the House Resources Committee's hearing last fall. the Secretaries of the Interior and Agriculture Departments stated 50 percent of western forests would need "mechanical treatment" before prescribed burns could be set.
- But the stated need for logging or "mechanical treatment" is not reflected in agencies' budgets.

Consequently, if the Regional Haze Rule is implemented, western states would be prevented from attacking real sources of haze while being forced to regulate only one minor contributor—stationary sources.

We need the help of this committee and help from other members of Congress on several fronts.

1. We need Congress to make it very clear that the Regional Haze Rule proposed, with "topdown" regulation ignoring all sources of aesthetic pollution in the West other than stationary source pollution, must be retreated and reworked before it is resubmitted to the public for public comment and notice. The new proposal must take into account statutory cost/benefit analysis and must regulate the major contributors first. It must follow the timetable mandated by the Inhofe Amendment.

2. The Grand Canyon Visibility Transport Commission was created by Congress to address visibility issues in the West. The Commission's extensive interdisciplinary resources and science resulted in recommendations concurred in by EPA. We in the West should he allowed by Congress and EPA to design a protection program to implement the Grand Canyon Commission's findings and recommendations—not ignore those findings. If the Western Governors are given en opportunity to have input, based upon the Commission's findings, the input they give must not be selectively ignored and implemented to create a command and control, "topdown" enforcement program from Washington.

3. State laws, such as the one I sponsored allowing the states to form their own strategies to control regional haze, should be honored—not ignored. Instead, the Regional Haze Rule would empower EPA to force each state to adopt a federally enforceable standard framed at a national or regional level that would set a quota for each state regardless of scientifically supported impact analysis.

4. In light of the continuing benefits of the 1990 Clean Air Act, science, and statutory cost/benefit considerations of non-health or aesthetic issues, the general timetable for implementation set forth in the Inhofe Amendment to TEA-21 must be applied to all 50 states. Congress intended by that amendment to allow for real scientific research to identify sources of pollution impacting health and/or non-health aesthetic standards before a new set of costly regulations were required.

We in the West ask the Congress to help us change EPA's Regional Haze Rule to recognize these four necessities. Then both the health-based regulations and non-health aesthetic-based regulations can be implemented to the advantage of science, reduce costs and reduce needless regulation, and honor the 1990 Clean Air Act provisions and the intent of the Inhofe Amendment.

STATEMENT OF DIANNE R. NIELSON, DEPARTMENT OF ENVIRONMENTAL QUALITY, STATE OF UTAH

Good afternoon. I am Dianne R. Nielson, Ph.D., Executive Director of the Utah Department of Environmental Quality, and Governor Leavitt's Official Representative to the Western Regional Air Partnership (WRAP). Governor Leavitt has taken an active role in air quality and visibility issues in Utah and in the West, as Vice-Chair of the Grand Canyon Visibility Transport Commission, Co-Chair of the WRAP, and lead Governor for air quality issues for the Western Governors' Association (WGA). I am here today on behalf of Governor Leavitt to provide testimony regarding a western regional approach to regional haze and the Environmental Protection Agency's recent Notice of Availability of Additional Information related to proposed regional haze regulations.

This issue is important to western states, to the people who live and work in the West and to the many people who visit. As Utah's chief environmental official, I appreciate the inherent value of our Western vistas and my stewardship responsibility.

This subcommittee has been vigilant in its efforts to oversee the progress of the Grand Canyon Visibility Transport Commission and its successor organization, the Western Regional Air Partnership (WRAP). You are aware of the history and work of these unique regional partnerships, as summarized herein. When Congress enacted the Clean Air Act Amendments of 1990, directing the EPA Administrator to establish the Grand Canyon Visibility Transport Commission, you laid the groundwork for visibility protection through regional partnership. You provided the opportunity to address a regional problem at a regional level. States, tribes, Federal agencies, local government officials, business and industry, environmental representatives, academicians, and citizens came together in partnership to develop recommendations for protecting visibility at the Grand Canyon and 15 other western Class I areas. The consensus recommendations of the Grand Canyon Commission were presented to EPA in June 1996. The Western Regional Air Partnership or WRAP was established to implement the Grand Canyon recommendations, and as appropriate, address other air quality issues of regional interest. The WRAP consists of western states and tribes as well as the Secretaries of the Interior and Agriculture and the Administrator of the EPA. Committees and workgroups, with the involvement of stakeholders as in the Commission, are working to develop consensus approaches to initiatives and technical efforts to reduce regional haze.

In April 1998, when Governor Leavitt testified before this subcommittee, he reaffirmed the commitment of western Governors to the consensus recommendations of the Grand Canyon Commission and to WGA's Environmental Doctrine, which guides our efforts to seek solutions to environmental and natural resources problems facing the West. Prior to that time, EPA had proposed a regulation which failed to incorporate the Grand Canyon recommendations. In April, while states were encouraged by the interest EPA demonstrated in incorporating the Commission recommendation into the proposed rule, that work was yet to be accomplished. Following that hearing, environmental representatives voiced their concern about the commitment to that goal. Again, with a renewed determination, representatives of states, tribes, industry, environmental groups, and Federal land managers worked for countless hours to craft a consensus agreement on specific language which we would recommend to EPA for incorporation in the proposed regional haze regulation, language which would implement the Commission recommendations. Copies of that June 25, 1998, consensus document have been provided to this subcommittee and are available on the WGA website at www.westgov.org. Governor Leavitt, in his June 29, 1998, cover letter to Administrator Browner, endorsed the consensus work product. The environmental representatives also endorsed the consensus document in a letter to Administrator Browner. On August 31, EPA issued a Notice of Availability regarding proposed regulatory language to reflect the proposal, as well as a request for comment regarding the Transportation Equity Act (TEA–21).

The Grand Canyon recommendations, the work of the WRAP, and this recent consensus document all recognize that improvements in visibility must include more than just management of emissions from industry stationary sources. The reductions must also come from the ever-increasing volume of mobile source pollution, from vehicles on-road as well as construction and other off-road vehicles, reductions in road dust, management to reduce impacts of wildfires, and trans-boundary pollution from Mexico.

WGA recommended that EPA reopen the public comment on the ideas in the consensus document, and we appreciate EPA doing so. The following comments focus on key considerations in the June 25 consensus document and how they are reflected in EPA's August 31 draft regulatory language.

1. The consensus document laid out time frames for the development and implementation of the states' long range strategies for addressing regional haze on the Colorado Plateau.

EPA has accurately reflected the time frames in the consensus document. We recognize that the time frames are tight, but we believe they are achievable. However, the schedule requires a commitment by all parties to complete the development of models, strategies, databases, and other work products for consideration by the WRAP. Two specific commitments are critical to achieving these goals.

- All partners and their representatives must come to the table committed to implement the recommendations from the Grand Canyon report. While we have and will continue to have discussions about the particulars of those strategies, there can be no doubt about our commitment to the recommendations.
- The WRAP must have sufficient funding to support development of those work products through committees, workgroups and the WRAP itself. Individuals, agencies, and stakeholders participating in the Commission and WRAP have provided countless hours to this work. However, funding is needed to cover expenses of the WRAP and the development of work products. As Governor Leavitt pointed out in his cover letter of June 29, 1998, our success is dependent largely on the financial support of EPA. Likewise, we ask Congress to support this critical financial commitment.

2. The consensus document defined the components necessary for inclusion in state or tribal implementation plans, recognizing that any endorsement with respect to tribal plans must come from the individual tribes.

EPA has addressed the identification of components with respect to state implementation plans and established mechanisms for states and tribes to define those plans.

3. The consensus document also created a set of principles for EPA's involvement in western efforts to develop plans and implement the Commission's recommendations.

That set of principles was not included in the EPA draft. While we recognize that EPA appropriately did not participate in the consensus work group or document, those principles were agreed to by the consensus group partners and were significant enough to justify inclusion in that document. We look to EPA for further clarification on how they intend to address those principles. We are resolved that they must be incorporated in the regulation and implemented in the work of the WRAP.

4. The consensus document did not provide for specific action if the Annex was not timely delivered to EPA.

EPA has indicated that, if the Annex deadline is not met or if the annex did not meet regulatory requirements in—§ 51.309(f)(1), EPA would establish stationary source sulfur dioxide provisions.

Instead, EPA should provide that, if the Annex is not delivered to EPA by the deadline or if EPA determines the Annex does not meet regulatory requirements, EPA could initiate the process of establishing stationary source sulfur dioxide provisions. However, if the an Annex or revised Annex were provided within 1 year of the deadline or determination, EPA would review it and accept the Annex if it met the regulation.

5. The Grand Canyon recommendations were specific to the 16 Class I areas identified in the Clean Air Act Amendments. However, western Governors also recognized that the Commission process could serve as a model for other Class I areas in the West.

EPA has clearly reflected that option, but not requirement, in its draft. While implementation of the Commission's recommendations is necessary, some states are also concerned about areas beyond the original charge. The option, and the flexibility inherent therein, is critical to states and the region.

6. WGA, recognizing the carefully balanced compromise in the words of the consensus document, recommended that EPA not selectively use only portions of the document.

EPA's draft appears to reflect the integrity of the consensus. However, preamble language specifically included in the consensus document is not reflected in EPA's draft. Since EPA has not provided a draft of that critical preamble to the regulation, it is not possible to evaluate it's consistency. We will request that EPA provide for comment on draft preamble language or be prepared to revise such language, if recommended, when it is released for public notice.

7. WGA did not propose imposition of the consensus recommendations on states outside the Transport Region. Any such endorsement must come from those states.

EPA's proposal appears to reflect that distinction.

States will provided comments to EPA regarding the draft language. The WRAP has considerable, significant work before it, and I believe the partners are up to the

challenge of developing a flexible, regional approaches to reducing regional haze in the West.

Thank you for the continued interest of the members of this subcommittee to that goal. We look forward to your support as we develop and implement these strategies.

STATEMENT OF JOHN PAUL WOODLEY, JR., SECRETARY OF NATURAL RESOURCES, COMMONWEALTH OF VIRGINIA

The Commonwealth of Virginia strongly supports protection of visibility in our national parks. We believe, however, that a more effect and efficient regional haze program will result if EPA's proposed regional haze regulation is revised to address visibility in a more stable and practical way.

I would like to begin with a number of issues regarding Virginia's planning obligations made the Clean Air Act.

First, we appreciate Congress's efforts in passing TEA–21 and adapting the timelines for the regional haze and $PM_{2.5}$ programs so that they coincide. As you know, the eastern states have been focusing on health-related pollutants and have thereby been unable to devote the resources needed to address the issue of regional haze. The additional planning time this revision to the law creates will enable us to properly assess own regional haze conditions and develop effective strategies. It is important both administratively and environmentally for regional haze and $PM_{2.5}$ to follow on a parallel track.

Second, states should be allowed to abandon the deciview and no degradation targets, as well as the technology requirements, and develop their own goals and programs for visibility improvement. More detail on these issues is provided later in this document.

The proposal also requires each state to submit revised SIPs which provide for periodic revision of the long-term strategy. Such periodic SIP revisions are not required by the Clean Air Act are not needed to meet the national goal, and will draw on resources better used for pollution control elsewhere. The SIP decisions that EPA proposes for tracking reasonable progress are unecessarily frequent and resource intensive. Note that Sec. 169 of the Clean Air Act clearly makes EPA responsible for evaluating visibility improvement over time. Therefore, each state should not be required to individually assess improvements through continual SIP revisions.

Other issues related to regional planning are raised by EPA's proposal.

- Regional haze is an issue that must be addressed through coordination of states, localities, and other stakeholders. The traditional methods of states and localities addressing control measures within their boundaries to resolve localized air pollution control programs cannot address regional haze problems. One state has no authority over any other state to implement control measures. For most mandatory Class I areas, the host state cannot individually implement control measures that will ensure improvement in visibility within the Class I area. Transport regions and commissions will be required to implement effective regional programs for visibility improvements.
- EPA encourages regional stakeholder coordination to address regional haze, but does not address how such efforts will be facilitated or provide incentives for stakeholders to participate. Congress acknowledged the need far multi-state coordination in the Clean Air Act by establishing the authority for EPA to establish visibility transport regions and commissions. As states do not have authority over other states to address regional emissions, the authority established in the Clean Air Act is also clearly EPA's responsibility. EPA must take an active role in establishing and facilitating these regional efforts.

The proposal requires that individual states address and justify control programs individually. This is a disincentive to expend the resources to coordinate with regional grows. The regional haze rule must also directly allow for the implementation of programs developed through the removal coordination process.

We recommend that EPA allow all regions of the country to follow the process used by the Grand Canyon Visibility Transport Commission. This commission was created in order for the states to take the lead in developing regional visibility objectives, with EPA taking a supporting role. In order for EPA to know what requirements for visibility SIPs to include in the removal haze rule, the other regions need to form their own commissions.

Further, the proposed rule does not allow for direct implementation of program by the Grand Canyon or other commissions for the control of regional haze. The

final rule should allow for a state to incorporate the recommendations of a regional commission as part of its SIP without having to justify the program individually.

The inadequacy of EPA's proposed approach to regional planning is highlighted in its recent action with a particular group of states. Recently, EPA issued a supplemental notice on implementation in response to a request from the Western Governor's Association, which solicits comment on the Association's suggestion for how the proposal should be changed in order to accommodate the recommendations of the Grand Canyon Visibility Transport Commission. The recommendations specify the visibility goals for eight western states, and would make the proposed rule more flexible. No such flexibility has been afforded to any other states. It is important for EPA to recognize that the other states any regions need the same opportunity to address their specific regional concerns.

The proposal also requires all states to submit an initial visibility SIP and subsequent SIP revisions every 3 years. If a state determines that its overall contribution to regional haze is insignificant or that the contribution from particular sources within the state is insignificant, it should be exempt from further involvement in the regional haze program. EPA is authorized by the Clean Air Act to exempt major stationary sources that do not "contribute to significant impairment." Exempting sources that make insignificant emissions contributions is also reasonable.

Further, the proposal is unclear about the respective roles authority of the Federal land managers' the states and tribes, and regional commissions and partnerships in the BART process. EPA should clearly define who determines, reasonable attribution for an out-of-state source that contributes to regional haze, and whether a Class I area host state can trigger BART for any stationary source that contributes to regional haze.

The proposal requires development of a monitoring plan with a revision no later than 4 years from the date of the initial plan, and additional revisions every 3 years thereafter. Formal submittal of monitoring plans on this schedule is a duplicative use of limited resources.

Also of concern are some program and technical issues.

Given that regional haze is a welfare, not health issue, EPA should abandon the deciview standard and allow states the flexibility to develop their own visibility improvement goals and programs. Regional haze measures should focus more directly on scenic viewing and use a system that has more of a relationship to the public's overall ability to experience improved viewing. Use of the deciview scale, as proposed by EPA, does not provide an accurate measurement of the total viewing experience.

The proposal emphasizes the Best Available Retrofit Technology for point source emission control, and identifies the private sector in the western United States as being most affected. EPA agrees with the Grand Canyon Visibility Transport Commission's recommendations for addressing stationary sources by providing a "flexible air quality planning framework to facilitate the interstate coordination necessary to reduce regional haze visibility impairment m mandatory Class I Federal areas nationwide." It is not clear, however, how the BART program provides flexibility, as it is experiencing costly analytical technical and legal challenges that would divert scarce state resources. The regulations should explicitly allow for alternatives to the BART process, for example, market trading programs and emission caps.

Another issue is the reduction of fine particulate, which scatters light and contributes to haze. About 73 percent of these particles are from fine dust, some of which is naturally generated by wind and some of which is emitted from activities such as farming, industry, and travel. All of these activities are very difficult to control; nor is it clear what share of particulate comes from natural sources versus emissions from human sources. The proportion of these emissions must be determined and suitable controls must be implemented. It would be unfair to burden the states with target reduction rates unless research establishes where and how these reductions can be met.

How different types of emission sources are treated are another important aspect of the proposed haze regulation.

Reducing area source emission will be critical to reducing visibility impairment, yet emission factors are not well developed for many area sources. This is an issue requiring EPA's prompt attention, since progress in addressing area sources cannot be made until emission factors are more highly refined. Use urge EPA to improve area source emission factors and develop appropriate national controls.

Another significant of area source is fire suppression, which was considered effective land management for many decades. The states require more specific guidance on how prescribed fire activity should be incorporated into their regional haze programs.

As with area and point sources, national controls for mobile sources will play a role in reducing regional haze. The preamble to the proposal includes language on mobile sources that is consistent with the Grand Canyon Commission's recommendation that some sources are best controlled at the Federal level. Yet, the proposal itself does not include a commitment by EPA to impose Federal controls. It is important for EPA to develop national measures to address mobile sources.

The relationship between states and Federal entities is another important issue facing control of regional haze.

A cooperative consultation process between Federal Land Managers and states is critical to the achievement of regional haze goals. EPA should clarify that such cooperation and consultation will take place between FLMs and state environmental agencies.

Finally, I would like to address the issue of resources needed by Virginia order to implement any form of regional haze program.

The proposed regulation places significant new burdens on states without indicating from where to resources necessary to support these efforts will come. BART assessments are technically rigorous and controversial. Monitoring is resource intensive, particularly given the remote locations which many of the monitors will be sited. Assessment of progress in improving visibility will depend on a clear understanding of source/receptor relationships, highlighting the need for significant improvements in model input parameters. EPA support to the statics is essential if those tasks are to be performed effectively.

In addition to technical and administrative assistance, no regional haze program will succeed unless accompanied by additional Federal funding. States cannot divert funds allotted for efforts related to implementation of the health-based $PM_{2.5}$, PM_{10}, and ozone standards to address regional haze. The success of the regional haze program hinges on EPA's financial support.

We understand and appreciate that EPA is carefully considering state's comments in revising the regional haze rule. I now wish to reiterate that Virginia would like to see as many of the states comments incorporated into the rule as possible.

RESPONSES OF JOHN PAUL WOODLEY, JR., TO ADDITIONAL QUESTIONS FROM SENATOR BAUCUS

Question 1. You asked that the states in the Southeast be granted sufficient time for regional planning to address regional haze. Hasn't Virginia been involved in regional planning on air quality issues with other states since 1992 through the Southern Appalachian Mountain Initiative (SAMI)? Will the SAMI's work fit in with the state implementation plans due under the regional haze rule? What efforts in addition to the SAMI's work do you believe are necessary?

Response. Yes, Virginia has been involved in regional planning on air quality issues with other states since 1992 through the Southern Appalachian Mountain Initiative (SAMI). While SAMI's work is indeed useful, and will make a valuable contribution to the understanding of haze issues in the region, its work is still preliminary, and it is too soon to propose any definitive recommendations.

Regional haze is only one of a number of issues being addressed by SAMI. Other region specific efforts by other groups designed to address regional haze in a more specific manner and in direct response to EPA regulation will be needed.

Question 2. During the hearing you suggested that the "blue haze" in the Blue Ridge and Great Smoky Mountains is a natural phenomena. What scientific evidence do you have to support this claim? Do current monitoring data support your position that this "haze" is not contributing to anthropogenic emissions? Do national experts agree with your claim that the "haze" is natural and your implication that there has been no human-caused visibility impairment in the region?

Response. I did not intend to imply that there was no human-caused visibility impairment in the Blue Ridge or Smoky Mountains, merely that the Blue Ridge has been called "blue" since at least the 1730's, before humans could significantly impact visibility. Its distinctive blue haze was due to natural sources. dust and biogenic volatile organic compounds. This haze has since become a milky gray primarily due to the scattering of sunlight from hydroscopic sulfate particles, phenomenon particularly evident in the warm, humid months, as determined by National Park Service research.

As I said in my testimony, I am not suggesting that Virginia cannot or should not take efforts to improve visibility in the Blue Ridge Mountains. However, historically speaking, it appears that some of the visibility impairment is from natural sources. Any regulatory program that does not take this into account is likely to be unduly costly and ineffective.

Question 3. Your written testimony noted that 73 percent of fine particulate matter is dust, implying that it is the most significant contributor to regional haze nationally. However, the data from the IMPROVE monitoring sites at Shenandoah and several other sites in the Appalachians show that dust is responsible for less than 5 percent of the visibility impairment in your region of the country, and no more than 20 percent in any other region. Please explain the scientific basis of your statement in light of the data collected over the past 10 years under the IMPROVE program. Included in your response, please provide the specific source or sources of the data that support your testimony.

Response. Our original statement was that about 73 percent of fine particulate consists of fine dust. This figure was obtained from an analysis performed by Edward C. Trexler, P.E., a consulting engineer and expert on regional haze. Mr. Trexler's complete report with background data-which is based in part on IMPROVE measurements—is available from the EPA docket (Docket No. A–95–3 8).

To summarize, Mr. Trexler cited data showing the annual average concentrations of fine particulate dust, organic carbon, elemental carbon, sulfates, and nitrates during 1989, a representative year. Approximately 73 percent of these particles were from fine dust.

Whether the amount of fine dust contributing to regional haze in Virginia is 5 percent, 20 percent, or 73 percent, we are troubled that emission factors for this particular pollutant are not well-developed, and that speciation of sources of this particular pollutant has not been performed. In order for the states to develop and meet targets and goals, the proportion of pollutants must be accurately determined before effective controls can be implemented.

RESPONSES OF JOHN PAUL WOODLEY, JR., TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. In response to a series of questions asked by the Senate Appropriations Committee, EPA said it plans to publish its 5 year update report under section 169B(b) on progress on improving visibility later this year. EPA also said that it does not believe that it is obligated to predict future trends in visibility due to other parts of the Clean Air Act (CAA)as part of the 169(B)(b) report, but that it may do so as a matter of discretion. The testimony at the October 1 hearing made clear that accurate projections about future trends in visibility impairment due to other sections of the CAA will be crucial to States as they try to develop implementation plans under the regional haze rule. Would an updated report on visibility progress and trends resulting from other sections of the Clean Air Act be of assistance to your State as it tries to develop an implementation plan to meet the final regional haze rule? Would it be of crucial importance in helping your State find the most efficient means of complying with the law?

Response. An updated report on visibility progress and trends resulting from other sections of the Clean Air Act would be of invaluable assistance to Virginia as we attempt to develop an implementation plan to meet the final haze rule. The overall tenor of our comments on this issue centers primarily on the lack of information available to states—information that is crucial in making plans and implementing effective controls. We cannot meet the law's requirements if we are not provided with the tools for doing so. Therefore, it is important that EPA support the states by reporting on progress and trends as much as possible.

Question 2. Another of the Appropriators' questions asked EPA what research needs to be performed to support the States to implement the visibility program. EPA answered that "No research is needed before the States can begin to implement the visibility protection program." EPA cited the 1993 NAS report for the proposition that "Current scientific knowledge is adequate and control technologies are available for taking regulatory actions to improve and protect visibility."

Question 2a. Outside of the 16 areas studied by the Grand Canyon Commission, do you believe that EPA or the States currently have data on sources of regional haze visibility impairment, atmospheric processes, monitoring, emission control strategies and source-receptor models sufficient to allow States to overcome the presumptions on the deciview goal and Best Available Retrofit Technology should a State choose to attempt to overcome the presumption?

Response 2a. No, adequate current data on sources of regional haze visibility impairment, atmospheric processes, monitoring, emission control strategies, and source receptor models does not exist. Grand Canyon Commission data, while interesting, is not useful to states located on the east coast.

Question 2b. Do you believe State should be required to meet regulatory obligations under the regional haze rule prior to the date that these data are available?

Response 2b. No, the states should not be required to meet regulatory obligations under the regional haze rule prior to this data becoming available. The plans prepared by the states will be only as good as the data used to develop them; at this time, there is not sufficient data for preparing technically accurate, workable plans.

Question 3. In amending the Clean Air Act in 1990, Congress authorized the establishment of VTCs to make an integrated assessment of the effects of other provisions of the Act, including the ozone and particulate matter provisions, in order to determine whether there was any need for additional specialized regulations to achieve progress on visibility. Mr. Sietz's testimony suggested that EPA's notion of integration is the integration of states' efforts to implement EPA's mandated ozone, particulate matter and regional haze rules.

Question 3a. Doesn't EPA's approach to integrated implementation contradict the congressionally mandated approach of an integrated assessment of the need for any additional regulations?

Response 3a. Yes, EPA's approach to integrated implementation contradicts the congressionally mandated approach of an integrated assessment of the need for any additional regulations. Regional haze is a site- and region-specific problem that needs to be approached on a site- and region-specific basis; this has not been done. Integrated assessment needs to occur before integrated implementation of regulations.

Question 3b. Do you believe it would be more cost-effective for VTCs to first make an determination of whether any additional efforts are needed on regional haze, and only then for states to look at the integrated implementation of these efforts?

Response 3b. Yes, it would be more cost-effective for VTCs to first determine whether any additional efforts are needed on regional haze before considering integrated implementation of such efforts. Again, the states need a much clearer picture of the situation before implementing regulations that may or may not effectively address the problem.

Question 4. In his testimony, John Seitz indicated EPA's desire to provide state's with "flexibility" and "alternatives" under the regional haze rule. These are the same words, however, that EPA uses to describe what it did in the proposed rule, which contain Federal presumptions to be met unless states make a demonstration that equivalent improvements in visibility can be accomplished another way. This formula for flexibility has been severely criticized by some states and industry as producing, in actuality, an inflexible result. Based on Virginia's experience, can EPA's formulation in the proposed rule provide flexibility to the states? What changes should be made in the proposed rule to assure that state's have the flexibility to work together on local solutions as intended by Congress?

Response. No, EPA's formulation in the proposed rule does not provide flexibility to the states. While it appears that some steps have been taken toward this end (for example, making the health-based $PM_{2.5}$ rules consistent with those for regional haze), nevertheless serious questions regarding the flexibility—and thereby the feasibility—of EPA's proposed planning process remain.

Establishment of VTCs is one way that states would be able to assess and address their individual and regional haze situations, and provide more locale-specific flexibility in planning and implementation. It is important for EPA to recognize that the other states and regions need the same opportunity to address their specific regional concerns as did the Grand Canyon Commission.

Question 5. What is Virginia's view of EPA's interpretation of the WGA proposal, in which EPA would establish a SIP requirement for a renewable portfolio target?

Response. We are not certain what EPA means by "renewable portfolio target." Our guess would be that EPA would adjust a target reduction amount every 10 years or so. Rather than do this now, it would be more sensible to see what steps are necessary to meet the $PM_{2.5}$ standard. These same steps would improve and, in some cases, may completely solve the visibility problem. If problems still remained, then additional measures could be developed. Ideally, regional haze efforts should follow the $PM_{2.5}$ SIP development. Trying to do both regional haze and $PM_{2.5}$ simultaneously overtaxes state resources.

Question 6. The House and Senate Appropriations Committees, in the VA-HUD funding bill for fiscal year 1999, has strongly recommended that EPA provide up to $500,000 in seed money when states wish to form a visibility transport commission as authorized under the Clean Air Act Amendments of 1990 to decide what more, if anything, needs to be done to improve visibility in the Class I areas, after

improvements accruing from other provisions of the Clean Air Act are taken into account.

Question 6a. If EPA finalizes the regional haze rule, with the Federal presumptions on deciview, the BART requirement and NSPS presumption, will this hamper the ability of VTCs to make the best regional decisions about achieving reasonable progress in improving visibility in Class I areas in a cost effective manner?

Response 6a. Yes, finalizing the haze rule with current presumptions on deciview, the BART requirement and NSPS presumption would hamper the ability of VTCs to make the best regional decisions about achieving reasonable progress in improving visibility in Class I areas in a cost effective manner. Imposition of these problematic concepts without provision of adequate background research and documentation, as well as prevention of region-specific planning, is not a realistic approach to solving the problem of regional haze.

Question 6b. Do you think states should form VTCs and should these commissions be focused on assessing the need and means for further action to address visibility impairment as contemplated under the Clean Air Act amendments, or should they focused simply on implementing the ozone and PM NAAQS and the Federal regional haze rule in an integrated fashion as Mr. Seitz suggested during the hearing?

Response 6b. Formation of VTCs will be crucial to addressing regional haze. The VTCs should focus on assessing the need and means for further action to address visibility impairment as stated in the Clean Air Act. While implementing the ozone and particulate matter NAAQS and the Federal regional haze rule in an integrated fashion makes sense, it does not make sense to proceed before a more realistic picture of the need and means to address haze on a truly regional basis has been established. The states need more regional planning time, and more technical data and support from EPA before the welfare-based standards can be integrated into the health-based standards.

STATEMENT OF SHAWN B. KENDALL, EXECUTIVE ASSISTANT, PHELPS DODGE CORPORATION

Mr. Chairman, and members of the subcommittee. I am Shawn Kendall, Executive Assistant on corporate staff of Phelps Dodge Corporation (Phelps Dodge). Phelps Dodge is the largest producer of copper in the United States, the second largest producer of carbon black, a major manufacturer of copper rod for the wire drawing industry, and a major producer of magnet wire. Phelps Dodge has 15,000 employees operating in 26 countries around the world, with 9,000 operating in 13 states in the U.S. Phelps Dodge has been heavily involved in copper mining since the 1880's, when our operations were in the Arizona Territory.

Phelps Dodge appreciates the opportunity to discuss regional haze with you. I am the Corporation's policy and technical lead with respect to regional haze regulations. I have worked for Phelps Dodge for nearly 23 years in a variety of areas including air quality technical and policy support, budgeting and financial planning at our largest mine in the U.S., and Director of our Corporate Data Center in Phoenix. For the last 13 years I have been in my current position working on a variety of technical and policy issues.

I am testifying today on process issues important to the regional haze debate. These include The Grand Canyon Visibility Transport Commission (Commission) and how it lead to the formation of the Western Regional Air Partnership (WRAP); and how EPA's regional haze rule published last year ignored the work of the Commission and led to the recent proposal based on a input from Western Governor's Association. Finally, I will address the need to encourage the formation of other visibility transport commissions, funding needs of these new processes and the WRAP, and the need for EPA to re-propose the regional haze rule.

The Grand Canyon Visibility Transport Commission

Phelps Dodge was highly committed to the Grand Canyon Visibility Transport Commission process, as evidenced by the almost 6,000 hours of my time which was allowed to be committed to serve on or in support of various committees for the Commission. I was Secretary of the Commission' Public Advisory Committee that delivered consensus recommendations to the Commission in May 1996. These recommendations were the basis for the Commission's final recommendations forwarded to EPA in June 1996. In addition to my work with the Public Advisory Committee, I also devoted substantial effort to support and staff the Commission's technical and policy analysis committees.

I commend the Commissioners for designing and utilizing a broad-based stakeholder process in the development of their recommendations, for assembling tech-

nical committees which significantly advanced the state of understanding of regional haze in the West, and for having patience and understanding when the consensus process took longer than planned. I came away from the Commission process with an appreciation of the differing views of the many wonderful people who participated in the process and a detailed understanding of what we did well and what we could do better in the future. In the end, I recognized the success of the Commission process as the beginning of a new paradigm for environmental policy development in the West.

Western Regional Air Partnership

One of the key recommendations of the Commission was the need for a follow on entity to assist the states and tribes with the monitoring and implementation of the Commission's recommendations. That entity was established us September 1997 as a voluntary alliance of Governors, tribal leaders, and Federal of finials whose mission is to follow through on the Commission's recommendations, and to work collaboratively on odor air quality issues Bat the alliance deems appropriate. It is known as the Western Regional Air Partnership (WRAP). I have been appointed Co-Chair of the Technical Oversight Committee by the WRAP, and serve on the WRAP Coordination Committee. The WRAP organization will consist of approximately 250 volunteers from states, tribes, local government, Federal agencies, industry, environmental Soups, academic institutions, and the general public working collaboratively to develop sound technical and policy work products to support the WRAP mission. These work products will be a resource the states and Gibes can rely on in developing their implementation plans for the management of visibility in the mandatory classy Federal areas, and for monitoring and reporting on the effectiveness of their programs.

The USEPA Regional Haze Proposal published in July, 1997

Phelps Dodge was quite disappointed with EPA's proposed regional haze regulations released in July 1997. September 1997, I testified at an EPA public hearing regarding areas that the proposal failed to recognize or learn Cam the Commission process. I worked with the Western Regional Council, perhaps the leading inter-industry group engaging the regional haze issues in the West, on an extensive comment package. This included a proposed full rewrite of the rule to better guide the collaboration needed between states.

These comments also explained why the establishment of arbitrary visibility objectives without consideration of other factors required by the Clean Air Act was not the correct way to formulate long-term strategies. The development of these strategies rests with states and tribes, and must take into consideration a multitude of factors in order to develop an equitable, politically acceptable and environmentally effective long-term strategy which will be implemented and succeed in protecting visibility in EPA's mandatory class-I Federal areas.

The most serious oversight in proposed rule was the lack of guidance with respect to the Commission's recommendations.

The Commission's technical and policy analysis committees and Public Advisory Committee generated a significant number of work products that the public should have had access to during this rulemaking. Since EPA staff worked in the Commission process, these work products were part of the history that any participant would rely on in forming opinions. I was disturbed to find that as of 2 weeks prior to the end of the comment period last December, the rulemaking docket only contained the Commission's final report. None of the other key Commission work products were in the docket. Phelps Dodge filed comments on December 5, 1997, and included all of these work products and meeting minutes of the Public Advisory Committee that were in the company's files.

Based on the serious deficiencies I determined existed in the proposed Ale, and the lack of these key Commission work products in the docket, Photos Dodge requested that the Agency reconsider its approach to the rule, fix it, and repropose the rule. A corrected rule that reflects the lessons learned from the Commission process would be significantly different than EPA's proposal. I determined, and still believe, that the public and private sector should be given a chance to comment on a reproposed rule conforming to the lessons learned in the Commission process.

Western Governor's Association Comments on the Regional Haze Rule

The Western Governor's Association (WGA) also filed comments on the proposed rule in December 1997 and provided an update to this proposal in early April 1998. The concept being put forth in the SAGA proposal was the establishment of a formal Regional Plan, which EPA would approve, and the States and Tribes would rely on for implementation plans. Several members of the environmental community who participated in the GCVTC process and the WRAP process protested this treatment

to EPA Administrator Browner and Governor Leavitt, since Here is no statutory basis for such a regional plan, and the procedural requirement for implementation plans could be bypassed. In addition, many industrial representatives disagreed with the concept.

Governor Leavitt of Utah, who was Vice-Chair of the GCVTC, and currently is Cochair of the WRAP and the lead Governor for the WGA on this issue, was concerned about the reaction to the WGA proposal. He had his staff assemble a small stakeholder group to try to come to consensus on the issue and provide him win an alternative that he could review with other Governors and then forward to EPA. The mission of the group was to develop a consensus work product under a very tight timeframe. The group consisted of representatives from two environmental organizations, two industrial organizations, two state environmental regulatory organizations and the National Park Service, and was supported by staff from the Western Governors Association and the National Tribal Environmental Council. I served as on of the industry representatives in the process. The key stakeholders outreached to the broader sector they represented.

Although the outreach was generally effective, some stakeholders felt disenfranchised by the process. In the end, the group came to a consensus on a recommendation for the States to review, and it was the basis for the submittal to USEPA at the end of June of this year by Governor Leavitt.

The recommendation from WGA has several key points on how the Agency should treat the GCVTC recommendations in a rule context. The guidance to the agency called for specific rule and preamble language to be added to the rule, consistent with the GCVTC recommendations. In addition, the specific rule components for stationary sources were to be deferred until the Commission could provide an annex containing the details of regional targets, and backstop contingency regulations for a market-trading program. The Commission had envisioned delivering this to the Administrator within 1 year after the Commission's original report (i.e., in June 199 7), but Dad group agreed that the current WRAP Room working on this issue should be given a chance to finish their work. As such. an agreement was reached that the Commission would submit the annex describing the details of the stationary source targets and backstop program to the Administration by October 1, 2000.

Another key consideration in the proposal was the need to ensure that states and tribes would be allowed to focus on the GCVTC based rule, and not be distracted by over programmatic issues for other class I areas. The group agreed that with the momentum and progress of the WRAP, states and tribal should be able to submit long-term strategy implementation plans in 2003. Most of the technical and policy work should be completed by the end of 2001, allowing the states and tribes 2 years to move through the implementation plan review process. In addition, states and tribes could defer consideration of additional measure for non-GCVTC class I area until 2008 if they include a modeling analysis of the effects of the 2003 long-term strategy based son the GCVTC rules with the 2003 submittal. This would allow the effects of the GCVTC rules to be assessed for their impact on non-GCVTC class I areas, and preclude the formation of a bifurcated program.

The WGA requested that the Agency notice the receipt of its suggestions for how to implement the GCVTC recommendations in the regional haze rule, and open a thirty-day comment period lo allow others, especially those that may have felt disenfranchised, to provide input to the process. On September 3, 1998, EPA noticed the receipt of the WGA recommendation, released its proposal on the specific rule language which it derived Am the WGA recommendation, and opened the record for comment for thirty days. This comment period will close next Monday, October 5, 1998.

Phelps Dodge commends the Agency for taking the WGA recommendation to heart, not only in allowing the public an opportunity to provide input, but also for drafting proposed rule language which is substantively consistent with the WGA recommendation. Phelps Dodge will be filing comments on this rule later this week, noting some minor changes that should be made, and requesting clarification of some issues that night not be interpreted correctly in the fixture. It is, however, Phelps Dodge's position that the entire rule package should be corrected and reproposed before being finalized.

Other Visibility Transport Commissions

Of all the lessons learned in the GCVTC process, the most important is that states and tribes can not develop effective long-term strategies for mandatory class I Federal areas in their jurisdiction without consideration of the developments in neighboring jurisdiction. Regional haze is heavily influenced by long-range transport. The plowing for other class I areas should occur through alliances or partnerships. States and tribes should be encouraged to from transport commissions in

order to guide Agency rulemaking needed to ensure reasonable progress. Phelps Dodge is aware of efforts to allow other visibility transport commissions to be formed. Phelps Dodge supports these initiatives and believes, based on the regional haze timing requirements legislated earlier this year, that the formation of these commissions will accelerate the development of sound long-term strategies for the non GCVTC mandatory class I Federal areas. The Governors, tribal leaders, and stakeholders in the rest of the country should have the same opportunity that the GCVTC process provided.

Funding

Funding for the regional collaborative processes is essential for their success. This funding is generally limited to travel, meeting, staff and consulting services. It is essential that travel reimbursement for date, tribal, local regulatory, environmental and academic participants is available if those participants would otherwise not be able to participate. Keep in mind that the in-kind contribution of their time is worm much more than travel costs, and a consensus work product can not be realized unless there is balanced participation. Another mayor cost is for meeting facilities, and in some cases professional facilitation services. Staff support is needed for the organization, especially for coordination, and internal and external communications. In the course of developing a consensus work product, it is sometimes necessary to undertake technical or policy analysis work. This work is best done by a reputable outside firm without a stake in the outcome. Although this can be costly, it may be necessary to ensure the process outcome has a credible basis that will stand up to public scrutiny.

The WRAP was advised that available BPA grant funds would probably be reduced to $150,000 in fiscal year 1999 from the $369,000 received in fiscal year 1998. The Coordination Committee for the WRAP is currently investigating sources of few for the nearly $1,000,000 in costs projected for fiscal year 1999, especially recognizing the needed developments for the Commission's Annex. The House has proposed up to $500,000 each for a maximum of eight visibility transport commissions to allow other groups to begin regional planning. Phelps Dodge believes that $1,000,000 per year for the next 2 years should be allocated for the development of the Commission's Annex. Based on the experience of the Commission and the WRAP, this could come out of the same pool of funds since the initial planning costs for a new Commission will be less than $500,000 in the first year.

Re-Proposal

Phelps Dodge believes EPA's original proposal was off the mark, and although the recent WGA development goes a long way to rectify the deficiencies with respect to the GCVIC recommendations, the full context of the final rule is still unclear. A full re-proposal is in order. Such a move can only help, and can not hurt the process. The timing of the regional haze requirements for non-GCVTC states has been delayed, and the WRAP is proceeding to follow through on the GCVTC recommendation, regardless of whether the regional haze rule is published this year or next year. The regional haze issue is one that will require continuous monitoring and updating to ensure reasonable progress toward the goal. It will have a direct impact and benefit not only on us, but on our grandchildren's grandchildren. Phelps Dodge continues to request that the rule be corrected and re-proposed to allow all interested parties to providing meaningful input to the rulemaking.

Thank you for your attention to this very important issue to Phelps Dodge, and to all my colleagues in the WRAP process. I would be happy to answer any questions.

RESPONSES BY SHAWN KENDALL TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. When Governor Levitt submitted the WGA's proposal to the EPA, he said, "We ask that in using the document you respect the carefully balanced compromise it represents. Selective use of portions of the document could easily undermine the significant "give and take" involved in reaching our final draft." However, EPA's "translation" document does not appear to include many elements identified in the WGA proposal as needing to be addressed in the preamble to the rule. Can you identify any elements of the WGA proposal that were omitted in EPA's Federal Register notice?

Response. There were some minor inconsistencies with respect to the requested rule language components from the WGA. I am attaching a copy of Phelps Dodge Corporation's comments to the docket which clarify some of these. The most signifi-

cant omissions were related to the preamble language, which was requested to be prepared to accompany the specific rule language.

Question 1a. Are these missing provisions an integral part of the WGA proposal?

Response. Yes. The preamble language is an integral part of the consensus agreement in that it clarifies interpretation and intent of the rule.

Question 1b. Does the omission of these elements from the EPA translation document alter the substance of the WGA proposal or upset the balance struck by the proposal?

Response. This is a matter of timing and intent. If the final rule package were to contain preamble language consistent with the WGA request, then it would not be a problem. If the final rule language were to omit the requested preamble content, then it would affect the balance struck by the proposal.

Question 2. The translation document also appears to convert the WGA's "5 year milestones" into an annual emissions reductions. Does the reference to annual emissions reduction milestones in the EPA translation document alter the substance of the WGA proposal or upset the balance struck by the proposal?

Response. The EPA wording should have referred to 5-year milestones of annual total emissions. This is clarified in my comments to the docket which are attached. If the agency were asking for year-by-year annual milestones, then this would be a major problem since the administrative burden and expectations of the party would be significantly altered. The expectation in the WGA proposal is that the states would review and assess progress every 5 years. It should be up to the Commission, in its Annex submittal, to define the specific accounting methodologies to be employed and the specific milestones.

Question 3. The translation document also appears to add a new renewables requirement that was not in the WGA proposal. Does the reference to renewables in the EPA translation document alter the substance of the WGA proposal or upset the balance struck by the proposal?

Response. I believe that the renewables requirement that was included by EPA is generally consistent with the Commission's recommendation and the WGA proposal. It must be made clear that the expectations for the states would be to monitor the potential for renewable energy and report on a routine basis (every 5 years) as part of the normal progress assessments. States may elect to establish their own internal goals, but these would not be federally enforceable requirements. The only federally enforceable requirement would be for a comprehensive summary of the renewables generating capacity within the jurisdiction and the potential for renewables which exist within the jurisdiction.

Question 4. In response to a series of questions asked by the Senate Appropriations Committee, EPA said it plans to publish its 5 year update report under section 169B(b) on progress on improving visibility later this year. EPA also said that it does not believe that it is obligated to predict future trends in visibility due to other parts of the Clean Air Act (CAA) as part of the 169(B)(b) report, but that it may do so as a matter of discretion. The testimony at the October 1 hearing made clear that accurate projections about future trends in visibility impairment due to other sections of the CAA will be crucial to states as they try to develop implementation plans under the regional haze rule. Would an updated report on visibility progress and trends resulting from other sections of the Clean Air Act be of assistance to your state as it tries to develop an implementation plan to meet the final regional haze rule?

Response. As you know, Phelps Dodge is committed to supporting the Western Regional Air Partnership (WRAP). My home state of Arizona is a very active participant in WRAP. Much of the work of WRAP is aimed at providing updated, high-quality technical data and assessments for use by the states and tribes in developing their ultimate implementation plans, in addition to other policy related components. Phelps Dodge believes it is critical that the states and tribes work collaboratively on such efforts. The role of EPA should be to support the work of collaborative processes such as WRAP or other visibility transport commissions which are much closer to the regional transport and emission management issues within their jurisdictions. EPA has failed to provide adequate funding for the development of modeling tools for these types of assessments. Consequently, the Western Regional Air Partnership is continuing to try to develop improved techniques in light of the lack of EPA commitment to visibility modeling research in the West.

Question 4a. Would it be of crucial importance in helping your State find the most efficient means of complying with the law?

Response. Yes. Assessments of current requirements under the Clean Air Act will have the effect of reducing long-term emission trends. These assessments must be

considered in developing an overall strategy for the remedying of existing visibility impairment and the prevention of future visibility impairment in mandatory class-I Federal areas. The Clean Air Act section 169A defines a national goal and requires states to develop implementation plans that will make reasonable progress toward the goal. Obviously, it is improbable to consider a scenario where all man-made impairment can be eliminated. That said, it is perfectly reasonable to expect that emission management strategies can be developed that are cost effective and will provide for improvements in visibility on worst-case days, and will assure no significant degradation of visibility on clean days. Strategies associated with regional haze must be put into context with the other emission management strategies associated with the attainment and maintenance of our National Ambient Air Quality Standards and appropriate state and local standards. The impact of implementation plan components for other CAA requirements must therefore be taken into consideration when determining what additional measures will be needed to make reasonable progress.

Question 5. Another of the Appropriators' questions asked EPA what research needs to be performed to support the States to implement the visibility program. EPA answered that "No research is needed before the States can begin to implement the visibility protection program." EPA cited the 1993 NAS report for the proposition that "Current scientific knowledge is adequate and control technologies are available for taking regulatory actions to improve and protect visibility." Outside of the 16 areas studied by the Grand Canyon Commission, do you believe that EPA or the States currently have data on sources of regional haze visibility impairment, atmospheric processes, monitoring, emission control strategies and source-receptor models sufficient to allow States to overcome the presumptions on the deciview goal and Best Available Retrofit Technology should a State choose to attempt to overcome the presumption?

Response. Although much is known about the nature of fine particulates which impair visibility, there is a gross lack of validated, scientifically defensible models which can predict the effects of a control strategy on visibility. As I said in my statement at the hearing, significant financial resources need to be prioritized on the development of regional-haze models. One of the major inconsistencies with EPA's initial proposed rule and our current state of understanding is that there is no objective way of establishing what natural background is without comprehensive modeling. In addition, there are no comprehensive models which can be used to assess how the long-term strategies for regional haze will effect visibility. How can states' demonstrations hold up to the Agency's scrutiny of meeting a one-deciview-per-decade test if there are no approved and validated models? The answer is they can't.

Question 5a. Do you believe State should be required to meet regulatory obligations under the regional haze rule prior to the date that these data are available?

Response. I believe that the states, tribes and Federal agencies, working in cooperation through transport commissions and organizations like the WRAP, should develop these data and tools. I do not believe that EPA, working alone on a national scale, can effectively develop the information, tools, and techniques that will be required for the various regions of the country. There are fundamental differences in the emissions and transport characteristics which are best dealt with on a regional basis. That is why I believe that additional visibility transport commissions should be established to allow these collaborative efforts to move forward.

Question 6. Do you believe EPA should re-propose the regional haze rule in its entirety?

Response. Yes. Phelps Dodge is on record in the December comments on the Regional Haze Proposal and in our most recent comments that the rule should be reproposed.

Question 6a. What could be gained from such a step by EPA, procedurally and substantively?

Response. Phelps Dodge believes that the original Regional Haze Rule proposed by EPA failed to adequately reflect the lessons and understanding developed by the Grand Canyon Visibility Transport Commission. The rule lacked any specific guidance with respect to the Grand Canyon Visibility Transport Commission as was required under section 169b of the CAA. Phelps Dodge believes that the rule was so flawed that many of the comments received on the original proposal would have been irrelevant had the rule been properly crafted. As such, it is in the public interest that EPA re-propose the rule and allow the public to comment on it after these deficiencies have been remedied. There is no fundamental reason that the agency must proceed on an artificially accelerated timeline now with respect to regional haze given the timelines legislated by TEA–21. The work of the Western Regional Air Partnership to follow through on the Grand Canyon Commission is underway.

The Governors, tribal leaders, and stakeholders in the West are committed to following through to develop sound long-term strategies. A delay in the regional haze rule would not have any effect on the progress we are making in the West.

Question 7. We understand that the Grand Canyon Visibility Transport Commission contemplates a need for a true-up for the emissions inventory for purposes of implementing the recommendations. Does the timetable specified by WGA allow time for the development of an accurate emissions inventory for the original 16 Class I areas as well as any other Class I area that wishes to take advantage of the WGA recommendations?

Response. It is important to qualify the role of true-up of the emissions inventory. The true-up was asked for in the Commissions recommendation related to stationary sources prior to the establishment of the overall design of the back-stop market trading program and establishment of emission management milestones. To date the majority of major stationary source emissions of sulfur dioxide in the West have been validated and corrected. There is some residual work which will be finished over the next few months to deal with potential control strategies for other smaller stationary sources. This will provide the basis for a "trued-up" forecast of sulfur dioxide for the region. Emissions inventories will always continue to improve in quality. You don't need perfect data to make all policy decisions. However, you need the best unbiased technical data and an understanding of its limitations when making those policy decisions. I believe that the inventory is adequate for the programmatic activities associated with follow through on the Grand Canyon Visibility Transport Commission. In addition, the Emissions Forum of the WRAP is preparing for the updating of comprehensive region-wide emission inventories on a routine basis to satisfy our long-term planning and tracking needs. Thus, to summarize, Phelps Dodge believes that there is adequate time for the emission inventory true-up to be completed.

SHAWN B. KENDALL,
PHELPS DODGE CORPORATION,
Phoenix, Arizona 85004–3014, October 5, 1998.

U.S. Environmental Protection Agency,
Air and Radiation Docket and Information Center,
Room M1500 Mail Code 6102,
401 M Street SW,
Washington, DC 20460.

ATTENTION: DOCKET NUMBER A–95–38

DEAR SIR/MADAM: Phelps Dodge Corporation ("Phelps Dodge") respectfully submits the enclosed comments on the Environmental Protection Agency's ("Agency") Notice of Availability of Additional Information Related to Proposed Regional Haze Regulations published in the Federal Register September 3, 1998, Volume 63, Number 171, Docket Number A–95–38. Phelps Dodge appreciates the opportunity to participate in this very important rulemaking for the protection of visibility in our mandatory Class I Federal areas.

These comments supplement the comments Phelps Dodge presented before the United States Environmental Protection Agency Public Hearing on the Proposed Regional Haze Rulemaking (62 Fed. Reg. 41138) held September 18, 1997, in Denver, Colorado, and the written comments submitted to the docket A–95–38 on December 5, 1997. Phelps Dodge, the nations largest copper producer, as well as a major producer of carbon black and magnet wire could be significantly affected by the proposed rulemaking.

Phelps Dodge believes that the rule, if structured properly, could provide a new model for how difficult and complex environmental issues are solved in this country. Phelps Dodge understands the complex and difficult issues inherent in this rulemaking. Protection of the quality of visibility, while maintaining sound regulatory procedures and equity between the regulated community and the agency are common challenges that, if successfully resolved, will advance the shared goals of visibility protection in the Class I areas and reasonable regulation.

Phelps Dodge continues to be highly supportive of the work of the Grand Canyon Visibility Transport Commission (GCVTC or "Commissions), and the Western Regional Air Partnership (WRAP). A representative of the company participated in the stakeholder team assembled by Governor Leavitt of Utah to develop the consensus position that the Western Governors Association (WGA) forwarded to the Agency, and is a major part of the subject Notice of Availability. We support the consensus recommendation of the WGA as submitted by Governor Leavitt. We thank the Agency for allowing a 30-day comment period for interested parties to provide input and

perspective on the WGA proposal, as this was a major concern for the participants in the consensus process that developed the recommendations for Governor Leavitt. In addition, we appreciate the effort of the Agency's staff in preparing draft rule language for public review, which is substantively consistent with the proposed guidance from WGA and illustrates the procedural due process that this consensus gathering and public involvement was meant to afford.

Phelps Dodge has observed some technical or interpretation errors in the draft rule developed by the Agency in response to the WGA letter. The following comments are requested changes to the rule language in the proposed section 51.309 that we have determined the Agency should make to align the language with the intent of the WGA proposal. These changes are also intended to clarify rule issues and prevent future misinterpretation. The references below are to the proposed rule language in 51.309.

Sec 51.309(a)Purpose

The purpose section should be modified to indicate that the time period is from 2003 to 2018 unless subsequently extended to assure continuity of long-term strategies that rely on market-trading programs or other components requiring extension of the requirement. Clarify that the provisions apply to the implementation plan and the periodic plan revisions required every 5 years.

The preamble must specify that a negative declaration plan revision would be acceptable if accompanied by the required reporting and justification.

51.309(b)(5) Milestones

The word "annual" should be removed to allow the program monitoring and tracking to utilize either annual or multiyear average emissions. The 1990 baseline reference should clarify that it is a reference to ? baseline of actual emissions."

51.309(d)(2) Projection of Visibility Improvement

This section is not as clear as it needs to be to provide guidance to the regulated community. Plan submission should be accompanied by a projection of the expected visibility conditions resulting from the long-term strategy. These projections should be in all appropriate metrics. The choice of metric should be clearly articulated in the regulatory guidance, not the rule. Limiting the expression of visibility projections to the haziness index, expressed in deciviews, ignores the probability that better metrics may be identified in the future as technology improves. In addition, during public review, it would be better to express these projections in standard visual range, light extinction, as well as haziness index, as some members of the public may be familiar with one, but not others.

Although the modeling associated with these projections does need to recognize contributions from other jurisdictions, states and tribes should be free to either rely on the work of a regional partnership, such as WRAP, or to perform the modeling themselves. Instead of specifying that the modeling procedure must be acceptable to all Transport Region States and the Administrator, the rule should simply require that the modeling projections conform to modeling guidance issued by the Agency, and the Agency should issue such guidance.

51.309(d)(3) Treatment of Clean-Air Corridors

The Agency failed to include the basis for this section and should add the phrase ". . . to ensure that the frequency of clear air days increases or does not decrease at any of the 16 class I areas. . . " to the first paragraph.

51.309(d)(3)(i) Identification of Clean-Air Corridors

The rule should not limit the identification simply to one report, based on the limited scientific and technical data available at that time. The rule should include the phrase n updated as appropriate with improved technical information. if the citation to the report is retained.

51.309(d)(4)(iii) Provisions to fully activate . . .

The term "regional" should be included when referring to milestones (i.e., "applicable regional emission reduction milestone".)

51.309(d)(4)(vi) Provisions requiring the State . . .

The Agency should use the exact language from the WGA proposal in place of this interpretation. The current wording does not track the intent of the Commission report, or the WGA proposal. It should read:

"Report on the exploration of various emissions management options for stationary source NOx and PM, including considering the establishment of emission targets, in order to avoid any net increase in the pollutants from stationary sources within the region as a whole and to provide a foundation for future incorporation

into a multi-pollutant and possibly multi-source market-based program. Based on these investigations, include emission management strategy components into the long-term strategy, if needed.''

51.309(d)(5)(i) A statewide inventory . . .

Phelps Dodge agrees with the Agency's addition of sulfur dioxide emissions to the requirements for this inventory. This is a small departure from the Commission's recommendation and the WGA proposal intended to track the Commission's recommendation. Phelps Dodge believes this was a minor oversight when the Commission's recommendations were drafted, and should be included in any case.

51.309(d)(5)(iv) Interim reports to BPA and the public . . .

Clarify that this refers to reporting on the strategies contained in the Commission's Report.

51.309(d)(6)(iii) Enhanced smoke management . . .

In the first line, add the words ''identify and'' before ''consider.'' The purpose was to both identify these and consider remedies.

51.309(d)(6)(iv) Identification of any legal . . .

We feel the context of this requirement is incorrect. The expectation is for the state or tribe to identify any non-statutory administrative barriers, and where appropriate, to document that these have been removed.

51.309(d)(9) Implementation of Additional . . .

The preamble must include the transboundary emissions issue, and should ensure that the states and tribes are kept apprised of these efforts and emission projections.

51.309(d)(10) Periodic Implementation Plan Revisions

The preamble or rule must clarify that negative declaration revisions are acceptable if appropriate and accompanied by the necessary reporting.

51.309(f)(1) The provisions of . . .

This paragraph is contextually incorrect, since reasonable progress applies to the 16 class I areas, not the states. Replace the language with n In order for the provisions of 51.309(d) to ensure reasonable progress for the 16 Class I areas, the Grand Canyon Visibility Transport Commission must submit a satisfactory annex to the Commissions Recommendations no later than October 1, 2000. To be satisfactory, the annex must contain the following elements:''

51.309(f)(1)(i) The annex must contain quantitative . . .

The Agency dropped the qualifier ''as projected by the Baseline Forecast Scenario H from the WGA language. The preamble language is needed here for full qualification of the 50–70 percent reference.

Re-Proposal of the Rule is needed

In addition to the issues raised above, the lack of preamble draft significantly limits an understanding on how some issues might be interpreted by the Agency, states and tribes in the future. The omission of a preamble results in the loss of significant portion of the regulatory record and compromises the required publication of part of this rulemaking which is essential for effective policy implementation. In addition, the Agency uses references to 51.3xx, and based on the fact that the proposed references are vague and proposed modifications to the rule proposed last year are undisclosed, it is not possible to fully interpret how the Agency intends to implement some of these provisions.

Phelps Dodge requested on December 5, 1997 that the Agency correct the rule and re-propose it so the public could comment on the rule before it becomes final. Phelps Dodge once again is requesting the Agency to re-propose the full rule, retaining the new 51.309 section with the modifications identified above, so that the public will be able to fully assess the impact of the program and that this rulemaking more fully comports with the Agencies rulemaking protocol and the Administrative Procedures Act. We acknowledge that the proposed treatment of the Commission's Recommendations are a valid approach, but we note that the Administrator had a non-discretionary duty to propose similar language in the original proposal in July 1997. Instead the Agency's proposal noted the Commission's work in the preamble, and asked for comments on how to treat the Commission's Recommendations. This was clearly not the intent of Congress in CAA 169B which specifically requires the Administrator to promulgate regulations under CAA 169A designed to assure reason-

able progress based on the recommendations from a visibility transport commission on what actions, if any, are needed.

Phelps Dodge's key concern continues to be the need for adequate public participation in this rulemaking. Phelps Dodge believes the Agency must re-propose this rule to gather relevant comment prior to finalizing this rulemaking. This, unlike any other rule, will have impacts for many generations to come as the states and tribes continuously attempt to make reasonable progress toward the goal. It is imperative that the public input process provide an opportunity for all affected parties—states, tribes, local governments, land managers, industry, environmental groups, and the general public—to be given an opportunity to provide relevant comments on this rule.

Respectfully submitted by,

SHAWN B. KENDALL, EXECUTIVE ASSISTANT,
Phelps Dodge Corporation.

STATEMENT OF HON. PATRICK LEAHY, U.S. SENATOR OF THE STATE OF VERMONT

Mr. Chairman, I want to thank you and Senator Chafee for convening this hearing. Over the years I have spoken many times on the floor of the Senate about my concerns about the ongoing threats from mercury pollution to the lands, rivers and lakes of Vermont and the rest of the country.

This hearing is an important early step in the journey to finally address the scourge of mercury pollution.

It has not been an easy journey, even this far. In the first congressional session of this Congress, I worked with many in the Senate and in the House to introduce a Senate resolution that called on the Administration to release its long overdue Mercury Study Report to Congress, a report that was mandated by the Clean Air Act of 1990.

Earlier this year I introduced S. 1915, the "Omnibus Mercury Emissions Reduction Act of 1998," which used the Mercury Study Report to Congress as part of its factual basis. If enacted, this bill would significantly reduce the risks that this powerful neurotoxin poses to the health and development of pregnant women, women of child bearing age, and children.

Most recently Senator Chafee and I have worked in the FY 1999 appropriations process to support EPA's efforts to begin collecting mercury emissions data from power plants, and to voice our strong opposition to report language on the EPA appropriations bill that would seriously hamper EPA's work on this pollutant.

Mr. Chairman, Vermonters share a deep and abiding concern for the environment. Vermont has enacted some of the toughest environmental laws in the country.

Unfortunately, despite these laws, we face threats from beyond our borders that we cannot control. Mercury is one of those threats, drifting silently into our lakes and waterways.

When I was growing up spending my summers on Lake Champlain, I never had to worry about eating the fish I caught—I only had to worry about catching them in the first place. Now the Lake has fish advisories for walleye, lake trout and bass due to mercury.

As a new grandfather, I am looking forward to spending time with my grandson out fishing on Vermont lakes. I do not want to have to explain to him why he cannot eat the fish he catches.

What I tell my grandson in the future is largely a function of the direction we take in Congress over the next few years to protect the environment.

Are we going to look the other way, or are we going to build on the vision and the courage that two former leaders on this committee, Senators Stafford and Muskie—like Chairman Chafee and others on this committee today—have shown in bringing us to a higher level of accountability in protecting our environment?

Although we should be proud of the great strides we have made to reduce the levels of many air and water pollutants, rebuild populations of endangered species and clean up abandoned hazardous waste sites, we must now address the environmental threats that have to date defied easy solutions.

Finding those solutions will be even more important over the next few years as states and perhaps Congress restructure the electric utility market. This committee will have the responsibility to find those solutions.

How do we reduce emissions of mercury and other pollutants from coal-fired power plants without significantly increasing our utility prices? I introduced my mercury bill to begin to answer this question and to bring more attention to one of the last major toxins for which there is no control strategy.

When the 1970 Clean Air Act was written, Congress did not fully understand the dangers posed by mercury exposure. At the time of the 1990 Amendments, we knew enough to worry about it, but we couldn't agree on what to do.

Our response at that time was to write a provision into the law requiring EPA to do a thorough study of mercury pollution and formally report on it to Congress.

It took a long time to write the report, and then it took a lot of time and effort to overcome industry opposition to its release. Now we have the report, and it gives Congress the information to finally act to bring this toxin under control.

EPA's Mercury Study Report to Congress documents the troubling levels of mercury emissions that are being deposited over much of the country [DEPOSITION MAP]. The report estimates that at any point in time there are more than 1.6 million pregnant women and their fetuses, women of child-bearing age, and children, who are at risk of brain and nerve development damage from mercury pollution.

The Mercury Report shows that year after year sources in the United States emit at least 150 tons of mercury to the environment. Once released to the environment, mercury does not behave like many pollutants. [MERCURY CYCLE POSTER] As you can see from this drawing, mercury does not biodegrade. It recycles through our environment and accumulates in fish, and then it accumulates in the people who eat the fish.

Mr. Chairman, we invest tremendous amounts of love, time, energy and fiscal resources in our children, yet we are not protecting them from the possibility of being poisoned in the womb or in their early developmental years by this potent neurotoxin.

Other new facts on mercury pollution are also troubling. As you can see from this chart [1993 FISH ADVISORY MAP], there were 27 states with fish advisories for mercury contamination in 1993. In all, 899 lakes, river segments, and streams were identified as yielding mercury contaminated fish. By 1997, [1997 FISH ADVISORY MAP] you can see that 39 states had issued mercury fishing advisories, for 1,675 water bodies.

That is an increase of 86 percent. Mr. Chairman, we are going in the wrong direction. I do not want to wait until the entire map is filled with red before we summon the will to act.

Today, I am sure we will hear that it is not possible to determine the degree to which kids with learning disorders, coordination problems hearing, sight or speech problems are being banned by mercury pollution.

But we do know that just as with lead, mercury has much graver effects on children, even at very low levels, than it does on adults. We might not be able to precisely measure the harm done by mercury in children, but we should not use that as an excuse to do nothing.

We don't have to wait until we have a body count. We just need the will to act.

It is hard to believe today, but at the time, the decision to eliminate lead from gasoline was, itself, a controversial decision, and these same arguments were heard then. We WILL solve the mercury problem some day, and I hope it is soon. Just as with leaded gasoline, a few years after we tackle mercury pollution, our children and grandchildren will wonder why it took us so long to do the right thing.

The bill I have offered, S. 1915, is based on this new body of scientific evidence and proposes a comprehensive approach to eliminate mercury pollution from coal fired power plants, solid waste incinerators, and other industrial sources from our air, waters, and forests.

What I am proposing is that we begin putting a stop to this poisoning of America. Emitting 150 tons of mercury to the air each year is unnecessary, and it is wrong. Mercury can be removed from products, and it has been done. Mercury can be removed from coal-fired power plants, and it should be done.

Each year coal-fired power plants alone emit at least 52 tons of mercury into the air, one third of the U.S. total. With states deregulating their utility industries, Congress today has a unique opportunity to make sure that these power plants begin to internalize the true costs of their pollution so that market decisions can help us correct this problem.

If we don't level the pollution playing field now and make these power plants internalize the environmental cost of the way they produce power, in a deregulated industry the financial incentive will be to pump even more underpriced power and pollution out of these plants for as long as they will last.

In that case, we would never make a dent in those 52 tons of mercury emissions per year. In fact, that toll could easily rise.

As long as the rules of the game allow this, these companies understandably will act solely to suit their economic self interests, without taking into account the true costs to our communities and our people. As a nation, we cannot afford to subsidize their inefficiency, but our inaction does just that.

At the heart of the argument against taking action is a concern about the cost to curb mercury pollution. I want to address that up front.

When examined closely, that cost argument does not hold water. The EPA report estimates the cost nationally of controlling mercury emissions from power plants at $5 billion per year. This industry generates more than $200 billion a year in revenue. That is less than two and half percent, and that strikes me as the equivalent of a fly on an elephant's back.

We should not concede our responsibility to defend the health of our children to corporate accountants and lawyers.

As required by Congress, the EPA has overseen the most comprehensive scientific study ever on the sources of mercury pollution and on the harm mercury does to us and to our environment. With mercury pollution, as with other pollutants, we have the benefit of all the knowledge that science can offer us. The question is, will we pay attention, and then will we act to make our communities safer?

We have the technology to reduce the amount of mercury and other pollutants that spew from some powerplants. We know how to separate and recycle mercury-containing products before they reach the combustion units. We already have alternatives to the many products that contain mercury. It is time to begin acting on our knowledge.

Mercury pollution is a key piece of unfinished business in cleaning our environment. The health of our children and the health of our environment demand that we take action.

Mr. Chairman, I thank you and Senator Chafee for your attention to this issue, and I look forward to working with you on this in the months ahead and, the people of Vermont willing, in the next Congress.

STATEMENT OF HON. OLYMPIA J. SNOWE, U.S. SENATOR FROM THE STATE OF MAINE

First of all, I want to thank you, Senator Chafee, for holding this hearing today as it gives me the opportunity to highlight the problem of mercury pollution in our freshwater lakes in the Northeast.

Mercury, as we have historically thought of it, brings to mind the ancient Roman messenger of the gods, or the symbol that made us all proud, that of a small Mercury capsule carrying a lone astronaut into space.

Mercury, as we are now coming to know it, is one of the most toxic substances in our environment, causing great necrologic damage if ingested by humans, and, unfortunately, remains largely unregulated by the Environmental Protection Agency. There is growing concern around the country about mercury contamination and the risk it posses to those most vulnerable: young children, infants, and the unborn.

Over the last several years, the EPA has conducted considerable research on the sources and effects of manmade mercury pollution, and has confirmed that mercury emissions are getting worse. The research, published in EPA's Report of December, 1997, shows that more than a third of this pollution comes from coal? burning power plants—close to 33 percent, or the release of approximately 52 tons per year.

Mercury, which is contained in coal and emitted up through smokestacks into the atmosphere as the coal is burned, is then transported through the air and carried downwind for hundreds and hundreds of miles, falling to Earth in snow and rain and ending up in our lakes, rivers, and streams. The mercury is then ingested by fish, and in turn by humans when they eat the fish from these freshwater sources.

In 1993, 27 states issued health advisories to warn the public about consuming mercury-tainted fish. In 1997, 39 states issued health advisories pertaining to eating fish from over 50,000 bodies of water. This should alarm us, especially as the deregulation of the electric industry may lead to a greater use of older, polluting power plants—plants that currently have no emissions regulations for mercury.

In Maine, the beautiful common loon with its haunting call is known as a symbol of conservation—and even appears on license plates, the cost of which funds conservation efforts. The haunting call is now coming from biologists whose studies show that the loons and other birds, such as the bald eagle, may now be having trouble reproducing or fighting diseases because of mercury ingestion.

Last year, Maine's state legislature passed a resolution to limit mercury emissions in the State, and other states are taking aim at similar actions as well. This past June, the New England Governors and the Eastern Canadian Premiers met in Portland and came up with a Mercury Action Plan to address the pervasiveness of mercury in freshwater fish in the Northeast at levels that pose health risks to humans. The representatives also recognized the important economic consequences to the recreational and commercial value of fisheries resources across the region. The Plan

addresses how the Northeast can cope with the problem of mercury pollution by taking steps that are within the regions' control or influence.

This is an excellent step forward to decrease regional mercury pollution, but also points out the need for a nationwide information system and controls for mercury releases for the largest polluters, such as the coal-burning power plants, as polluted air does not stop at state borders or even international boundaries. On the horizon is the fact that the burning coal continues to rapidly increase in developing nations around the globe.

I was pleased to join as a cosponsor of Senator Leahy's Omnibus Emissions Reduction Act of 1998, which directs the EPA to promulgate mercury emissions standards for the largest emitting sources to reduce these emissions by 95 percent in 5 years. The Act also directs the EPA to work with Canada and Mexico to inventory the sources and pathways of mercury air and water pollution within North America and to reduce transboundary atmospheric and surface mercury pollution. The bill dovetails nicely with the new actions the State of Maine is taking and also the goals of the Mercury Action Plan of the Committee on the Environment of the Conference of Northeast Governors' and Eastern Canadian Premiers.

I want to thank Senator Leahy for his hard work in highlighting the problem of mercury emissions through the introduction of his legislation, and also the House sponsor of the companion bill, Representative Tom Allen, a member of my own Maine delegation. It is my understanding that, realistically, the Omnibus mercury emissions bills will have a short lifespan in this Congress because of time constraints, and were introduced mainly to bring the problem before Congress and the public, to spark debate, and to begin a dialog, especially with those industries that will be affected by any curbs in emissions and those people most directly affected by the mercury emissions.

Mr. Chairman, your hearing today will go a long way toward developing a much needed solution to the problem of mercury emissions in the environment, and I look forward to working with you and the committee and the Environmental Protection Agency to come up with a fair solution and one that will truly protect the people from this pervasive emissions problem. I thank the Chair.

STATEMENT OF C. MARK SMITH PH.D., M.S., DEPUTY DIRECTOR, OFFICE OF RESEARCH AND STANDARDS, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, NEW ENGLAND GOVERNORS AND EASTERN CANADIAN PREMIERS MERCURY TASK FORCE

Introduction

My name is Mark Smith. I am the Deputy Director of the Office of Research and Standards at the Massachusetts Department of Environmental Protection, Chair of our Department's Mercury Workgroup, and represent Massachusetts on the New England Governors and Eastern Canadian Premiers Regional Mercury Task Force. I have been involved in toxicology research and policy development for the last 12 years.

My testimony today is derived from three perspectives: first as a toxicologist; second, as an environmental regulator at the State level; and third, and perhaps most importantly, as the father of a 5-year old daughter and 5-month old son. Mercury is of great concern to the from all three of these perspectives.

The most important messages that I wish to convey today are that:

1) The weight of the scientific evidence regarding mercury pollution and its toxicity is sufficient to warrant aggressive steps to reduce mercury emissions;

2) Mercury levels in the environment of the Northeast are unacceptably high; and;

3) Out-of-region sources contribute significantly to our regional problem; thus the commitments in the New England Governors and Eastern Canadian Premiers Regional Mercury Action Plan, a binational effort to reduce mercury emissions in the Northeast that was endorsed in June, 1998, should be adopted nationally.

Scientific Basis for Action

First, I wish to emphasize the remarkable degree of consensus that has been reached in the northeast by public officials and scientists that mercury is a significant environmental problem in the region. This conclusion has been reached by essentially all the Northeast State and Eastern Canadian Provincial Environmental Protection and Public Health agencies. Our regions concern about mercury is based on the following:

- mercury is toxic to people and can poison fish eating wildlife, such as loons and eagles;
- mercury injures the brain and nervous system;

- children—born and unborn—are at greatest risk; the recent Northeast States and Eastern Canadian Provinces Mercury Study noted that a pregnant woman eating as little 0.4 ounces of fish a day containing 0.5 parts per million (ppm) of mercury could put her fetus at risk;
- mercury levels in freshwater fish in the northeast are high, often exceeding 1 ppm and ranging up to 5 ppm, well above a level of public health concern (no matter what the outcome of current debates on mercury toxicity);
- once in the environment mercury is very persistent, Is difficult if not impossible to cleanup and can be transported long distances to affect people far from its source.

Recently, some have argued, largely on the basis of results from the Seychelles Island Health Study, that mercury may be less toxic than previously thought. This debate is not critical in the Northeast because levels of mercury in fish here are high enough to be of public health concern even if the lower risk value were correct. Nonetheless, it is important to note that I and many other toxicologists have concluded that this single study, although of excellent quality, is not sufficient reason to reduce our concern about mercury. In fact, by appropriately accounting for uncertainties in this study it can easily be interpreted as supporting current risk estimates. The fact that a second study, at the Faroe Islands, also supports current risk estimates for mercury fiber argues for caution.

In addition to potential effects on people it is important to keep in mind that mercury can also impact fish and fish-eating wildlife such as loons, eagles and otters. There is increasing evidence that mercury levels are high enough in some waterbodies to alter Irish and bird behavior and reproductive success.

In conclusion, although ongoing debate exists over the magnitude of low dose mercury risks, the available data in its entirety supports continued action to further reduce mercury levels in the environment. On a personal note, this low dose risk debate also has not altered my level of concern about mercury-based on my knowledge as a toxicologist of the risks and uncertainties involved, I advised my wife to not eat certain types of fish likely to have high levels of mercury when she was pregnant with both our children. I would do the same today.

Evidence That Mercury is a Problem in the Northeast

The evidence that mercury is a problem in the Northeast is extensive: more than 4,000 samples of fish from over 700 waterbodies across the region have been analyzed for mercury. This data indicates that mercury levels in freshwater fish often exceed 1 ppm, with concentrations reaching in excess of 5 ppm. In the region, the overall average concentrations of mercury in smallmouth bass, largemouth bass, walleye, and pickerel exceed 0.5 ppm with concentrations in many lakes and ponds even higher. Thus, mercury concentrations in many of our fish are at levels where potentially toxic doses to a fetus could occur if a pregnant woman were to regularly eat a modest amount of the contaminated fish.

Based on this data all the Northeast states and decree Eastern Canadian Provinces have issued freshwater fish consumption advisories waking the public, in particular pregnant women, to limit or avoid eating contaminated fish. In Massachusetts alone, fish from more Han 50 waterbodies are unsafe for the general public due to mercury and pregnant women are advised to avoid eating native freshwater fish caught in the state. Similar advisories have been adopted in all the Northeast states.

Actions to Reduce Emissions

Consensus has been reached in New England that aggressive actions to reduce mercury pollution are warranted both in our region and at the nations level. Toward this end a comprehensive regional plan to address mercury pollution was adopted in June, 1998 by the unanimous vote of all the New England Governors and Eastern Canadian-Premiers. This binational plan established a long-term goal of virtual elimination of manmade mercury emissions in the region with a 50 percent reduction target by 2003. Stringent but achievable emission limits, which go beyond current EPA requirements, were agreed to for municipal waste combustors and medical waste incinerators. Commitments were also made to address utility and other major emission sources and to coordinate regional efforts to promote pollution prevention activities, including reduced use of mercury In products and increased recycling of those Mat continue to contain mercury.

Numerous analyses indicate that much of the mercury impacting the Northeast is derived from atmospheric deposition. This mercury comes from both local and distant sources with as much as 40 percent coming from out-of-the-region The major sources of mercury emissions include municipal waste combustors, utilities (especially coal-fired facilities), medical waste and sludge incinerators, and industry.

Because mercury pollution can be transported in the air for long distances national efforts are needed to address the problem.

Conclusions

To reiterate, we in MA and others across the Northeast have concluded that:

1) The scientific evidence on mercury pollution and its toxicity is sufficient to warrant Archer steps to reduce mercury use and emissions;
2) Mercury levels in freshwater fish in the Northeast are too high; and,
3) Out-of-region sources contribute significantly to mercury deposition in the region due to long range transport; thus, the aggressive commitments to reduce mercury pollution made in the New England Governors and Eastern Canadian Premiers Regional Mercury Action Plan should be adopted, in a timely fashion, nationally.

STATEMENT OF BARRY L. JOHNSON, PH.D., ASSISTANT SURGEON GENERAL, ASSISTANT ADMINISTRATOR, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Good afternoon. I am Barry Johnson, Ph.D., Assistant Administrator of the Agency for Toxic Substances and Disease Registry (ATSDR). The subcommittee invited ATSDR to testify on regional haze and mercury pollution. Our Agency has had no involvement with regional haze but has worked on various mercury issues. Much of our work on the scientific issues of mercury pollution is reflected in the ATSDR draft Toxicological Profile for Mercury.

ATSDR has developed a toxicological profile on mercury in compliance with a mandate in the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA, or Superfund). Section 104(i)(3) directs us to develop toxicological profiles for priority hazardous substances released from Superfund sites. Our priority list of hazardous substances is developed jointly with EPA and updated every 2 years. Mercury is No. 3 on the 1997 list. ATSDR is also required by CERCLA (—104(i)(3)) to revise and republish individual toxicological profiles as necessary, but no less often than once every 3 years.

CERCLA also requires that ATSDR's toxicological profiles contain "An examination, summary, and interpretation of available toxicological information and epidemiologic evaluations on a hazardous substance in order to ascertain the levels of significant human exposure for the substance and the associated acute, subacute, and chronic health effects." This language directs ATSDR to develop numerical estimates of health risks posed by hazardous substances. Health assessors and risk managers use numerical values to characterize the toxicities of hazardous substances. Risk assessment methods are most often used for carcinogenic substances. This results in point estimates or ranges of health risk that are based on various exposure scenarios. ATSDR uses the numerical minimal risk levels (MRLs) for noncarcinogenic toxicities of substances.

An MRL is an estimate of what level of daily human exposure to a hazardous substance is likely to be without appreciable risk of adverse noncancer health effects over a specified duration and route of exposure. These substance-specific estimates are intended to serve as screening levels. Public health assessors use MRLs to identify contaminants and potential health effects that may be of concern at hazardous waste sites. It is important to note that MRLs are not intended to define clean-up or action levels for EPA or other agencies.

ATSDR develops MRLs during the preparation of toxicological profiles. They are derived when ATSDR determines that reliable and sufficient data exist to identify the target organs of effect or the most sensitive health effects for a specific duration of exposure. MRLs are based only on noncancer health effects and not on a consideration of cancer effects.

ATSDR first published a toxicological profile on mercury in 1989. The mercury profile was then updated in 1994, and a second update was released in a draft version in October 1997.

ATSDR's 1994 mercury profile contained a chronic duration, oral exposure MRL that was based primarily on a 1989 analysis of data collected on persons in Iraq who had been accidentally exposed to methylmercury in grain during the early 1 970's. That MRL was 0.1 micrograms of mercury per kilogram body weight per day (µg/kg/day). It was numerically equal to EPA's reference dose (RfD), and was based on the same neurodevelopmental endpoint (children's delayed walking and talking) that EPA used to derive their RfD for methylmercury.

The CERCLA mandate to update the mercury profile, coupled with the need to increase our knowledge of the health effects associated with mercury, led us to convene a series of meetings in Atlanta in 1994 and 1995. We invited peer scientists

to join us in panel meetings to review the direction we should take in our continuing assessment of the health impact of methylmercury. At that time, we were cognizant of a number of ongoing studies, including studies in the Faeroe Islands and the Seychelles Republic.

In 1995 our panel of experts recommended that we await the development of the Seychelles data and use them as a starting point in our mercury reassessment efforts. So we waited until 1996, when published data from the Seychelles study began appearing in the scientific literature, to begin updating our mercury toxicological profile.

In October 1997, ATSDR released for public review and comment our current draft profile. The document remains in draft, pending further discussions with EPA, other Federal agencies, and the public. An upcoming interagency workshop in November to evaluate the major scientific studies on methylmercury and its developmental effects in children will be a key forum for resolving some remaining points of science and public health.

ATSDR's MRL for chronic, oral exposure to methylmercury in the October 1997 draft toxicological profile is derived from a study conducted by University of Rochester investigators in the Seychelles Islands that reflects multiple generations of human exposure to organic mercury through fish as a primary route of exposure. Because of the long-term nature of this exposure, the large sample size, and the rigorous study design, this data set was used as the primary basis of ATSDR's evaluation. The Seychelles study overcomes several of the limitations in the Iraqi study. For example, there is a rather large sample size of 779 mother-infant pairs before the application of the exclusion criteria. This was a prospective study, with the goals and objectives stated before data collection.

In the Seychelles study, children were evaluated at 6.5, 19, 29, and 66 months of age. Through the age of 29 months, no effects attributable to methylmercury exposure were found using a battery of neurobehavioral and neurophysiological tests. The only endpoint that was correlated in any way with mercury exposure was the subjective observation by several examiners that some boys, but not girls, showed a decreased activity level during the testing period. This decrease in activity associated with an increase in maternal hair mercury levels was, however, not considered by the Rochester team to be attributable to mercury exposure, and was observed only in boys whose mothers had hair mercury levels above the median value (5.9 ppm) used as a no-observed-adverse-effect level (NOAEL). This value is 2–4 times less than the level at which the transient depressed activity levels in young boys were noted (i.e., > 12–26 ppm). Similarly, the Rochester researchers found no statistical association between prenatal exposure to mercury and the age at which the children in the Seychelle Islands study walked or talked.

Since October 1997, there have been additional scientific publications on the human health effects of mercury. For example, results of the 66-month testing of children in the Seychelle islands are now available. Further, a study of the Faeroe Islands population published in December 1997 will need to be examined by ATSDR in the context of our draft toxicological profile.

A scientific evaluation of studies like those conducted in Iraq, the Faeroe Islands, and the Seychelles is complicated. All studies like these have particular strengths and limitations. One must evaluate each study for its statistical power, the adequacy of data collection and analysis, the relevance of exposure data, biological plausibility, and relevance of health findings. Examination of all currently available scientific information must be concluded and thoroughly debated by peer scientists before final pronouncements are made on MRLs and similar health guidance values. The results from studies published since October 1997 will be carefully reviewed by ATSDR and incorporated in our final version of the toxicological profile on mercury.

As previously noted, our toxicological profiles require developing MRLs, the derivation of which is a rather straightforward algorithm. It is deliberately analogous to what the EPA and the Food and Drug Administration (FDA) do for RfD and ADI derivations, respectively. You have a benchmark of toxicity, no-observed-adverse-effect level (NOAEL), or some other surrogate for that, and an uncertainty factor. The higher the uncertainty factor, the lower the overall quality of the data set. The higher the quality of the data set, the lower the uncertainty factor.

Although the operational derivation of an MRL is straightforward, any derivation involves a substantial amount of professional judgment. In the case of mercury, we must consider the fact that mercury is ingested by mothers, yet we know the fetus is the target of concern. The mercury concentrations are measured in the mothers' hair, but we are really concerned about the concentration of mercury in the blood reaching the fetus. So we have to convert the maternal hair mercury concentration to a blood mercury concentration, and subsequently convert that blood mercury concentration to an oral daily intake.

In addition, we have the issue of uncertainty. ATSDR considers four general areas of uncertainty in the derivation of MRLs: cross-species extrapolation, 1 to 10; intraspecies variability, 1 to 10; the use of an adverse effect level as opposed to a nonadverse effect level, 1 to 10; and a factor to account for the quality of sufficiency of the overall database, 1 to 10, sometimes referred to as a modifying factor by ATSDR.

In our draft 1997 mercury profile, we looked at the uncertainty and the available mercury data. We have the most sensitive population, the developing fetus. We have a known and relevant route of exposure, consumption of mercury-contaminated fish. We have identified a NOAEL in the most sensitive subpopulation, and we see an absence of any neurodevelopmental deficit at similar exposure levels in other populations. That led us to select an uncertainty factor of 1. This uncertainty factor is consistent with the standard application of those factors in the derivation of health guidance values. This is not to suggest that there is no uncertainty remaining about any threshold for the health hazards of methylmercury, or that ATSDR's proposed MRL does not reflect a margin of safety consistent with adequate precautionary approaches and good public health practice.

From the foregoing considerations, ATSDR derived an MRL for chronic, oral exposure to methylmercury of 0.5 μg/kg/day. MRLs for both elemental mercury and inorganic mercury (salts) are also presented in the draft mercury toxicological profile. The significant neurotoxic (nervous system) and nephrotoxic (kidney) health hazards posed by these forms of mercury are often addressed by ATSDR in response to spills or other unplanned releases of mercury in schools, hospitals, and homes. In fact, mercury has been the single most frequently encountered chemical in our emergency response program for the last 8 years. For this reason, ATSDR and EPA jointly developed and released a health alert in the summer of 1997 that has been widely distributed to schools and other potential targets of mercury spills.

In July 1998, ATSDR assembled a panel of 18 experts from the scientific and medical communities to assist the Agency in reviewing key issues in the areas of toxicology and human heath risk assessment as they relate to metallic, inorganic, and organic mercury compounds. The purpose of the meeting was to review all relevant science on mercury and its compounds, including methylmercury, and to react to ATSDR's proposed response to comments we received during the public review and comment period. The meeting of the panel was held as an announced public meeting. It consisted of scientists from the EPA, FDA, the Centers for Disease Control and Prevention (CDC), academia, and the private sector, including the teams of scientists who conducted the human epidemiological studies in Iraq, the Seychelles, and the Faeroe Islands. The discussions from this expert panel are being used by ATSDR and other Federal agencies to help form part of the agenda for the November 1998 interagency workshop on mercury.

ATSDR continues to work with other Federal agencies to reach a consensus on mercury issues. The Committee on Environment and Natural Resources (CENR), Subcommittee on Toxics and Risks, established a Mercury Working Group in September 1997 to look at a number of issues concerning mercury. This workgroup, which includes representation from ATSDR, EPA, FDA, CDC, NIH, NOAA, USDA, and the Office of Science and Technology Policy, has already come to a consensus on a range of issues, and continues to work towards agreement on all public health issues concerning mercury.

The CENR Working Group is sponsoring the November 18–20 interagency workshop in Research Triangle Park, North Carolina, to further elucidate issues regarding methylmercury exposure and public health. The research teams responsible for the Seychelles and Faeroes studies, as well as a team conducting similar studies along the Amazon River basin, will present and discuss their findings at this meeting. ATSDR considers this meeting to be an important step toward resolving remaining scientific issues. The meeting will be used by ATSDR to help bring closure to its toxicological profile on mercury.

A challenge for health officials is to balance the known public health benefit of consuming more fish in the diet, and the known dangers of excess mercury exposure. To mitigate adverse health effects of excessive exposure to mercury, ATSDR supports efforts to reduce or eliminate exposure to mercury in the environment. Such efforts must be pursued through pollution prevention strategies, including health education for both health care providers and the citizens who may be at risk due to high levels of exposure to not only organic, but also inorganic and metallic mercury. Throughout the profile revision period, ATSDR has advised the public that it would be premature to predicate any risk management decisions on information in a draft document. That needs to await the sorting out of all relevant issues and the finalization of the profile.

I thank you for this opportunity to present to you some of the conclusions in ATSDR's Toxicological Profile for Mercury and to discuss our ongoing efforts to enhance the accuracy and utility of our mercury MRLs, including the chronic oral MRL for methylmercury.

Mr. Chairman, we would be pleased to answer any questions that you or subcommittee members may have.

STATEMENT OF WILLIAM H. FARLAND, DIRECTOR, NATIONAL CENTER FOR ENVIRONMENTAL ASSESSMENT, ENVIRONMENTAL PROTECTION AGENCY

Introduction

Mr. Chairman, members of the subcommittee, I am pleased to have this opportunity to offer this testimony in hopes that it will contribute to the subcommittee's discussion of science issues involved in assessing health and ecological impacts of mercury exposure.

Mercury (Hg) is a basic element, it is neither created nor destroyed, and has always been a component of the earth's dynamic systems. What has changed with time and what has caused increasing concern about mercury and mercury exposure is the addition of the human component to the planet's complex systems. Mercury cycles in the environment as a result of natural and anthropogenic (human) activities. The amount of mercury mobilized and released into the biosphere, and thus biologically available within the environment, has increased since the beginning of the industrial age as a result of increasing anthropogenic activities, raising concern about the potential for public health and ecological impacts. The scientific community knows a lot about the human health and ecological effects of mercury and mercury exposure, and has agreed, in spite of the scientific uncertainties, that mercury is an important environmental problem.

The U.S. Environmental Protection Agency (EPA) has been at the forefront on science issues and control activities regarding mercury. The Agency's study of the human health and ecological assessment of mercury exposure has been centered in the National Center for Environmental Assessment (NCEA), one of five major components of EPA's Office of Research and Development (ORD). NCEA has major responsibility in EPA for the conduct of chemical-specific risk assessments in support of EPA regulatory programs, the development of Agency-wide guidance on risk assessment, and the conduct of research to improve risk assessment. NCEA occupies a critical position in the Agency between the researchers in other ORD components who are generating new findings and data, and the regulators in the EPA program offices (e.g., pollution prevention and toxic substances, air, water and waste programs) and regions who must make regulatory, enforcement, and remedial action decisions.

As Director of NCEA, I am committed to the development of national and international approaches to the testing and assessment of the fate and effects of environmental agents. Prior to my appointment as Center Director, I was Director of the Agency's Office of Health and Environmental Assessment, a position which I held since 1988. I began my EPA career in 1979 as a Health Scientist in the EPA's Office of Toxic Substances. I received my Ph.D. in 1976 from UCLA in Cell Biology and Biochemistry, an M.A. (1972) in Zoology from the same institution and a B. S. (1970) from Loyola University, Los Angeles. I serve on a number of committees and advisory boards including: the National Toxicology Program's Executive Committee, EPA Liaison to the Public Health Service Environmental Health Policy Committee, and past Executive Secretary of the Federal Coordinating Council on Science Engineering and Technology's Ad Hoc-Working Group on Risk Assessment. I have also served on the Office of Science and Technology's Committee on Environment and Natural Resources' (CENR) Risk Assessment Subcommittee, and I was co-chair of the Federal Liaison Group to the National Academy of Sciences Committee on Risk Assessment Methods. I am also a past member of the Science Advisory Panel of the Chemical Industry Institute of Toxicology, and a member of the Science Advisory Panel on Electromagnetic Fields (EMF) Research at the Electric Power Research Institute (EPRI). I am currently a member of the Council of the Society for Risk Analysis, and on the editorial boards of two respected science journals, Risk Analysis since 1987 and Environmental Health Perspectives since 1997.

NCEA and the Office of Air and Radiation's (OAR) Office of Air Quality Planning and Standards (OAQPS), were the lead Agency offices overseeing the development of the 1997 Mercury Study Report to Congress. Work on the Report began in 1992. On December 19, 1997, the Agency released an eight-volume report to Congress. The Report fulfills the requirements of section 112(n)(1)(B) of the Clean Air Act as amended in 1990. The Report inventories the quantity of mercury emissions to the

air from a number of sources related to human activity; estimates the health and environmental impacts associated with these combined emissions; and describes the technologies (and associated costs) available to control mercury emissions from these sources. The Report was reviewed and approved by EPA's Science Advisory Board (SAB), -a panel of independent scientific experts, and was developed with substantial input by industry groups, the general public, and state, local, and other Federal Government agencies including the U.S. Fish and Wildlife Service, Department of Energy, Food and Drug Administration, National Institute of Environmental Health Sciences, Agency for Toxic Substances and Disease Registry, and National Oceanic and Atmospheric Administration.

The Mercury Study Report to Congress

The Mercury Study Report to Congress, prepared by EPA, provides an assessment of the magnitude of U.S. mercury emissions by source, the health and environmental implications of those combined emissions, and the availability and cost of control technologies. As the state-of-the-science for mercury is continuously and rapidly evolving, this Report should be viewed as a "snapshot" of our current understanding of mercury. The Report also identifies areas where further research is needed to provide a quantitative risk assessment.

Most of the mercury in the atmosphere is elemental mercury vapor, which circulates in the atmosphere for up to a year, and hence can be widely dispersed and transported thousands of miles from sources of emission. Most of the mercury in water, soil, sediments, or plants and animals is in the form of inorganic mercury salts and organic forms of mercury (e.g., methylmercury).The inorganic form of mercury, when either bound to airborne particles or in a gaseous form, is readily removed from the atmosphere by either precipitation or dry deposition. Wet deposition is the primary mechanism for transporting mercury from the atmosphere to surface waters and land. Even after it deposits, mercury commonly is re-emitted back to the atmosphere either as a gas or associated with particles, to be redeposited elsewhere. As it cycles between the atmosphere, land, and water, mercury undergoes a series of complex chemical and physical transformations, many of which are not completely understood.

What is well understood is that mercury accumulates most efficiently in the aquatic food web after being transformed into methylmercury in sediments. Predatory fish and fish-eating birds and mammals at the top of the food web generally the highest mercury concentrations in their body tissues. Because of its physicochemical properties and strong propensity to bioaccumulate, nearly all of the mercury that accumulates in fish tissue is methylmercury. Inorganic mercury, which is less efficiently absorbed and more readily eliminated from the body than methylmercury, does not tend to bioaccumulate.

Mercury Emissions and Deposition in the United States

The best point estimate of annual anthropogenic U.S. emissions of mercury, based on 1994–1995 data, is 158 tons. Roughly 87 percent of these emissions are estimated to be from combustion sources, including waste and fossil fuel combustion. Contemporary anthropogenic emissions are only one part of the mercury cycle. Human activities today are causing releases from the reservoirs that already exist in land, water, and air, both naturally and as a result of previous human activities. The flux of mercury from the atmosphere to land or water at any one location is comprised of contributions from the natural global cycle including re-emissions from the oceans, regional sources, and local sources. Local sources could also include direct water discharges in addition to air emissions. Past uses of mercury, such as fungicide application to crops, are also a component of the present mercury burden in the environment.

Computer modeling of long-range transport of mercury suggests that about one-third (52 tons) of U. S. anthropogenic emissions are deposited, through wet and dry deposition, within the contiguous 48 States. The remaining two-thirds (107 tons) is transported outside of U. S. borders where it diffuses into the global cycle. In addition, the computer simulation suggests that another 35 tons of mercury from the global cycle is deposited in the U.S. for a total deposition of roughly 87 tons annually. One estimate of the total annual global input to the atmosphere from all sources including natural, anthropogenic, and oceanic emissions is 5,500 tons. Based on this, U.S. anthropogenic sources are estimated to have contributed about 3 percent of the 5,500 tons in 1995.

Based on model estimates, the highest deposition rates from anthropogenic and global contributions for mercury are predicted to occur in the southern Great Lakes and Ohio River valley, the Northeast and scattered areas in the southeastern United States. The location of sources, the chemical species of mercury emitted, and cli-

mate and meteorology are key factors in mercury deposition. For instance, humid locations have higher deposition than arid locations.

Public Health Impacts

Epidemics of mercury poisoning following high-dose exposures to methylmercury in Japan and Iraq demonstrated that neurotoxicity is the health effect of greatest concern and that effects on the fetal nervous system occur at lower exposures than do effects on the adult nervous system. Minimally affected mothers have given birth to severely affected infants. Dietary methylmercury is almost completely absorbed into the blood and distributed to all tissues including the brain; it also readily passes through the placenta to the fetus and fetal brain. To describe the implications of chemical exposures on human health, including the impacts of methylmercury exposure, the Agency uses the concept of a "reference dose." The reference dose (RfD) is an amount of methylmercury, which when ingested daily over a lifetime is anticipated to be without adverse health effects to humans, including sensitive subpopulations. At the RfD or below, exposures are expected to be safe. The risk following exposures just above the RfD is uncertain, but it is clear that risk increases as exposures to methylmercury increase significantly above the RfD.

EPA has on two occasions published Rims for methylmercury which have represented the Agency consensus for that time. The original RfD of 0.3 micrograms per kilogram body weight per day (μg/kg/day), based on effects seen in adults, was determined in 1985 by EPA's agency-wide consensus workgroup. This assessment was subsequently included on the Agency's Integrated Risk Information System (IRIS). The critical effect was nervous system damage in an Iraqi adult population exposed to methylmercury through consumption of contaminated grain. The effect seen at lowest dose was changes in sensation or numbness.

The current RfD of 0.1 μg/kg/day, based on effects seen in children, was established as Agency consensus in 1995. The revised RfD was estimated by extrapolating from the high-dose exposures that occurred in the Iraqi incident to impacts on the most sensitive individuals in that population—the developing fetus.

At the time of the Mercury Study Report to Congress, it became apparent that considerable new data on the health effects of methylmercury in humans were emerging. However, as many of these new data had either not been published or have not yet been subject to rigorous review, EPA decided that it was premature to make a change in the 1995 methylmercury RfD at that time. This decision was supported by the Agency's SAB, a public advisory group providing extramural scientific information and advice to the Administrator and other officials of the EPA. The SAB is structured to provide balanced, independent expert assessment of scientific matters relating to problems facing the Agency. Their report makes the following statement:

"In general, from the standpoint of looking at human health effects and the uncertainties, draft report is a very good document and an important step forward in terms of bringing the relevant information together in one place for the first time. The current RfD, based on the Iraqi and New Zealand data, should be retained at least until ongoing Faeroe and Seychelles Islands studies have progressed much further and been subjected to the same scrutiny as has the Iraqi data."

With respect to the ongoing, two large epidemiology studies in the Seychelles Islands and in the Faeroe Islands that were designed to evaluate childhood development and neurotoxicity in relation to fetal exposures to methylmercury in fish-consuming populations, the SAB report states:

"Investigators conducting two new major prospective longitudinal studies—one in the Seychelles Islands, the other in the Faeroe Islands—have recently begun to publish findings in the literature and are expected to continue releasing their findings during the next 2–3 years. These studies have advantages over those cited in the previous paragraph in that they have much larger sample sizes, a larger number of developmental endpoints, potentially more sensitive developmental endpoints, and control a more extensive set of potential confounding influences. On the other hand, the studies have some limitations in terms of low exposures (to PCBs in the Faeroes) and ethnically homogenous societies. Since only a small portion of these new data have been published to date and because questions have been raised about the sensitivity and appropriateness of the several statistical procedures used in the analyses, the subcommittee concluded that it would be premature to include any data from these studies in this report until they are subjected to appropriate peer review. Because these data are so much more comprehensive and relevant to contemporary regulatory issues than the data heretofore available, once there has been adequate opportunity for peer review and debate within the scientific community, the RfD may need to be reassessed in terms of the most sensitive endpoints from these new studies."

To respond to the SAB's comment regarding the future need to reassess the current RIO in light of the newly emerging data and because of various limitations and uncertainties in the available data, both the Iraqi data and those newly published from the ongoing studies, the EPA and other Federal agencies intend to participate in an interagency review of the human data on methylmercury. A scientific workshop scheduled later this year will include review of the most recent studies from the Seychelles Islands and the Faeroe Islands. The purposes of this workshop are to refine the estimates of the level of exposure to mercury associated with subtle neurological endpoints and to further consensus between all of the Federal agencies. Additional information on this upcoming meeting is included in this testimony. After this process, the EPA will determine if a change in the underlying scientific basis for, or the numeric estimate of, the RfD for methylmercury is warranted.

While fate and transport of mercury in the environment is complex, the scientific community agrees that fish consumption is the major pathway for human and wildlife exposure to methylmercury. The data support a plausible link between anthropogenic releases of mercury from industrial and combustion sources in the U.S. and methylmercury in the fish in U.S. lakes and streams. However, these fish methylmercury concentrations also reflect additional sources of methylmercury. These include background concentrations of mercury (which may consist of mercury from natural sources), as well as mercury from previously emitted anthropogenic and natural sources. Given the current scientific understanding of the environmental fate and transport of this element, it is not possible to quantify how much of the methylmercury in noncommercial fish consumed by the U.S. population is contributed by U.S. emissions relative to other sources of mercury (such as natural sources and re-emissions from the global pool). As a result, it cannot be predicted how much nor over what time period a reduction in mercury emissions will result in decreased levels of methylmercury in fish. This is an area of ongoing study.

Critical elements in estimating methylmercury exposure and risk from fish consumption include the species of fish consumed, the concentrations of methylmercury in the fish, the quantity of fish consumed, and how frequently fish is consumed. The typical U.S. consumer eating fish from restaurants and grocery stores is not in danger of consuming harmful levels of methylmercury from fish and is not advised to limit fish consumption. The levels of methylmercury found in the most frequently consumed commercial fish are low, especially compared to levels that might be found in some non-commercial fish from fresh water bodies that have been affected by mercury pollution.

While most U.S. consumers need not be concerned about their exposure to methylmercury, some exposures may be of concern. Those who regularly and frequently consume large amounts of non-commercial fish—either marine fish that typically have much higher levels of methylmercury than the rest of seafood, or freshwater fish that have been affected by mercury pollution—may be more highly exposed. Because the developing fetus is the most sensitive to the effects from methylmercury, women of child-bearing age are regarded as the population of greatest interest. An analysis of dietary surveys led the EPA to conclude that between 1 and 3 percent of women of child-bearing age (i.e., between the ages of 15 and 44) eat sufficient amounts of fish to be at risk from methylmercury exposure, depending on the methylmercury concentrations in the fish. These consumers should be aware of the fish advisories issued by the Food and Drug Administration and various States that suggest limiting the consumption of fish containing higher levels of mercury. Such advisories in the U.S. have been issued by 41 states (including 11 statewide advisories) and by some Native American Tribes, warning against consumption of non-commercial of fish contaminated with methylmercury.

Environmental Impacts

The pattern of mercury deposition nationwide influences which eco-regions and ecosystems will be more highly exposed. Piscivorous (fish-eating) birds and mammals are more highly exposed to mercury than any other known component of natural ecosystems. Adverse effects of mercury on fish, birds and mammals include reduced reproductive success, impaired growth and development, and behavioral abnormalities, and even death.

Mercury contamination of the food web has been well documented. In addition, the endangered Florida panther and the wood stork, as well as populations of loons, eagles, and forbearers as mink and otter have been found to have elevated tissue mercury concentrations. These species are at high risk of mercury exposure and effects because they either are eat fish or eat other fish-eaters. Concentrations of mercury in the tissues of wildlife species have been reported at levels associated with adverse health effects in laboratory studies with the same species. However, field data are insufficient to conclude whether piscivorous wading birds or mammals have

suffered adverse effects due to airborne mercury emissions. Modeling analyses conducted for the Report suggest that it is probable that individuals of some highly exposed wildlife subpopulations are experiencing adverse effects due to airborne mercury emissions.

Mercury Control Technologies

Mercury is widely used in industry because of its diverse properties and serves as a process or product ingredient in several industrial sectors. However, industrial demand for mercury declined by about 75 percent between 1988 and 1996, due largely to the elimination of mercury additives in paints and pesticides and the reduction of mercury in batteries. Most of the emissions of mercury are produced when waste or fuel containing mercury is burned. The EPA has already finalized emission limits for municipal waste combustors and medical waste incinerators. Once these regulations are fully implemented in 2002, emissions from these categories will decline at least 90 percent from 1995 levels. In addition, mercury emission limits have been proposed for hazardous waste incinerators.

The largest remaining identified source of mercury emissions is coal-fired utility boilers. Although a number of mercury control technologies are being evaluated for utility boilers, most are still in the research stages, making it difficult to predict final cost-effectiveness as well as the time required to scale-up and commercialize the technologies. Because the chemical species of mercury emitted from boilers varies from plant to plant, there is no single control technology that removes all forms of mercury. There remains a wide variation in the end costs of control measures for utilities and the possible impact of such costs on utilities. Preliminary estimates of national control costs for utility boilers (based on pilot scale data) are in the billions of dollars per year. Ongoing research, as well as research needs related to mercury controls for utilities, are described in the Report.

In addition, cost-effective opportunities to deal with mercury during the product life-cycle need to be pursued. A balanced strategy which integrates end-of-pipe control technologies with material substitution and separation, design-for-environment, and fundamental process change approaches is needed. Also, international efforts to reduce mercury emissions as well as greenhouse gases will play an important role in reducing inputs to the global cycle of mercury.

Mercury Research Needs

As described above, the Mercury Study Report to Congress identifies mercury as a human health and environmental problem requiring additional scientific and technical research. While mercury has long been known to be neurotoxic, the development of the final Report and its assessment of risk, is an example of an iterative process that by its nature includes a discussion of identified research needed to increased our understanding of the magnitude and extent of the problem. The Report suggests additional research in the following areas:

Effects: Human health effects
  Ecological effects
Exposure: Emissions characterization
  Transport and fate modeling
- atmospheric
- terrestrial and aquatic
- bioaccumulation

  Human exposure assessment
  Ecological exposure
Risk Assessment (Human/Ecological): Risk characterization
Risk Management: Pollution prevention
  Control technology

In addition, other Agency reports (e.g., Great Waters Second Report to Congress—June 1997, Utility Air Toxics Report to Congress—February 1998) stress the adverse impacts of mercury on both human health and the environment. The Agency's Clean Water Action Plan; Restoring and Protecting America's Waters (February 1998) cites mercury as a complex environmental challenge because of its ability to circulate in the atmosphere both locally and globally and eventually biomagnify in the aquatic food web where it is consumed by both humans and wildlife. The Office of Air and Radiation (OAR), the Office of Solid Waste and Emergency Response (OSWER), and the Office of Water (OW) are faced with addressing mercury as part of their regulatory programs. The above Offices, along with a number of other Agency Program and Regional Offices, formed the Mercury Task Force and the Task Force identified cross-office actions to address mercury in the draft Mercury Action Plan that is currently undergoing internal EPA review.

In response to this heightened Agency activity regarding mercury, EPA's Deputy Administrator asked ORD to initiate a research program directed at responding to these activities and supporting the Agency's proposed and future actions on mercury. It was determined that there were several facets in developing a mercury research program including:

1) short-term research needs that required immediate attention and reprioritization of Agency research projects and resources—FY1998/FY1999 Mercury Research Projects; and

2) longer-term research needs for the 2003–2005 time period—Mercury Research Strategy. FY1998/FY1999 Mercury Research Projects

Immediately after the submission of the Mercury Study Report to Congress, the need to examine EPA's current mercury research in light of the Report and other recent mercury-related activities was clear. Was the Agency doing and had the Agency planned the appropriate research that would provide information to reduce the uncertainties detailed in the reports? Was the Agency doing and had the Agency planned the appropriate research that would provide information to the program offices that are faced with addressing mercury as part of their regulatory programs? As a result of these questions, current research projects were examined and immediate research needs for fiscal year 1998 and fiscal year 1999 were identified and subsequently prioritized. These projects are consistent with priorities identified in the Mercury Study Report to Congress and the evolving Mercury Research Strategy, discussed below. ORD has responded with a targeted mercury research program. This research program represents an increased level of effort on which future mercury research initiatives would build. The fiscal year 1998 and fiscal year 1999 research projects include:

Resolve Health Assessments for Methylmercury—This project focuses on resolving issues surrounding mercury exposures associated with adverse health effects, including scientific questions raised when developing reference doses and other quantitative values. This project supports interagency workshops and activities related to resolution of which data sets describing adverse health effects of methylmercury on developmental effects of methylmercury exposure in humans (e.g., Iraqi data, Faeroe Islands data, Seychelles Island data) should serve as the primary data set for revising the RfD, if necessary.

Control Technology Projects—These control technology projects are directed at developing more effective emission controls on coal-fired utilities and industrial boilers, and other stationary sources of mercury emissions including hazardous waste combustors. The projects focus on understanding issues related to speciation of mercury and fundamentals of sorption capture; both being necessary to develop effective control technologies, as well as experimental work on: 1) mercury speciation, characterization, and control in high and low temperature environments; 2) advanced multi-pollutant sorbents for mercury and acid gas capture; and 3) capture mechanisms for carbon-based sorbents.

Community-Based Risk Communication—This project supports continuation of an ongoing cooperative agreement with the State of Wisconsin that determines how women of child-bearing age from ethnically diverse populations obtain and utilize risk communications regarding mercury contamination/health risks of non-commercial fish consumption. Fiscal year 1999 funding supports an intervention study to determine if mercury intakes can be reduced through risk-reduction strategies tailored for women from ethnically diverse groups. An important component of this project is the analyses of hair samples to determine long-term mercury exposures among ethnically diverse groups. The subgroups selected will include persons with high intakes of non-commercial fish and seafood.

NHANES IV-Mercury Biomonitoring—This project will improve information on occurrence of hair and blood mercury levels in the U. S. population. Mercury exposures integrated over time can be assessed through biological monitoring based on hair and blood mercury concentrations permitting EPA to refine estimates of human exposure to methylmercury based on diet and lifestyle.

Continuous Emissions Monitoring for Speciated Mercury—The focus of this project is to assess comparability of results of currently available monitoring equipment that determines concentration of speciated mercury in diverse environmental media. Availability of methods for analyzing speciated mercury in environmental media will improve evaluation of estimates of source contributions.

Mercury Treatment Technologies—These projects are directed at improving control technologies for hazardous waste combustors. Included are testing to evaluate both low-cost retrofit options especially for cement kilns and industrial boilers that burn mercury-bearing hazardous waste and development of technologies other than retorting and recovery to permanently treat mercury-containing hazardous wastes.

Testing of Continuous Emissions Monitors (CEM) for Mercury Emitted from Hazardous Waste Combustors—To support rulemaking to set MACT emission standards for hazardous waste combustors, additional performance tests of CEMs for mercury will be conducted. The first round of testing revealed that the CEMs devices that were tested need additional engineering and then additional field testing to provide sufficient performance data to finalize the 1996 proposal to require mercury CEMS at hazardous waste combustion facilities.

State-of-the-Science Workshop on Mercury—With increased emphasis on the prevention, control, and elimination of mercury pollution, a multi-day "State-of-the-Science" workshop to address current knowledge and future needs relating to mercury releases to the environment will be conducted. It is designed to focus on recent and ongoing research conducted by the Agency, as well as mercury research activities being conducted by others in academia, government, and the private sector. Proceedings from the workshop will be prepared and published. The workshop would be targeted at participants in NAFTA (i.e., Canada, the United States, Mexico) and will focus on domestic and cross-border issues. Target Date: Spring 1999

In addition, the Agency is proposing to fund investigator-initiated grants that are responsive to a "Request for Applications" (RFA) entitled, "Mercury: Transport and Fate Through a Watershed." This RFA is for grants to support fundamental research on mercury fate and transport in the environment and levels of methylation. This project is on an accelerated schedule in order to support OAR, OW, OSWER, and Office of Prevention, Pesticides, and Toxic Substances (OPPTS) regarding their need for new data in this area. ORD will solicit fundamental research on the complex chemical and physical transformations and movement of mercury through the environment. Because of the needs identified in the Mercury Study Report to Congress and other recent Agency reports related to mercury issues, this mercury solicitation has been accelerated in order to more quickly meet the needs of the Agency programs. The outcome of this research will increase our ability to trace mercury from its entrance into the ecosystem through its biogeochemical cycling to the concentration of methylmercury in fish tissue. This will promote the development of risk management strategies based on sound science.

Mercury Research Strategy

As previously discussed, OAR, OPPTS, OSWER, and OW are all faced with addressing mercury as part of their regulatory and voluntary programs. The need for mercury research is specifically identified in the Clean Water Action Plan—Restoring and Protecting America's Waters. ORD is committed to the preparation of a comprehensive, multi-year strategy for mercury research addressing the most pressing mercury research needs of the Agency as part of the action plan.

As described previously, the Mercury Study Report to Congress and other reports (e.g., Great Waters Second Report to Congress—June 1997, Utility Air Toxics Report to Congress—February 1998), initiatives, action plans, etc. have identified research needs. However, particular documents were prepared to meet a specific charge. For example, the Mercury Study Report to Congress primarily dealt with air emissions as a source of mercury and did not address releases of mercury to water. Although the broad research questions posed in the Report apply to many source categories, it is useful to consider all mercury sources in an overall EPA Mercury Research Strategy. The research strategy is envisioned to be a comprehensive document that encompasses a discussion of current and planned research activities and addresses the long-term research needs of the Agency. The strategy will: 1) build on the research work undertaken in the FY1998/FY1999 time frame, 2) help to focus the research needs included in future mercury research initiatives, and 3) identify data that will be needed by EPA to make regulatory decisions and support EPA programs and regions in the period 2003–2005 and propose broad research initiatives/strategies that will close these data gaps between now and 2003–2005. The research strategy identifies needed research on assessing and managing risks from mercury, and supports EPA's Program Offices and Regions by identifying scientific and technical data and information that will assist them in addressing mercury's effects on human and wildlife health. The research strategy was prepared based, in large part, on the research needs identified in the Mercury Study Report to Congress The general research themes for mercury are:

- Hazards of Mercury/Methylmercury to Human Health
- Ecological Effects of Mercury/Methylmercury
- Modeling and Monitoring of Environmental Media for Mercury
- Human and Wildlife Exposures to Methylmercury through the Aquatic Food Web
- Control Technologies for Combustion Sources of Mercury
- Controls for Non-Combustion Sources of Mercury

- International Issues and Transboundary Distribution of Mercury/ Methylmercury
- Risk Communications on Mercury/Methylmercury

The Agency's drain Mercury Research Strategy is currently undergoing internal EPA review. This critical step allows EPA programs and regions to review and comment to both assure that Agency-wide concerns, needs, and issues are addressed and to identify any possible discrepancies, inaccuracies, or errors in the draft document. After internal Agency review, the comments received as a result of that review will be addressed and, if appropriate, incorporated in a revised draft in preparation for the start of external Agency review. The external review draft will be subjected to peer review and public comments, including a related effort to elicit review comments from known stakeholders and interested parties, as well as the other Federal agencies who have been EPA's partners in various mercury-related activities. The external draft will be peer reviewed by an independent expert scientific review panel. External review is expected to begin in November 1998. Following review of all comments from both the expert science panel review and as a result of public review, the draft will be revised to reflect incorporation of those comments, as appropriate. The goal of a final Mercury Research Strategy by Spring 1999 is essential in order for the Strategy to have effective input into EPA's future mercury research initiatives.

Interagency Cooperation to Address Common Mercury Concerns and Coordinate Activities

During the course of the development of the Mercury Study Report to Congress, many Federal agencies and departments were involved in key aspects of the Report. In addition, during the review and comment phase, scientific experts in these Agencies peer reviewed the draft document and provided useful comments. The next step in this continuing dialogue and cooperation in the Federal community on mercury science issues will be an upcoming workshop: "Scientific Issues Relevant to Assessment of Health Effects from Exposure to Methylmercury" on November 18–20, 1998 to be held in Raleigh, North Carolina. The meeting is being organized by the Committee on Environment and Natural Resources and the Office of Science and Technology Policy—The White House, and chaired by the National Institute of Environmental Health Sciences. Representatives from other key agencies are attending and participating including the following:

- Environmental Protection Agency
- Centers for Disease Control and Prevention
- Agency for Toxic Substances Disease Registry
- Food and Drug Administration
- Department of Health and Human Services
- National Oceanic and Atmospheric Administration
- Office of Science and Technology Policy
- Office of Management and Budget

The goal of the workshop is to discuss and evaluate the major epidemiologic studies associating methylmercury exposure with an array of developmental measures in children. Subsequently, the product of the workshop should facilitate agreement on risk assessment issues. The major studies being considered are those which have examined populations in Iraq, the Seychelles, the Faeroe Islands and the Amazon along with the most relevant animal studies for estimating human risks.

While there is no doubt that some issues will remain unresolved and further research will be recommended, the EPA is committed to a timely review of its current position regarding levels of exposure to mercury which are likely to be without appreciable risk for sensitive members of the population (fetus and infants) once Workshop conclusions and recommendations have been received.

The public is invited to attend the meeting as observers. The only limitation on public attendance is space availability. In addition, a public comment session will provide the opportunity for additional views and comments. Oral presentations will be limited to 5 minutes in length to allow for a maximum number of presentations. For more information on the Workshop please see the preliminary program attached to this testimony.

Summary

EPA has been actively engaged in the assessment of the health and ecological effects of mercury exposure for many years. While the scientific community knows a lot about the human health and ecological effects of mercury and mercury exposure, and has agreed that mercury is an important environmental problem, the development of the multi-volume 1997 Mercury Study Report to Congress provided an opportunity to integrate the years of work by the EPA, other Federal agencies, aca-

demia and the private sector into a comprehensive report on the state-of-the-science. The Agency has viewed its work on the health and ecological assessment of mercury as an iterative process that proceeds through assessment, research and data collection, refined assessment, etc. The Report gave substantial impetus to this process. ORD has responded with a targeted mercury research program and the development of a comprehensive, multi-year mercury research strategy. It is important to note, that as the Agency has developed its work on mercury related issues, it has continually coordinated its efforts with colleagues in other Federal agencies and departments, applied stringent scientific peer review, and benefited from public input.

Mr. Chairman, this concludes my written statement. I would be happy to answer any questions that you might have.

RESPONSES BY WILLIAM FARLAND TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. Do you agree that the fish consumption studies, rather than the Iraqi grain studies, more closely resemble the situation here in the U.S. that health agencies should be concerned with?

Response. Methylmercury from both grain and fish is highly big-available (over 95 percent absorption from either source) and methylmercury from either food source has produced devastating neurological damage among humans ingesting either of these sources. The short-term, high-level exposures that caused harm in the Iraqi outbreak far exceed the levels of exposure seen among typical U.S. consumers who chronically are exposed to methylmercury from fish in their diet. In that sense, the fish consumption studies more closely resemble the situation here in the United States. Although about 10 percent of the U.S. population rarely eat fish, the top 1 percent of the population eat fish almost every day and have hair mercury levels that approach the average levels found in fish-eating populations in the Seychelles and the Faroes. In addition, there are other U.S. groups that episodically consume large amounts of fish.

The severity of adverse health effects from frequent ingestion of fish depends on the fish methylmercury level and other contaminants that may be in fish. In Japan, disastrous neurological effects to the fetus occurred after long-term ingestion of fish containing high levels of methylmercury. Also, among people living in the Amazon River basin, preliminary evidence has been gathered on possible adverse effects on visual function following long-term methylmercury ingestion from fish containing lower levels of methylmercury than seen in Japan. However, a number of uncertainties in this study will need to be resolved before clear conclusions can be drawn. Adverse health effects detectable with sophisticated testing methods have also been documented in the past few years among people living in the Madeira Islands, as well as in the Faroe Islands. Additional highly suggestive findings supporting adverse effects of methylmercury from fish on cognitive and neuro-behavioral development have been described among fish consumers living in New Zealand and members of Native American tribes with high levels of fish consumption. The exposure levels associated with these findings may be comparable to exposure levels among groups with high levels of fish consumption in the United States. Therefore, all of these studies are relevant to evaluation of mercury health and environmental effects, and all data, including those from the poisoning incidents, must be considered.

Question 2. What specific information is needed in order to have a better scientific understanding of mercury and its health and environmental impacts?

Response. EPA is developing a Mercury Research Strategy that describes our view of research needed to: (1) understand fate and transport of mercury once released into the environment; (2) more extensively document the degree of contamination of methylmercury in fish and other seafood; (3) better understand variability in human biokinetics of methylmercury so that variability in human response to methylmercury is better understood; (4) more thoroughly identify control technologies that permit us to limit release of methylmercury to air and water, and (5) allow improved interagency assessment of health effects. This research strategy is anticipated to be completed during the second or third quarter of fiscal year 1999.

Additionally, we will establish the levels of methylmercury in a representative sample of U.S. women of reproductive age and in children less than 5 years of age, by measuring mercury in hair and blood of persons participating in the Fourth National Health and Nutrition Examination Survey (NHANES IV), conducted by the Centers for Disease Control and Prevention (CDC). This effort is sponsored by seven Federal agencies: EPA, CDC, FDA, National Institutes of Environmental Health Sciences (NIEHS), Department of Health and Human Services (HHS), National Oceanic and Atmospheric Administration and Department of Energy. This information will be used by public health officials to establish policies relative to methylmercury

exposure based on risk assessments using actual biomarker data. Mercury levels in individuals will be correlated with data on fish consumption. The study results should be available in 3 years.

Question 3. Given the testimony received during the hearing, regarding the incompleteness of the scientific understanding of mercury, isn't it prudent to vigorously pursue scientific research which addresses the unresolved issues of mercury speciation, and the transport, fate, and effects of elemental mercury? Wouldn't it also be prudent to have a coordinated Federal effort which, among other things, determines the appropriate level for a mercury exposure reference dose?

Response. The overall nature of mercury cycling in the environment is clear: air emissions of mercury are carried in the atmosphere, deposited to land and water locally and at large distances from the source, and there is a plausible link of such emissions to accumulate as methylmercury in fish. Mercury deposited to land and water can be re-emitted and reenter the global circulation to be deposited elsewhere and can also be stored in soils and sediments. This movement of mercury through different environmental media is called the mercury cycle. The amount of mercury in biota is ultimately a function of the overall mercury burden in the air as well as direct discharges to water and soil. The physical, chemical, and biological processes involved in the mercury cycle are extremely complex and are not understood in detail at this time.

In order to improve our understanding of mercury cycling, EPA and other agencies are undertaking a number of investigations. These include EPA sponsored research to provide an enhanced understanding of mercury fate and transport, and pollution prevention and control options. The EPA is developing a comprehensive strategy for mercury research which will be peer-reviewed and completed in fiscal year 1999. Information that EPA is collecting this year on the species of mercury emitted by the largest source of mercury emissions coal-fired electric power plants will also help us to better understand mercury transport. The US Geological Survey is conducting air and environmental monitoring to better characterize deposition of mercury in sensitive environments. Also, along with other Federal agencies, EPA is funding the National Health and Nutrition Examination Survey, described previously, to establish levels of mercury exposures in a representative sample of women and children in the United States. EPA participated in a workshop that was sponsored by the National Institutes of Environmental Health Sciences to bring outside experts together to discuss recent research on the health effects of mercury. EPA is currently funding a review of the mercury heath science by the National Academy of Science. Based on their work, the Academy will provide recommendations to EPA regarding the reference dose.

RESPONSES BY WILLIAM FARLAND TO ADDITIONAL QUESTIONS FROM SENATOR CHAFEE

Question 1. In your testimony, you say that the scientific community agrees that mercury is an important environmental problem. What supports this assertion and at what point in the scientific discussion of mercury do the uncertainties overtake the general agreement?

Response. Mercury contamination can result in neurological damage to wildlife and people. During the 1 950's and 1 960's large numbers of birds died following their ingestion of mercury treated grains. Several human poisoning episodes have occurred. Methylmercury poisoning from fish in Minamata, Japan is prima-facie evidence that devastating human health damage can result from uncontrolled release of mercury into environmental media resulting in excessive human exposure. In Iraq, in the early 1970's, methylmercury poisoning from seed grains treated with methylmercury killed hundreds and seriously harmed thousands of people. The Iraqi medical authorities investigating this poisoning knew immediately that what they saw was methylmercury poisoning; they had seen the symptoms previously in two preceding methylmercury poisoning episodes in Iraq. In the 1 990's, adult human methylmercury poisoning in the Amazon River basin followed mercury contamination of the aquatic food web following use of mercury to extract gold in mining operations.

Environmental contamination and human exposure do not occur only from use of mercury as a pesticide, fungicide, or from large scale industrial releases to water. Mercury may also be released to the air. The U.S. Environmental Protection Agency (EPA) estimates worldwide anthropogenic emissions (resulting from human activities) to air at about 4,000 tons per year (158 tons from U.S. sources), with about half the emissions joining the global pool and about half depositing locally and regionally. Eventually mercury emitted to the air is deposited to land and water. EPA's 1997 Mercury Study Report to Congress concluded that there is a plausible

link between mercury emissions, if transformed to the methylated form, and levels of methylmercury observed in fish and other aquatic creatures used as food by people and wildlife.

As a precautionary measure, 40 U.S. states have issued fishing advisories based on mercury contamination. Although the bases for fish advisories vary from state to state, including many that cite the RfD based on the Iraqi data, 11 states have judged that advisories are warranted on every freshwater body in the state and five states have advisories on their coastal waters which are at least partially due to methylmercury. Freshwater fish in the U.S. occasionally may have methylmercury concentrations exceeding those that would cause the Food and Drug Administration (FDA) to remove them from interstate commerce. The FDA action level for mercury was based on avoiding clinically observable effects on the adult nervous system. The developing human fetus is more sensitive to methylmercury than the adult and population-based decrements in the cognitive function of children exposed in utero to methylmercury occurs at lower exposures than do clinically obvious neurological impairments.

Uncertainties remain about the precise level of methylmercury that one can consume on a daily basis without expectation of harm. There is known variability in human metabolism of and responses to methylmercury. In addition there are data gaps concerning the long term consequences of subtle neurotoxic effects. There are gaps in knowledge of sources and pathways of mercury in the environment. However, qualitatively, there is no debate as to whether mercury is an environmental problem. There is scientific consensus that methylmercury is a well-documented human fetal neurotoxin. There is general agreement that mercury exposure causes some changes in the central nervous system. The only remaining question is how much exposure to this toxic substance can be allowed without adversely affecting children's development.

Question 2. The ongoing Faroe and Seychelles studies appear to be reaching different conclusions regarding the potential for low-dose mercury exposure to harm a developing fetus. Why, in your view, are the results from these studies different?

Response. The Faroe Islands and Seychelles Islands investigations are both well-designed, prospective, longitudinal studies that aim to address the consequences of low-dose exposures to methylmercury. The results of these two studies are actually more consistent than one might be led to believe by the popular press. Although, the overall methylmercury toxicity data base supports the biological plausibility of the findings of adverse outcomes associated with methylmercury exposure from the Faroe Islands cohort, a number of potentially confounding variables in this study population, notably the concomitant exposure to PCBs (another developmental toxin), add uncertainty to the interpretation of this study. The most recently published data from the Seychelles Islands cohort finds no adverse effects of methylmercury. However, children in the two cohorts were examined at different ages using different neurobehavioral tests. To better understand the comparability between these studies, children in the Seychelle Islands cohort are being reexamined at the same age as children who were tested in the Faroe Islands using the same neurobehavioral tests. The results from these followup examinations will shed further light on the differences and similarities of the results from these studies. This work is currently under way. An additional possible explanation for some differences in observed effects is that the rate, intensity, or duration of methylmercury exposure may differ between the Seychellois and the Faroese cohorts in a way that increased the likelihood of adverse effects among those with the Faroese exposure patterns. Unlike the Seychellois, the Faroese also consume marine mammals, most specifically pilot whales, which contain elevated levels of PCBs and methylmercury. In addition, both the Seychellois and Faroese cohorts are from isolated island groups that are widely separated geographically. It is possible that there are sufficient genetic differences among human subpopulations in susceptibility to the neurological damage from methylmercury exposures to explain the different findings. Because both groups consume large amounts of fish, it is unlikely that the beneficial effects of fish consumption is a major difference between the Seychellois and Faroese cohorts.

RESPONSES BY WILLIAM FARLAND TO ADDITIONAL QUESTIONS FROM SENATOR LEAHY

Question 1. Has EPA validated the methodology used to statistically evaluate the findings in the Seychelles study?

Response. The EPA has not yet examined the primary data to do a statistical reanalysis of the Seychelles Islands data and has not independently validated the methodology used in the analyses of the Seychelles data by the University of Roch-

ester investigators. In the November 18—20 meeting, which was convened by NIEHS, one of the expert panels addressed statistical issues for all of the studies. The meeting report will include a discussion of this issue. There are not at this time established plans to independently validate the statistical methodology.

Question 2. How did EPA consider published studies in populations other than in Iraq, the Seychelles, and the Faroe Islands?

Response. EPA's current Reference Dose for methylmercury was established in 1994 prior to release of any data on association of methylmercury with neurological changes from either the Seychelles or Faroe Islands populations. It was published on the Agency's EPA's Integrated Risk Information System (IRIS) in 1995 and later included in the Mercury Study Report to Congress which was released in 1997. Dose-response estimates were based on data from the Iraqi study which was considered the best available data set in 1994. EPA's Science Advisory Board considered these Iraqi data, as well as other data from the Amazon River basin, in conjunction with the data from the Seychelles and Faroe Islands, when it reviewed EPA's reference dose in 1997. The predominant human health study establishing the adverse effects of methylmercury from fish in human populations were those data coming from the outbreaks in Minamata and Niigata, Japan. Suggestive evidence also came from the neurodevelopmental evaluation of New Zealand children whose mothers consumed fish containing methylmercury during pregnancy and from a similar assessment of the Cree Indian tribal group. Studies from these three geographic areas confirmed that adverse neuro-developmental consequences were associated with increased intakes of methylmercury (including consequences when fish was the source of methylmercury). These studies did not permit an estimate of dose-response because of the way the data were collected and reported.

Question 3. States have expressed concern that Federal actions to raise the reference dose for mercury in fish may destabilize carefully crafted state public health programs to warn the public about the hazards of mercury. For example, a recent national news program reported that the hazard from mercury in fish is overstated based on a news release from the University of Rochester study. What steps can be taken by EPA and other agencies to correct any mix-impressions that the public may have about whether the Rochester study represents the official position of the Federal Government?

Response. EPA agrees that it is important to correct any mix-impressions that could have arisen from the University of Rochester press release. EPA developed its own statement saying that its position would await analysis of the study results in light of other data. EPA and agencies from HHS (e.g., Agency for Toxic Substances and Disease Registry [ATSDR], FDA, CDC) issued a combined statement after the November 18–20 meeting on the status of various study results and that the University of Rochester research teams continue to monitor the children in the Seychellois cohort using additional testing methods (e.g., ones from the Faroes study). The statement clarified the role of the University of Rochester study, as well as additional studies (e.g., the Faroese study and possibly the Amazon studies), regarding effects of methylmercury on children's cognitive development at exposures that are within the upper ranges of exposures occurring in the U.S. at this time.

STATEMENT OF GARY MYERS, UNIVERSITY OF ROCHESTER, ROCHESTER, NY

Thank you for the opportunity to present the views of our research group which has been studying the health of methylmercury (MeHg) exposure for over 25 years. Mercury is a natural element in the earth's crust, active chemically, and excess exposure to most forms is toxic to the human nervous system. Methylmercury is especially dangerous. The following summary presents our view on the effects of MeHg exposure from fish consumption on child development.

Mercury Poisonings

In the 1950's industrial pollution in Japan resulted in high levels of MeHg in ocean fish and several thousand cases of human poisoning from consuming the contaminated fish. The exact level of exposure was never determined, but it was thought to be very large. During that epidemic some pregnant women who were exposed had few or minimal symptoms of poisoning, but their babies were born with brain damage and many had cerebral palsy, mental retardation, and seizures. This suggested that MeHg crosses the placenta from the mother to the fetus and that the developing nervous system was especially sensitive to its destructive effects.

In the early 1970's another epidemic of MeHg poisoning occurred in Iraq where people ate seed grain coated with a MeHg fungicide. Our research team studied the children of about 80 women who were pregnant during this outbreak and consumed

varying amounts of MeHg. We measured the mothers' exposure, examined the children, and concluded that there was a possibility that exposures as low as 10 ppm in maternal hair might be associated with adverse effects on the fetus. This value is 10 times the average in US, but a value seen in fish eating populations.

Mercury found naturally in the environment

In aquatic environments bacteria can convert inorganic mercury to MeHg. Once MeHg enters the food chain, it is bioaccumulated, and all fish have small amounts in their flesh. Predatory fish or mammals such as whales have the largest amounts. Most commercial oceanic fish in the US has < 0.5 ppm MeHg, but some freshwater fish have 2–3 ppm. Fish in Japan had up to 40 ppm.

People who consume fish are exposed to MeHg, and regular fish consumption can lead to hair mercury levels of 10 ppm or higher. The average hair mercury level in the US is < 1 ppm. If MeHg does affect the developing brain at such low levels, mothers who consume large amounts of fish would be exposing their babies to this risk.

Since the toxic effects of MeHg from fish consumption were not scientifically proven, we decided to investigate the question directly. We initiated the study of a sentinel population for the US in 1987.

The Seychelles Child Development Study (SCDS)

The SCDS is a collaborative study carried on by researchers at the University of Rochester Medical Center in Rochester, NY and the Ministries of Health and Education in the Republic of the Seychelles. Funding has come from the National Institute of Environmental Health Sciences, the Food and Drug Administration, and the governments of Seychelles and Sweden. The study has been in progress for over 10 years. The Republic of the Seychelles is an island nation in the Indian Ocean off the East Coast of Africa.

Our study was designed to determine whether prenatal exposure to MeHg from consumption of a fish diet is associated with developmental effects. The team's original hypothesis was that MeHg at levels achieved by regular maternal consumption of fish would be associated with adverse effects on child development.

The Seychelles was chosen partly because they have high levels of fish consumption. The Seychellois usually eat fish twice a day. The average mercury content of fish in Seychelles is 0.3 ppm and that is similar to ocean fish purchased commercially in the United States. There is no mercury pollution in Seychelles and many things that complicate studies of low level exposure are not present. Health care is free, universal and readily available. Prenatal care is nearly 100 percent, the birth rate is high, and the general health of mothers and children is good. Education is free, universal, and starts at 3/ years of age. There is limited emigration and both the people and the government are cooperative and supportive.

The study design was carefully planned since detecting the lowest effect level of any toxin requires looking for very subtle differences between children with no or very low exposures and those with higher ones. These differences are often detectable only statistically. To minimize any possibility of bias, a number of decisions were made before the study began. First, the study would be double blind. Neither the clinical team nor the families know the level of any child's exposure. Second, children with a known cause of developmental delay such as meningitis, very low birth weight, or brain trauma were excluded. Third, the test battery included tests previously reported to show associations with MeHg exposure, tests used with other toxic exposures, and tests that might detect subtle changes. Fourth, all testing was performed in age windows to minimize the effect of age on test interpretation. Fifth, multiple complicating factors (covariates) were studied. Sixth, the data analysis plan was determined before the data were collected to minimizes the possibility that the data will simply be analyzed until one finds the expected effect.

The SCDS main study involves over 700 mothers and children who were enrolled during by me during the year I lived on Mahe. They have been evaluated regularly for over 5 years. Prenatal exposure was measured in mothers' hair levels during pregnancy, and postnatal exposure was measured in the children's hair at 5½ years of age. Both ranged from 1 to 25 ppm. Evaluations have been completed at 6, 19, 29, and 66 months of age. The children's homes were evaluated when they were about 4 years old. Presently evaluations are being done at 96 months of age (8 years).

The results of the SCDS so far indicate no adverse developmental effects from prenatal MeHg exposure in the range commonly achieved by consuming large amounts of fish. Through 66 months of age we have examined the association between 36 primary test outcomes and the children's prenatal mercury exposure. Only one test showed an association with higher mercury exposure, and we are unsure

if this effect is adverse. The test was a subjective evaluation of the children's activity level during the evaluation, and in males the activity level declined as MeHg exposure increased. Additionally, a number of secondary endpoints have been examined and no adverse associations with MeHg have been found.

We have also examined the association between the children's postnatal MeHg exposure and the 6 primary test outcomes at 5/ years of age. With several of these outcomes the children did slightly better as the MeHg increased. This cannot be due to the MeHg, so we believe that the MeHg level may simply be a marker for fish consumption at these low exposures. This may confirm our understanding that fish contains nutrients such as omega–3 fatty acids that are important for brain development.

Our interpretation of the findings

Our studies in Iraq raised the possibility that MeHg exposure from eating fish might adversely affect development, but we do not believe the SCDS has demonstrated an adverse association through the first 5.5 years of life in this population. We consider the Seychelles an appropriate sentinel population for the US since they consume large amounts of fish, the MeHg content of the fish is similar to that of commercially available fish in the US, and the health and welfare of the people are similar.

Fish is an important source of protein in many countries, and large numbers of mothers around the world rely on it for proper nutrition. The mothers' nutrition is very important to the baby's wellbeing. Not one person of any age has been reported with MeHg poisoning from eating fish since the poisonings in Japan during the 1950's and 60's.

The nutrients that fish contains may be important for brain development. For older individuals, fish appears to have cardiac benefits and mental health benefits. Fish consumption is increasing in developed countries including the United States. We believe it would be unwise to limit fish consumption without convincing scientific evidence that exposure at the levels seen with fish consumption is harmful.

The SCDS is continuing, and as the children get older increasingly specific tests can be performed. We are presently completing evaluations at 8 years of age and planning more at 12 years of age. Findings will be reported as they are available.

APPENDIX

Because of the public health importance of the question being studied by the SCDS, the potential exists for differing opinions of scientific findings to become highly politicized. The SCDS has received only one published criticism (JAMA, 280:737, 1998), but other points have been raised at conferences. These questions are addressed here individually.

Why did the SCDS measure mercury in the hair rather than in the blood? Hair mercury was used because it is the standard measure used in nearly all other studies of this question. It was also chosen because blood tests are unnecessarily invasive, reflect only recent exposure rather than exposure over time, and can fluctuate widely depending upon recent meals.

Did the SCDS use subjects whose mercury values were too low to detect an association?

The study's goal was to see if the children of women who consume fish regularly were at risk for adverse developmental effects from MeHg. Women in Seychelles eat fish daily and represent a sentinel population with MeHg levels 10 times higher than US women. Their children are more likely to show adverse effects if they are present. These children show no adverse effects through 5½ years of age suggesting that eating ocean fish when there is no local pollution is safe.

Did the SCDS use the best tests available to detect developmental problems? The SCDS used the same developmental and psychological tests used in most other developmental studies. These tests are deemed to be excellent measures for determining development at the ages studied. As the children become older, additional tests with more specificity are being used.

Did the SCDS find expected associations between developmental problems and birth weight, socioeconomic factors, and other covariates? The study was not designed to examine such relationships. Some children with such problems (i.e., head trauma, very low birth weight, etc.) were excluded from the study because they are so frequently associated with developmental problems. However, many expected relationships were found.

Did the removal of statistical outliers in the analysis bias the study? No. It is standard practice to remove statistical outliers, which are values that are inconsistent with the statistical model employed to analyze the data. Every statistical analysis depends on a model, and every statistical model makes assumptions about the

statistical (distributional) properties of the data that must be satisfied if the results of the analysis are to be correct. Sound statistical practice requires that the necessary assumptions be checked as part of any statistical analysis. Examination of outliers constitutes one of these checks. Statistical outliers are defined by the difference between the actual test score for a child and the value predicted by the statistical model. Small numbers of such outliers occurred in test scores for children with widely varying MeHg exposures. In fact the results of the analysis were examined both before as well as after the removal of outliers, and for analyses in the main study they had little effect.

What about the Faroe Islands study where prenatal MeHg exposure was reported to adversely affect developmental outcomes? Questions about the measure of exposure, concomitant exposures, and the statistical analysis have been raised about the Faroes study. Exposure was measured in both umbilical cord blood and maternal hair. Associations with cord blood mercury levels were reported, but these are difficult to interpret since levels vary with recent meals and their relationship to exposure during the earlier parts of pregnancy is unknown. The main source of MeHg was consuming whale meat and blubber and they also contain high levels of PCBs, inorganic mercury, and other toxic compounds. In addition, the authors have not reported the details of the statistical analysis that led to their conclusions.

- Are the children in Seychelles too developmentally robust to find the effects of MeHg if they are present? Children in Seychelles tested similar to US children on nearly all measures apart from motor skills where they were more advanced. There is no reason to think that they are too robust to show the effects of MeHg if any are present.
- Are children in Seychelles exposed to PCBs or other toxins? Sea mammals are not consumed in Seychelles and measured PCBs in the children's blood were low.

Should data from the Seychelles be considered interim? No. Among developmental studies, a 5-year follow-up is considered quite good, and adequate to identify most toxic exposures.

RESPONSES BY GARY MYERS TO ADDITIONAL QUESTIONS FROM SENATOR CHAFEE

Question 1. Why have researchers chosen to study "sentinel" populations outside the United States rather than directing the rather significant resources of the Seychelles study toward an actual population of U.S. residents that have a high fish consumption diet—especially a diet based on fish from the lakes and streams in this country for which concerns over mercury levels have already been expressed?

Response. The clinical study of human populations with low level exposure to toxins presents many problems to the researcher. In order to detect subtle differences between individuals exposed and those not exposed, it is necessary to have a large population in which individuals have an appropriate range of exposure levels. These individuals must be as similar as possible with the exception of the exposure. In addition, it must be feasible to actually study the individuals (obtain their cooperation, test them, etc.). This is very difficult if there are only a few in each locality, which is the case in the United States where relatively few people consume freshwater fish on a consistent basis and they are widely scattered. Appropriate populations are in general very difficult to find. In the case of mercury exposure it is very difficult to find an adequate population to study in the United States since fish consumption is not very high. However, ocean fish consumption in some other countries is quite high and therefore they can serve as sentinel populations for the United States.

The research must be precise enough to detect a very subtle effect and also to rule out other factors that might cause a similar effect. In addition, findings that result from chance variation need to be excluded. It can be very challenging to detect the effects of low levels of exposure that can easily be influenced by bias within the study. This bias can be introduced at many levels in the study and can influence the findings without the researcher even being aware of it. Consequently, it can be difficult for the scientist to determine if the findings or lack of findings are truly related to the exposure being studied, to some other exposure, or are an artifact.

Additionally, following epidemiological studies the scientist can only say that an association was found. It is not possible to state that the exposure is the actual cause of the findings.

Question 2. The ongoing Faroe and Seychelles studies appear to be reaching different conclusions regarding the potential for low-dose mercury exposure to harm a developing fetus. Why, in your view, are the results from these studies different?

Response. The two studies are very different even though they are trying to answer the same scientific question. The Faroe Islands are in the North Atlantic near the arctic circle while the Seychelles are in the Indian Ocean almost on the equator. In addition to geographic differences, there are differences between the two populations in diet, exposure to other toxins, social structure of the society, and many other factors. In addition, the study designs are quite different with the Seychelles being a longitudinal study with the children tested at regular intervals starting at 6 months of age while the Faroes is a cross-sectional study with one extensive testing period at age 7 years.

The interpretations of these two studies are indeed different. Although there may be many factors, we believe that the following may explain some of these differences. First, exposure to mercury in the Faroes is primarily from consumption of whale meat and blubber while that in Seychelles is from consuming ocean fish. Whales are at the top of the food chain, have higher levels of mercury and accumulate other toxic materials beside mercury such as PCBs, dioxans, furans, etc. It is not clear if these additional exposures have been fully accounted for in the published studies from the Faroes. Second, the biological measure of mercury exposure used in the Faroes was a cord blood determination of mercury. Previous studies have measured exposure in hair as the biological marker. Blood values for mercury may vary significantly in relation to recent meals that contain mercury and cannot reflect the exposure during earlier parts of the pregnancy that could be significantly higher. The Faroes researchers also measured mercury in hair, but they did not find any significant association with their outcomes. They interpret the association between blood mercury and outcomes to mean that blood is a better marker for exposure, but this is circular reasoning. The fact that statistical associations between cord blood mercury and outcomes were found is not a valid reason by itself to choose blood mercury as the marker. Third, the statistical procedures used to determine associations between exposure and outcomes have not been clearly elucidated by the Faroes investigators. When studying very subtle effects, the statistical procedures used become very important since if a researcher examines enough models, some will show an association by chance.

RESPONSES BY GARY MYERS TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. Do you agree that the fish consumption studies, rather than the Iraqi grain studies, more closely resemble the situations here in the United States that health agencies should be concerned with?

Response. We believe that the fish consumption studies from the Seychelles Islands are more relevant to the United States than the study of poisoning from grain in Iraq. The Iraq study followed an acute poisoning episode with very high doses of methylmercury. We also believe the Seychelles study is more relevant than the study from the Faroe Islands since there is virtually no consumption of whale meat and blubber in the United States. While PCB co-contamination of fish is more likely in the United States than in the Seychelles, which enhances the relevance of the Faroe Islands exposures, the difference in the exposure source and its other components (such as selenium and omega–3 fatty acids) make the Seychelles study, on balance, a better model for United States exposures.

The issue of concern for the United States is whether small amounts of methylmercury present in fish can cause neurological effects. There are many substances that are toxic in large amounts that the human body can tolerate in small amounts with no ill effects.

The only poisoning episodes in humans due to consumption of methylmercury in fish are those that occurred in two local areas in Japan during the 1950's and 1960's. In these cases fish levels were 10 times higher than those in ocean fish due to heavy local contamination by factories releasing methylmercury. There have been no subsequent reported cases of methylmercury poisoning from consumption of fish where mercury was naturally methylated in the environment. This does not preclude that there may be some subtle alterations of neurological functioning at low levels of methylmercury exposure. However, it suggests that there is not serious risk and that if a risk is present it is likely to be very small alterations in neurological function.

Question 2. What specific information is needed in order to have a better scientific understanding of mercury and its health and environmental impact?

Response. We know that large amounts of methylmercury can be toxic to the nervous system, that mercury has no known use in the human body, and that all fish contain small amounts of methylmercury. We also know, however, that fish contain high levels of omega 3 fatty acids that are essential building blocks for the fetal

and neonatal nervous system. In addition, fish contain selenium that may be protective against the many deleterious effects of mercury.

We do not know for certain whether the small amounts of methylmercury present in fish have deleterious effects, but the beneficial health effects of fish consumption are well documented. It is important to determine the relative benefits or hazards of each of these 3 components of fish (methylmercury, omega 3 fatty acids, and selenium) before recommending any change in fish consumption to the public. We ar' presently planning to assess these 3 components of fish in a careful prospective study of children in the Seychelles Islands. This study should help in determining the relative health impact of these three factors.

Question 3. Given the testimony received during the hearing, regarding the incompleteness of the scientific understanding of mercury, isn't it prudent to vigorously pursue scientific research which addresses the unresolved issues of mercury speciation, and the transport, fate, and effects of elemental mercury? Wouldn't it also be prudent to have a coordinated Federal effort which, among other things, determines the appropriate level for a mercury exposure reference dose?

Response. We believe that there are a number of unanswered scientific questions related to methylmercury exposure that should be addressed by research. Our present state of knowledge is not optimal for adequately advising the public about the public health consequences of consuming large amounts of fish. A coordinated Federal effort to address the many issues surrounding fish consumption and human exposure to mercury, fatty acids, and selenium from this source would be very helpful. Such an effort should be coordinated through the National Institute of Environmental Health Sciences (NIEHS) so that the scientific quality can be maintained at the highest standard.

The NIEHS is already taking the lead in a couple of key interagency activities. On November 18–20, 1998 they will host a meeting on ''Scientific Issues Relevant to Assessment of Health Effects from Exposure to Methylmercury'' which has as a goal the definition of the most important data gaps and research needs in this area. There is also a surveillance/ exposure assessment effort underway between NIEHS, the Centers for Disease Control and Prevention, and other agencies to get the data we need to determine the actual levels of methylmercury in people's bodies here in the United States. Both of these are truly trans-agency initiatives.

RESPONSES BY GARY MYERS TO ADDITIONAL QUESTIONS FROM SENATOR LEAHY

Question 1. Will the results of the reevaluation of the Seychelles cohort using the methods used in the Faroe Island cohort be published as a journal article? When can we expect the reevaluation to be completed?

Response. The evaluations of the Seychelles cohort that have been completed so far have all been published in peer reviewed scientific journals. We anticipate that the results of future studies will also be published.

We have already published studies using methods similar to those used in the Faroe Islands and have not found adverse effects of methylmercury exposure from the consumption of oceanic fish.

We are presently evaluating the Seychelles cohort as they turn 8.5 years of age and included in that test battery are further tests that are similar to those done in the Faroes. This phase of testing will be completed early in 1999. The data will be analyzed as quickly as possible, but these analyses are complicated and the results will probably not be available until late 1999 or early 2000.

Question 2. For the various studies that the University of Rochester has conducted or participated in, and specifically the Iraq and Seychelles studies, please describe and discuss how the peak and average hair mercury levels during pregnancy were measured and used to correlate with effects in mothers and children?

Response. A segment of scalp hair is selected that grew during the period of pregnancy. One must take into account a hair growth rate of about 1 centimeter per month and a delay period of about 20 days corresponding to the time for mercury to travel from the blood to the first centimeter of hair next to the scalp. Thus a length of hair of approximately 9 cm corresponds to the period of pregnancy when collected some 20 days after delivery.

In Iraq we measured mercury in single strands of hair by a technique developed in our laboratory, X-ray fluorescent spectrometry. Because it was a new technique, it was calibrated against more commonly used techniques such as cold vapor atomic absorption. This technique measures short lengths of hair, about 2 mm, step by step along the 9 centimeter segment. This gives a detailed recapitulation of exposure

during pregnancy. The highest 2 mm segment was taken as the peak level during pregnancy.

These peak values were used as the basis of determining the relationship between adverse developmental effects in children and mercury levels in the mother during pregnancy. These data were used by the EPA in the recent report.

In the Seychelles, the mercury levels were much lower than those found in Iraq. It was necessary to used bunches of scalp hair (about 50 strands) instead of the single strand measured in Iraq. To measure bunches of hair, we used cold vapor atomic absorption, a technique in use in our laboratory since the 1960's. The entire 9 centimeter segment was measured giving an average level during the period of pregnancy. However, we also analyzed over 50 samples centimeter by centimeter giving a month by month recapitulation during pregnancy. In this case, the maximum one centimeter segment is taken as the peak value. We have found that, on the average, the peak monthly value is about 50 percent higher than the average level during pregnancy. This agrees with studies on other fish eating populations.

We also observed that the peak levels are closely proportional to the average levels so that using peak or average levels would not affect the correlation between mercury levels and the results of our neuropsychological performance tests.

The highest group in the Seychelles has hair in the 12–15 ppm concentration range based on average levels. The corresponding peak levels would be in the 18 to 22.5 ppm range. This makes the Seychelles an excellent sentinel population as average US hair levels are below 1 ppm.

Question 3. Were the peak hair mercury levels seen in the Seychelles study high enough, and in a sufficient portion of the study population, to reveal adverse effects that might be expected based on the findings and conclusions from the Iraqi exposure studies?

Response. The methylmercury exposure of the mothers in the Seychelles cohort is several times that of women in the United States, but lower than that of women poisoned by methylmercury treated grain in Iraq. Our study from Iraq suggested that we might find adverse effects at the exposure levels being studied in the Seychelles Islands. The exposure levels being studied in Seychelles are higher than those reported from the Faroe Islands where researchers studying mercury exposure from the consumption of whales report they are finding associations between exposure and outcomes.

Based on our findings in Iraq, we believe that the exposure levels in Seychelles are sufficiently high that the Seychelles cohort can serve as a sentinel population for mercury exposure from fish in the United States.

STATEMENT OF TIM EDER, DIRECTOR, GREAT LAKES NATURAL RESOURCE CENTER, NATIONAL WILDLIFE FEDERATION

Introduction

On behalf of over 4 million members and supporters around the country, the National Wildlife Federation ("NWF") is pleased to have the opportunity to present this testimony to the Senate today in support of legislation sponsored by Senator Leahy, S. 1915, and on the need for Congressional action to address the problem of mercury contamination in waters of the United States. Our members are active in hunting, angling, birdwatching and other outdoor activities, and care deeply about the health of our environment.

Our members are concerned about the health of people that enjoy or depend on catching and eating fish. We are especially concerned about segments of the U.S. population that are more sensitive to toxic chemicals, including populations of young children, pregnant women, and women of childbearing age. Information to be presented in this testimony shows that the health of these groups may be compromised or seriously damaged due to exposure to mercury and other toxic chemicals. Also, we understand that for wildlife to thrive, they need clean and healthy habitat. This includes protection from exposure to toxic chemicals like mercury that can impair their reproductive capacity, their ability to hunt and capture prey, and other abilities. In fact, NWF members and supporters care enough about mercury that two resolutions dealing with mercury issues have been approved at Annual Meetings in the past 2 years. In Resolution No. 2 for 1996, the Federation adopted a resolution addressing the atmospheric deposition of pollutants to the Great Lakes, Lake Champlain, and other Great Waters. The resolution includes a call for the U.S. Environmental Protection Agency to create a plan with a nationwide goal and time lines to reduce atmospheric mercury deposition by 90 percent by the year 2005. NWF Resolution No. 7, adopted in 1997, addresses energy deregulation, and supports state and Federal legislation that requires "all fossil fuel burning power plants to

comply with new source performance standards contained in applicable state and Federal air pollution laws.''

Mercury is a toxic metal that is being increasingly recognized as a threat to the health of numerous wildlife species and tens of thousands of women and children around the country.

The most significant sources of the metal in the U.S. environment include coal-fired power plants and incinerators emitting mercury to the air. After finding its way into water bodies, mercury can build up in the food chain, leading to high concentrations in fish that can then expose certain wildlife and people to the metal. The fact that 40 state health departments have issued fish consumption advisories warning certain populations to limit the amount of fish they eat due to mercury exposure indicates the severity of the problem.

While there has been some progress in dealing with several mercury sources in the past few years, much more work needs to be done to fully address the ever-present problem of mercury contamination in the U.S. and beyond. Senator Leahy's Omnibus Mercury Emissions Reduction Act is a necessary start in this effort, and an effort that we believe Congress should enact.

Mercury in the Environment, and its Ecological and Human Health Effects

While mercury occurs naturally in the environment, most studies have shown that mercury levels have increased appreciably in the recent past due to human activity. Since the beginning of the industrial era, researchers estimate that average mercury concentrations in the air have increased as much as five-fold. The recent Environmental Protection Agency Mercury Study Report to Congress noted that combustion sources, including coal-fired power plants, municipal waste combustors and medical waste incinerators, make up the great majority of current releases of mercury to the environment. Once in the air, mercury can be deposited either near its source, regionally, or transported over hundreds or thousands of miles to be deposited in distant lands or waters. Mercury that winds up in aquatic sediments can then be transformed to methylmercury, which works its way up the food chain leading to potentially high concentrations in fish.

The effects of mercury contamination on fish, wildlife and people has been increasingly well documented in recent years. Mercury is a known neurotoxin, which can effect the nervous systems of most vertebrates, because they lack barriers to block mercury from entering and interfering with the normal functioning of cells, and because internal mechanisms to detoxify mercury are not always sufficient.

Effects of Mercury in Fish and Wildlife

In fish, laboratory studies have shown that moderate to high mercury levels can result in impaired sperm generation, growth reduction or inhibition, reduced hatching success, and embryo or larval mortality. In addition, high levels of mercury in water have been shown to cause mortality to the embryo or larvae of frogs. In laboratory studies on wildlife, effects from methylmercury exposure include reduced hatching success and duckling survival in mallard ducks, and reduced hatchability and high embryo and duckling mortality in American black ducks. In addition, field studies have found reduced hatching success in common loons and common terns in mercury-contaminated waters in northwestern Ontario and other regions. In addition, mercury-related reproductive impairments have been seen in common loons nesting in lakes in Nova Scotia and New Brunswick, Canada. Common loons frequently nest on low-pH, low alkalinity lakes that have higher mercury levels. Many lakes in the northern Great Lakes region and New England fall in this category.

Effects of Mercury in People, and the Controversy over Acceptable Exposure Levels

The harmful effects of mercury on people have been well known since the poisoning incidence in Minamata, Japan in the 1950's. Dozens of people were victims of methylmercury poisoning after consuming fish contaminated by chemical plant effluent in Minamata Bay. In the 1950's and 1970's, three separate epidemic poisonings occurred in Iraq, with 459 deaths attributed to mercury-contaminated grain.

The concern of NWF and most health agencies in the U.S. stems from the effects of mercury exposure on children, when they are exposed in utero as a result of their mothers' consumption of mercury-contaminated fish. These exposure levels are generally much lower than the poisoning events in Japan or Iraq. However, lower levels does not mean without harm—elevated mercury levels in the U.S. are thought to put up to 166,000 pregnant women at risk of exposing their fetuses to harmful mercury levels in a given year.

Two long-term studies have been examining the effects of fish consumption and mercury levels on children exposed in the womb. The study in the Seychelles Islands in the Pacific has found decreased activity level of boys at 29-months as the

only negative response correlated to mercury exposure in the behavioral and other tests given to the children. In contrast, a study of a pilot whale-consuming population in the Faroe Islands in the North Atlantic has found mercury-related deficits in language, attention, and memory in 7-year-old children exposed to methylmercury in the womb.

Both of these studies are important because they are being used to establish methylmercury reference doses or minimal risk levels (i.e., the level of exposure thought to cause no adverse effects) by Federal agencies such as the Agency for Toxic Substances and Disease Registry (ATSDR), Food and Drug Administration (FDA), and U.S. EPA.

While much media attention has focused on recent results from the Seychelles Islands study, it is important to recognize limitations in that study. These limitations must be weighed as health officials in U.S. agencies establish safe exposure levels, and thus, fish consumption advisories in the U.S.:

1. Developmental tests in the Faroe Islands population have been recognized as more sensitive in detecting subtle cognitive and motor disturbances than the tests used thus far in the Seychelles study. As pointed out by Kathryn Mahaffey of the U.S. EPA, while evaluation with these more subtle tests are planned, current findings from the Seychelles should be regarded as interim.
2. In earlier analyses from the Seychelles group, several cases of high mercury exposure (and effects) were excluded as outlying points, even though such data could show real effects in more children due to mercury exposure.
3. In the recent report on the Seychelles study, researchers reported improved scores on several of the tests at higher methylmercury (and thus fish consumption) levels, indicating some apparent benefit from the higher fish consumption. The presence of components in fish such as omega–3 fatty acids is recognized as a benefit of consuming uncontaminated fish. However, because the Seychellois are consuming high levels of fish at relatively low mercury levels, the benefits to other populations (such as sports anglers and others in the U.S.) consuming smaller amounts of fish with higher mercury levels may not be realized.

Most median fish methylmercury values in the Seychelles study were in the range 0.05 to 0.25 parts per million (ppm), whereas methylmercury concentrations in the popular sportfish walleye in Wisconsin average approximately 0.5 ppm, or from 2 to 10 times higher than the amount of contamination in the Seychelles fish. Indeed average mercury concentrations in northern pike, three types of bass, and walleye in a recent survey of U.S. fish were 0.31, 0.38 and 0.52 ppm, respectively.

4. The Seychelles Islands population, like that in the Faroe Islands, is quite homogeneous. This means that the study's conclusions may not transfer well to the U.S. where we have a more diverse population. For example, the much greater genetic, racial, and ethnic diversity in the U.S., combined with widely-varying fish consumption rates across peoples who have lived in the country over varying numbers of generations may lead to much greater variation in sensitivity to mercury exposure than would be expected in either cohort study.

Mercury Contamination Around the United States: A Snapshot

Mercury contamination in sediments, waters and wildlife, and elevated human exposures, have been observed at numerous sites around the United States. A few examples are noted below.

—In a study of mercury levels and fish consumption in Wisconsin Chippewa Indians, 20 percent of the surveyed participants had blood mercury levels in excess of 5 microgram per liter (the upper limit of normal, unexposed populations), and were highly associated with recent walleye consumption. The researchers concluded that although there was little concern for overt health effects in Chippewa adults, the levels observed "may be associated with a slightly increased risk of neurologic effects (primarily developmental delays) in infants."

—Recent research has reexamined the long-standing mercury contamination problem in Poplar Creek, Tennessee. As a result of the lithium-isotope separation process used to produce nuclear weapons from the mid-1950's to the early 1960's, 150 tons of mercury were released into the creek. Researchers recently reported that contrary to expectations, sediment and water concentrations of mercury increased with distance downstream from the source, with water concentrations up to 560 parts per trillion (ppt) measured (compared to a few ppt in many "background" waters). The researchers attributed these results to sediment deposition and resuspension, in part due to hydropower operations.

—In a recent study of mercury contamination along the Texas coast, researchers reported that prey organisms (e.g., algae, clams, crustaceans) had higher mercury concentrations in industrially-contaminated Lavaca Bay as compared to nearby Keller Bay.

—Much recent research on mercury contamination in the environment has been directed at the Florida Everglades. Researchers have reported in recent years finding elevated concentrations of mercury in panthers, double-crested cormorants, alligators, and bald eagles that could be causing harmful effects on the behavior or reproduction of the populations. For example, a recent study reported that 15 percent of double-crested cormorants studied had liver mercury concentrations that would be lethal in some other bird species.

—A recent study of the endangered wood stork in southeastern Georgia found that all four colonies studied were at risk of sublethal effects due to mercury in the birds' diets.

Fish Consumption Advisories in the United States, and the Importance of Protecting Public Health

According to the U.S. EPA, fish consumption advisories have been issued by health departments in at least 40 states. Due to the special sensitivities of the fetus and young children, the most strict advisories are generally directed at pregnant women, women of child-bearing age, and young children. As of December 1997, 15 states around the country had statewide fish consumption advisories in place due to mercury contamination, the most for any pollutant. Advisories for either all lakes and/or rivers in a state are most common in the Midwest (e.g., Ohio, Michigan) and New England (Maine, Vermont, and New Hampshire). Statewide advisories for coastal waters are mostly in the Gulf states (Texas, Louisiana, Alabama, and Florida). The number of advisories for mercury nearly doubled from 1993 to 1997 (i.e., from 899 to 1782).

The fact that advisories exist for every body of water in several states indicates that the pathway by which mercury enters these water bodies is likely via the atmosphere. The fact that advisories have nearly doubled indicates both that more testing is being done and that the problem has not subsided.

State health departments generally base fish consumption advisories on recommendations from Federal agencies such as the ATSDR, EPA, and FDA. The ATSDR recommended in its recent draft Toxicological Profile for Mercury a minimal risk level (level of mercury exposure thought to result in no significant effects) of 0.5 µg/kg body weight—day. This recommendation is higher by a factor of five than the current EPA level, and reflects reliance on interim results from the Seychelles Islands. The ATSDR noted that they used an uncertainty factor of 1.0 in determining this level, which means that they essentially used no safety factor to apply the Seychelles results to the U.S. population. In light of the issues raised above regarding the Seychelles study and widespread application its results, and as we noted in a letter to the agency on February 17, 1998, NWF believes it is extremely premature for the ATSDR or any other agency to assume no uncertainty in recommended methylmercury exposure rates based on interim results from the Seychelles study.

SOURCES OF MERCURY IN THE UNITED STATES, DEPOSITION PATTERNS, AND THE POTENTIAL FOR REDUCING EMISSIONS

Sources and Deposition Patterns of Mercury in the United States

The recent Mercury Study Report to Congress summarized estimates of mercury releases to the U.S. environment. Globally, a recent study estimated that the amount of mercury emitted to the air has increased by a factor of 4.5 over the past century due to human activities, although the researchers noted that the atmospheric burden has increased by about a factor of three, due to deposition near the sources. In its discussion of mercury discharges to the environment from human activity, the EPA Study Report focused on mercury emission to the U.S. atmosphere, and noted that 87 percent of emissions for 1995 were estimated to be from combustion sources. Overall, of the estimated 158 tons annually of mercury emissions from human activity in the U.S., 32.8 percent was from coal- and oil-fired power plants (with the great majority due to coal plants—oil-fired plants are estimated to contribute 0.1 percent of the total), 18.7 percent from municipal waste combustors, 17.9 percent from commercial and industrial boilers, 10.1 percent from medical waste incinerators, 4.4 percent from hazardous waste incinerators, and the remainder from other miscellaneous sources.

Fossil fuel-fired power plants and industrial and commercial boilers are mercury emitters due to the presence of trace amounts of mercury in the raw fuel. Medical and municipal waste incinerators emit mercury largely due to the presence of discarded mercury-containing products in the waste stream.

In an emission inventory for the state of Ohio, NWF estimated that over 98 percent of mercury releases to the state's air and water were to the air. Fifty-five percent of the 16,700 pounds of annual mercury emissions to the air were from coal-

fired power plants. Our study indicated that 50 times more mercury was released from human-generated air sources than from natural sources in Ohio, based on a very rough estimate of natural emissions from soils.

While not all of the emitted mercury from a given industrial facility will wind up in a nearby waterbody, these releases of mercury can be put into perspective by considering the very small amount of mercury necessary to contaminate a given lake. A medium-sized coal-fired power plant, which typically has little mercury-removing technology, can emit in the neighborhood of 50 pounds of mercury per year. By contrast, 5,000 walleye in the two-to three-pound size class contaminated to a level of 0.5 ppm (a level sufficient to trigger fish consumption advisories) would contain a total of less than one-tenth of an ounce of mercury.

The EPA emissions estimates for many combustion sectors (power plants, incinerators, cement kilns, etc.) are based on estimates using the amount of material burned (e.g., coal, oil, or other fuel), and estimated emission factors (concentration of mercury in the fuel). Thus, there is still some uncertainty in actual mercury emissions, in particular for the utility industry. A thorough analysis of actual emissions rates and measurements of mercury content of as-fired coal would clarify the extent to which utilities are a major contributor to U.S. mercury emissions. Unfortunately, report language currently EPA Appropriations bill currently before a House-Senate Conference Committee would block EPA's plans to collect this information, as well as any other regulatory action directed at mercury emissions from utilities.

As part of the Mercury Study Report to Congress, the EPA also conducted a thorough modeling study estimating mercury deposition patterns in relation to known sources. The study estimated that while as much as two-thirds of the mercury emitted from anthropogenic sources in the U.S. may be deposited outside the country, mercury deposition within the country would be highest in the southern Great Lakes and Ohio River Valley, the Northeast, and scattered areas in southern states, including Florida. All of these regions are within or downwind of significant industrial regions or regions where there is a high concentration of coal-fired utilities. Due to several factors, including funding limitations and the fact that clean measurement techniques have become available only relatively recently to measure mercury in precipitation and surface waters, there are limited data on actual mercury deposition patterns around the country. The authors above note that the limited available field data tend to agree with the regional mercury depositional modeling, within a factor of two.

A recent survey of mercury concentrations in common loons found a general regional trend of increasing concentrations from west to east across North America, which mirrors the general pattern seen in the Mercury Study Report. In another study measuring mercury at a site in the Lake Champlain basin, highest mercury deposition occurred during spring and summer months, and highest mercury values during these seasons were associated with air transport from the west, southwest and northwest. These are the general directions of regions of significant industrial mercury sources.

Other recent studies have confirmed that human-generated mercury sources can have significant regional impacts. A modeling study examining mercury deposition in the Great Lakes estimated that 83 percent of the mercury loadings were attributable to anthropogenic sources. Based on limited mercury data and relationships to sulfate and other parameters, researchers inferred that some of the higher mercury concentrations detected in air and rain in northern Wisconsin likely had sources in industrial regions nearby.

CURRENT REGULATIONS AND INITIATIVES TO REDUCE MERCURY RELEASES TO THE ENVIRONMENT

Regulatory Programs to Control Mercury

The EPA has moved forward in recent years to implement several regulations on known mercury-emitting sectors. The outstanding exception to this trend is that there are no controls on mercury released from coal-burning utilities. The agency has issued final emissions limits for municipal waste combustors and medical waste incinerators, and has proposed emissions standards for hazardous waste incinerators, including cement kilns that burn hazardous waste. Regarding other sectors, including commercial/industrial boilers, chlor-alkali plants using the mercury cell process, and Portland cement kilns, the agency is "evaluating the impacts of mercury reductions", but has yet to promulgate final rules.

Notably absent are controls for the largest known source sector of mercury emissions, fossil fuel-fired power plants. As controls on other sectors, including municipal and medical waste incinerators, are fully implemented by the states, emissions from these sectors will continue to drop, creating a situation in which relative contribu-

tions from coal-fired utilities will increase. In fact, the EPA's recent Utility Air Toxics report estimated that annual mercury emissions from electric utilities will increase from 51 to 60 tons between 1994 and 2010.

While the EPA has not proposed formal emissions limits for utilities, the agency has proposed a plan to monitor mercury levels in as-fired coal at all coal-fired power plants, and to monitor mercury concentrations in stack exhaust at selected plants. This proposal has created intense opposition from the utility industry, in spite of claims from some in the industry that not enough is known about the actual amounts and forms of mercury emitted to consider controls. This opposition has resulted in the report language in the EPA Appropriations bill. NWF urges the Senate to seek removal of this report language. It can only be in everyone's interest to have more complete, accurate information on actual emissions from all known mercury sources.

While there has been very limited EPA action addressing mercury from electric utilities, controls recently promulgated on particular matter and nitrogen oxide emissions may, in small part, help address the mercury problem. The need for protecting our air from excessive levels of particulates and ozone is clear, in terms of the thousands of deaths each year that can be prevented with these controls in place. Although scrubbers and filters for these other pollutants will not specifically address mercury, which is more difficult to trap when it is in the gas phase, there will likely be some incidental capture of mercury, which will aid in reducing mercury emissions from plants subject to the new standards, as discussed below.

Voluntary Initiatives

In addition to regulatory approaches, there are voluntary initiatives that have begun in several regions and states. These include sector-specific initiatives, statewide programs, and regional plans to address mercury contamination. Minnesota has innovative programs to encourage product substitution in cases where non-mercury-containing products are available.

NWF has worked with representatives of the health care industry and municipal waste water treatment plants to develop common-sense approaches to eliminating mercury in products in the waste stream of those two sectors. Our office has published two reports, Mercury Pollution Prevention in Healthcare: A Prescription for Success, and Mercury Pollution Prevention for City Wastewater Plants: A Guide for Great Lakes Communities. These reports include several case-studies of facilities that have substantially reduced the amount of mercury used and released to the environment in the Great Lakes region.

The Binational Toxics Strategy signed by the U.S. and Canada to virtually eliminate persistent toxic substances in the Great Lakes region includes a goal of reducing releases of mercury from U.S. sources by 50 percent by 2006. A mercury workgroup is examining strategies for reducing mercury use in various industries, and will hold a meeting later this fall to address mercury emissions from the utility sector in the region.

A plan that could have regulatory components was signed by the New England Governors and Eastern Canadian Premiers on June 8, 1998, to reduce regional mercury emissions by 50 percent by 2003. The agreement calls for tighter controls on incinerators, utilities, and other sectors, elimination of non-essential uses of mercury in household and other products, and source reduction, segregation, and safe waste management to minimize releases of mercury through the waste stream.

While all these initiatives are laudable, it is unlikely that the ambitious goals in the regional initiatives (50 percent overall mercury reductions) will be met without a strong regulatory commitment to contend with the largest mercury source coal-burning utilities.

Solutions to the Mercury Problem in the United States

Due to the widespread problem of mercury contamination in the U.S. and beyond, a multi-pronged strategy is needed to reduce mercury levels so that wildlife and people are free of the threats posed by mercury pollution. Given that a major source sector in the U.S. remains without specific controls in place for mercury, increased attention to the electric utility sector is an essential place to begin.

Controls on Fossil Fuel-Fired Power Plants

As noted above, the relative contribution of coal-fired power plants to the total mercury emissions load in the U.S. will continue to increase over the next decade and beyond if nothing is done. While most other major mercury-emitting sectors either comply now or will soon be required to comply with mercury emission standards, the utility industry continues to have no requirements to even monitor mercury emissions, let alone control emissions. Senator Leahy's bill is a step in the right direction to correct that situation. Not only does it require the promulgation,

under the Clean Air Act, of controls requiring specific reduction targets, it also requires that a sensible monitoring program for emissions and fuel mercury levels be required in both the utility and commercial/industrial boiler industries.

Opponents of increased controls to reduce mercury from the utility sector have advanced several flawed arguments. These include 1) Much of the mercury emitted is transported outside the U.S., thus entering the global mercury pool; 2) Some of the mercury deposited on the U.S. comes from sources outside the U.S.; 3) Not enough is known about mercury emissions, deposition, and exposure in people to promulgate controls now; 4) Controls for mercury would be too expensive.

The arguments that much of the utility industry's mercury emissions are transported outside the U.S., and that the U.S. is also impacted by foreign mercury sources are flawed for these reasons:

1)Although modeling research shows that as much as two-thirds of the U.S. utility mercury emissions may drift outside the U.S., the data also show that mercury deposition within the country is highest in and near industrial regions, including regions with more coal-fired power plants. Also, this argument is similar to suggesting that dilution is the solution to pollution. It may be true that if an exhaust stack is tall enough, the pollutants will be transported far from the source. But for pollutants such as mercury, that do not break down in the environment, even small amounts can bioaccumulate up the food chain to dangerous levels for people, fish, and wildlife.

2) There are ongoing questions within the research community on the extent to which mercury emissions from utilities are mostly transported long distances. Preliminary research in several areas of the U.S. indicates that there may be significant regional deposition (i.e., within several hundred miles) close to fossil fuel-fired utilities and other sources.

3) Although other countries are also emitting mercury, the U.S., as a powerful industrial nation, should show responsibility and leadership in controlling pollution that drifts past our borders. The U.S. has no moral authority to prod other countries if we are not doing everything we can to reduce pollution at home, especially given that we have more resources and technical capability to address the problem. The U.S. should be setting an example of environmental stewardship to other countries rather than continuing to allow extensive pollution from decades-old power plants.

The argument that there is insufficient knowledge about mercury transport and exposure to justify controls is also flawed. More research on mercury transport, deposition, and human exposure is needed. However, as noted above, evidence already clearly shows that utility mercury emissions are causing problems throughout much of the country. Moreover, other sources of mercury pollution, including incinerators, are already implementing controls, while mercury pollution from utilities goes on un-abated. Operators of municipal waste water treatment plants are justifiably concerned about the costs of capturing and removing small amounts of mercury in order to meet water quality standards necessary to protect the health of people and the environment. It simply goes against common sense to require some dischargers to spend large amounts of money to prevent mercury pollution while the biggest source continues to pollute unchecked.

Finally, there are several flaws with and questions regarding the claim that controls for mercury would be too expensive.

1) Any evaluation of the costs of instituting pollution controls should consider the costs of the pollution itself. Elevated mercury levels in the U.S. are thought to put up to 166,000 pregnant women at risk of exposing their fetuses to harmful mercury levels in a given year. The risk to these 166,000 women is that their children will suffer from neurological or development problems. How do we put a price tag on the lost intelligence or potential of a child?

2) Another cost to consider is the extent to which mercury advisories discourage anglers from fishing in specific locations. According to the most recent National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, there were 17 million angler trips and expenditures (trip and equipment) of $1.4 billion in the Great Lakes region alone in 1996.

3) It is known that utility industry cost estimates have been inflated in the past, as was demonstrated in the debates on compliance cost estimates around the time of the 1990 Clean Air Act Amendments. In order to address the problem of acid rain in the U.S., Title 4 of the Act required 110 mostly coal-fired power plants to reduce sulfur dioxide emissions to 2.5 pounds per million BTU heat produced by 1995 (Phase I). Estimates for complying with Phase I limits ranged up to $5 billion annually by the Edison Electric Institute, and in other cases up to $30 billion annually for all utility provisions. The actual costs of achieving compliance with Phase I sulfur dioxide emission requirements was calculated in 1995 by the Energy Information

Administration to be $836 million. This figure is approximately 0.6 percent of the annual operating costs for investor-owned utilities in 1995.

The EPA Mercury Study Report estimated that reducing mercury from coal-fired utilities would cost $5 billion annually, based on an analysis of model plants. This sum has to be considered in light of the unquantifiable benefits that would accrue to families that could someday consume fish without concern for mercury-caused problems on their children, as well as improved health of loons and other wildlife and the factors noted above. In addition, as has been the experience with nearly all other cases of industrial controls, it is highly likely that new rules necessary to protect human health and the environment would create incentives for the development of new technologies that can more efficiently and cheaply reduce mercury emissions. Thus, the annual costs of mercury reductions will likely decrease after more research and development of technologies.

Improved pollution controls on utilities are needed not simply to reduce mercury emissions, but emissions of other pollutants as well, including ozone-forming nitrogen oxides, acid rain-forming sulfur dioxide, particulate matter and other components that contribute to regional haze, and carbon dioxide that contributes to global warming. A comprehensive approach that addresses these sources alone should have the added benefit of reducing some mercury incidentally. Given the new regulations for ozone and particulate matter and the interest among some in industry, and millions of consumers, for more environmentally-friendly forms of energy generation, this should be recognized as a window of opportunity for the electric utility industry to begin a committed transformation to a cleaner energy future.

Several Mercury Control Strategies and Technologies Available to the Electric Utility Industry

Promising strategies currently available for mercury control include fuel switching (i.e., switching from coal to natural gas, which contains less mercury), advanced coal cleaning, flue gas desulfurization scrubbers, and activated carbon injection. Fuel switching (in particular, switching from coal to natural gas) is a relatively simple technique for drastically reducing mercury emission, given that the mercury levels in natural gas are much lower than levels in coal. In addition, with the relatively abundant supplies of natural gas currently available, and utility deregulation beginning in a number of states, this should be a priority for utilities competing for consumers desiring cleaner energy generation.

In some studies, advanced coal cleaning has resulted in reduced mercury levels in coal by up to 60 percent. In other pilot studies, activated carbon injection in combination with other techniques and lower flue gas temperatures has achieved median mercury reductions as high as 98 percent. The problem of large amounts of carbon needed for this technology may yet be solved by other innovations.

Another control technique is the use of flue gas desulfurization scrubbers, which are currently installed on 25 percent of U.S. coal-fired generating units. Although these scrubbers are designed to remove sulfur dioxide, they can be effective at removing some of the mercury in flue gases as well. More widespread adoption of this technique by other U.S. utilities, in order to address the continuing problem of acid deposition in New England, parts of the Appalachian Mountains, and elsewhere, would have the added benefit of mercury reductions. Other emerging technologies include modifying standard sorbents to increase their capacity to absorb mercury, modification of existing technologies (such as flue gas desulfurization scrubbers), the Enhanced Limestone Injection Dry Scrubbing process, and enhanced fly ash scrubbing.

A Comprehensive Approach to Controls in the Utility Sector

The existence of continuing problems of mercury contamination causing fish advisories and health impairments, acid deposition affecting freshwater ecosystems and forests in many parts of the eastern one-third of the country, ozone and particulate pollution causing respiratory illnesses in thousands, and carbon dioxide contributing to the buildup of greenhouse gases, all point to the need for a comprehensive approach to dealing with environmental problems from power generation. In the interim, the use of co-controls (i.e., capturing mercury as well as other pollutants) should be pursued wherever possible, and will lead to reduced costs of complying with emissions standards and improved benefits for the environment and human health.

It is important to keep in mind that in this critical early phase of utility deregulation, there may be pressures for a number of utilities to shift resources to the cheapest generation systems available. Unfortunately, these may be old, dirty coal plants. The provisions of S. 1915 would help ensure that this situation does not result in even more mercury pollution than has already occurred over the past decade.

Other Provisions of S. 1915

In addition to the sound recommendations on requirements for the utility industry to reduce mercury emissions, S. 1915 also contains needed provisions to address mercury emissions from other sectors, including municipal waste combustors, medical waste incinerators, and hazardous waste incinerators. Although rules are either promulgated or in review for these sectors, the bill adds important language on monitoring, reporting and/or source separation that are important provisions not currently being considered in rules for these sectors.

The recommendations in the bill for controls on coal- and oil-fired commercial and industrial boiler units are a welcome and necessary component of the bill, given that this sector was estimated to contribute 18 percent of mercury emissions in the 1994–95 national emission inventory. While Portland cement plants are a slightly less significant source of annual mercury emissions in the U.S., the potential for mercury contaminated dust to deposit in nearby populated areas indicates the need for the types of strong controls included in S. 1915.

Similarly, the bill's strong permitting, monitoring and reporting requirements for chlor-alkali plants would insure that this sector, which is important both in terms of mercury use and emissions, will be subject to stringent emissions limits. Although the number of chlor-alkali plants using the mercury-cell process in the U.S. is relatively low (14), the significant mercury use in the industry (approximately 160 tons/year) indicates a crucial need to address what may be an under-estimated source of significant mercury releases. The prospect of new controls on mercury emissions may help spur some facilities to conduct more thorough life-cycle assessments of the fate of mercury used in their plants, and potentially switch to one of the other non-mercury-based technologies.

Finally, Section 11 of S. 1915 contains a number of important provisions to address mercury in an international context, including the requirement for completion of an emissions inventory for North America. Requirements which include efforts to describe mercury transport pathways, as well as recommendations for pollution control measures and options for eliminating or reducing transboundary mercury pollution would be pioneering efforts to increase our ability to understand, prevent and control mercury pollution. In addition, the provision to evaluate the adequacy, completeness, consistency, and public dissemination of fish consumption advisory information addresses an extremely important issue. The reporting requirement would ensure easy public access to advisory information at all geographic levels, and a compilation would allow greater ease in assessing the consistency and completeness of the state advisories.

Conclusion

NWF applauds Senator Leahy and this committee for its leadership in addressing this important issue. Everyday across this country, a grandfather takes his granddaughter to a lake for an afternoon of fishing. If they are lucky, they will enjoy each other's company and a beautiful afternoon with nature. They might even catch some fish. If they do, the grandfather will face a dilemma. If they are like most daughters, they will beg to take those fish home and cook them for dinner. Unfortunately, chances are good that those fish contain small amounts of mercury. The amount of mercury may be safe for granddad. It might even be safe for his granddaughter. But, if they are from one of the 15 states that have a statewide advisory warning them about unsafe levels of mercury in their fish, granddad will have to decide how much risk to subject his granddaughter to. Even worse, chances are good that they like most people are completely unaware of what advisories the state issues for their lake.

S. 1915 is an important step toward reducing and preventing mercury pollution across this country. S. 1915 sets important benchmarks and timelines for reducing pollution from the most important sources so that someday, people will be able to eat fish from our nation's lakes, rivers and streams without risking the health of themselves or their families.

RESPONSES BY TIM EDER TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. Do you agree that the fish consumption studies, rather than the Iraqi grain studies, more closely resemble the situations here in the United States that health agencies should be concerned with?

Response. We believe that health agencies in the United States should be basing advisories to the public on all relevant mercury exposure/epidemiological studies, with an eye toward precautionary measures in the face of uncertainty. While fish consumption studies are more relevant to mercury exposure among the great major-

ity of people in the United States, thorough analyses of contamination incidences, such as the poisoning episodes in Iraq, offer additional opportunities to assess health impacts of mercury exposure, and thus to set appropriate organic mercury exposure thresholds that are protective of human health, in particular for the fetus and sensitive populations. Because of the documented health effects of mercury exposure, and the genetic diversity and wide range of fish consumption patterns in the U.S., the use by public health agencies of a range of studies, including those from the Iraqi poisoning episodes, is entirely appropriate in setting appropriate mercury reference doses for human exposure.

Question 2. What specific information is needed in order to have a better scientific understanding of mercury and its health and environmental impact?

Response. There have been a number of recent advances in our understanding of mercury and its health and environmental impacts. While it has been recognized for over a decade that mercury can cause reproductive impairments in waterfowl, and obvious neurotoxic effects in people, it has only been in the last decade that more subtle effects in both people and wildlife have begun to be thoroughly investigated. We believe there remains a need for researchers to investigate the more subtle types of neurological effects (visual-spatial, attention, memory, etc.) in children exposed to methylmercury in the womb, including effects that may be present many years after exposure. These studies should be continued in the cohorts already established, and the more subtle tests should be used, where possible, in all relevant epidemiological studies examining effects of mercury exposure.

We believe the government and industry need to continue to put more resources into obtaining good data on mercury releases to the environment, as we mentioned in our testimony and we endorse the information collection and control proposals contained in Senator Leahy's omnibus mercury bill. in addition, we support further ecological research on reproductive and other effects on loons, bald eagles, and other wildlife (in particular piscivores) that may be threatened by mercury contamination.

Question 3. Given the testimony received during the hearing, regarding the incompleteness of the scientific understanding of mercury, isn't it prudent to vigorously pursue scientific research which addresses the unresolved issues of mercury speciation, and the transport, fate, and effects of elemental mercury? Wouldn't it also be prudent to have a coordinated Federal effort which, among other things, determines the appropriate level for a mercury exposure reference dose?

We acknowledge it is prudent to pursue scientific research to address unresolved issues of mercury speciation, transport, fate and effects, and we recognize, and support, the fact that this research will continue. However, it is recognized by both scientists and policymakers that mercury can be transformed in the environment from inorganic to the more harmful organic forms. Thus although most anthropogenic emissions are in the form of either elemental or oxidized mercury, transformation of this emitted mercury in wetlands or other water body sediments can lead to mercury exposure in fish, wildlife, and people. Because it has been generally recognized by the scientific community that mercury levels in the active environment worldwide have increased at least two-to-threefold since the beginning of the industrial era, developed countries such as the U.S. should not hesitate to institute measures to control preventable mercury emissions. Because of the fact that mercury is an element (and thus will never degrade in the environment), that contamination can therefore persist for decades after releases from human activity, and that active remediation of the environment following widespread mercury releases is impossible, we believe that stronger control measures should be taken now, even with remaining uncertainties in current exposure levels and effects.

We also acknowledge the desirability of a coordinated Federal effort to deal with mercury, both from the point of view of reducing emissions and determining an appropriate mercury reference dose. A single, consistent recommendation for the methylmercury reference dose from the Federal Government would simplify health department decisions in determining fish consumption advisories. But in the face of uncertainty and varying recommendations regarding the reference dose, we, believe it is entirely appropriate for health departments to issue advisories based on a precautionary approach, and thus base their decisions on the most conservative reference dose recommended by Federal agencies.

STATEMENT OF LEONARD LEVIN, ELECTRIC POWER RESEARCH INSTITUTE, PALO ALTO, CA

INTRODUCTION

I am Leonard Levin, manager of the research program on air toxics and mercury at EPRI (founded as the Electric Power Research Institute). We are a nonprofit collaborative science and technology consortium with headquarters in Palo Alto, California. Members of EPRI represent about 87 percent of the U. S. regulated electric power industry with significant international participation. EPRI has a twenty-five year record of providing highly respected and objective science and technology to address important energy and environmental questions.

My own background is primarily in atmospheric sciences. My doctorate is from the Institute for Fluid Dynamics and Applied Mathematics at the University of Maryland, with other degrees from MIT and the University of Washington. I have over 25 years' experience in environmental sciences.

EPRI has sponsored research on mercury since the early 1980's, and in the past few years has joined in cooperative mercury research programs with the U.S. Environmental Protection Agency, the Department of Energy, the National Park Service, and other federal, state, and international agencies. The total EPRI research budget on mercury to date is about $20 million, at a level of about $2 million per year. My purpose today is to discuss what science currently can tell us about mercury in the environment, and more importantly to highlight the key areas where we know our understanding is less than sufficient.

PERSPECTIVE

The issue of mercury in the environment is complex. Mercury is not only emitted from many currently-operating industrial sources, but was used industrially at a much greater rate earlier in the century. As an natural element in the earth's crust, mercury cannot be created or destroyed. It may persist in various compartments of the natural environment. Industrial activity has liberated a great deal of mercury from the earth's crust and mobilized it into many other compartments, including the atmosphere, the biosphere, and the human environment. Recent concern has focused on the potential health risk to U.S. consumers of freshwater fish that might contain mercury, and in particular on those who consume fish at a relatively high rate.

Foodfish taken from both freshwater and marine environments exhibit mercury concentrations that extend over a wide range. Some of these fish, particularly larger, older fish such as shark and swordfish that feed on other aquatic species, may exhibit mercury levels that can raise health concerns. These levels of concern are set by Federal and state agencies based on studies of accidental mercury poisonings at high doses that are extrapolated to estimate the effects of low doses on U.S. populations. Some of these poisonings involved fish as the route of exposure to mercury, but others did not.

Based on acute mercury poisonings that occurred in Japan and Iraq, it is known that high levels of mercury may cause measurable deficits in the mental and physical development of young children exposed during gestation. New scientific studies are now underway to clarify what mercury levels in children can produce adverse outcomes. Initial results from those studies indicate that mercury health effects on childhood development may be significantly less severe than previously believed.

BACKGROUND

Prior to enactment of the 1990 Clean Air Act Amendments, EPRI research teams carried out the first accurate measurements of mercury emissions from operating power plants. These and other data were provided to the U.S. Environmental Protection Agency by EPRI and other utility groups, and by the U.S. Department of Energy. As a result of such joint research efforts, our understanding of mercury in the U.S. environment has improved significantly in the last 10 years.

Nonetheless, many significant questions remain before a definitive quantitative assessment of the issue may be provided. Among these, three stand out:

What portion of all mercury emissions is contributed by U.S. industrial emissions?

How might mercury levels in fish reflect changes in the input of mercury to the atmosphere?

At what levels of exposure might mercury pose a health threat

A Note on Mercury Health Risk

Human health risk assessments are carried out to evaluate the likelihood that adverse effects may result from exposure to mercury. These assessments can be visualized as moving along two parallel pathways. One pathway is human exposure analysis: how

much mercury gets into the environment and reaches the human organism? The parallel analysis pathway is health hazard assessment at what levels of exposure does mercury pose a health threat?

When these two assessments are combined, they address how much mercury humans are exposed to, and whether that level of mercury represents a health threat. That result is the human health risk assessment.

A Note on Data vs. Computer Models

Because of the complex cycling of mercury through the environment, it is difficult to determine which sources contribute how much of the mercury found in fish. There are no current methods that allow us to, for instance, release a unique, benign material along with mercury from a particular industrial plant that would help us "tag" the mercury from that facility as it moves through the environment. For that reason, we must rely on computer models of mercury to assess its fate from source emissions, through atmospheric transport and deposition, to how much eventually makes its way into fish.

It is important to distinguish, therefore, between data, or observed and measured occurrences of mercury in the environment, and model results, which are computer outputs from the models used. As one example, we have surprisingly few data points on how much mercury deposits from the atmosphere to the surface, where people live, but there are many model results that portray what those numbers might look like. When these model results are compared to the sparse data, the model results tend to be rather uncertain, by a factor of two or more, either over or underpredicting the observations. The conclusions drawn from these estimates concerning management of mercury should, therefore, be tempered by the uncertainties in the estimates on which the conclusions are based.

Emission sources

EPA and EPRI are in essential agreement that the amount of mercury currently emitted by electric utility generation is about 50 tons per year nationally. Essentially all of the utility-emitted mercury is attributable to coal-fired plants. Most of these emissions come from power plants that are equipped with very tall stacks. The available evidence suggests that such tall stack sources disperse mercury over great distances, with small fractions being deposited locally. Extensive measurements done by EPRI and DOE make utility plants the best-characterized sources of mercury.

By contrast, other man-made sources of mercury are less well-characterized with respect to amounts and properties of emissions. Very few measurements exist on some other categories, such as chlor-alkali plants. In addition, these sources tend to emit mercury closer to the ground surface and, in some cases, in amounts greater than power plants.

Recently, evidence has come to light that indicates motor vehicle fuels may be a source of mercury emissions and that source is therefore under-represented in our database.

These measurements, primarily by the University of Michigan, are only indirect to date, with more data expected in the near future.

The linkage between these sources and deposition is poorly understood, even for very large sources of mercury. This is largely because the chemical state of the mercury leaving a source is critical in determining how far the mercury will travel before it is removed from the atmosphere. Data on whether mercury from a particular source is ionized or in its "elemental" form are basically lacking for most sources.

"Legacy" emission sources remain a very large area of uncertainty. These include both natural releases from geological formations, and previously emitted mercury issuing from soil that is due to activities (such as gold mining) extending back for hundreds of years. Recent progress has been made by U.S. and Canadian teams in measuring these "legacy" quantities directly. These studies indicate that U.S. "legacy" releases may equal all current industrial emissions of mercury combined.

Mercury environmental fate and transport

Mercury emitted to the atmosphere from point sources can be either an elemental form, essentially mercury metal, or an ionic form that is more easily combined into chemical compounds. The ionic mercury is more water-soluble and can be deposited

more easily close to its source by precipitation. The elemental mercury tends to enter long-range and global circulation, contributing to regional and global background levels. EPRI model results indicate that between about 70 percent and 95 percent of mercury exiting a coal utility stack will travel hundreds or thousands of kilometers before depositing to the earth's surface.

Other data, more indirect, indicate that about 2,200 to 3,300 tons of mercury are released to the atmosphere globally each year from today's human activities; all current U.S. manmade releases make up only about 7 to 10 percent of this total. Recent indications are that up to ¼ of the global total may emanate from mainland Asia, for which data are essentially lacking.

Direct measurements of mercury depositing to U.S. territory are still sparse, and not representative yet of the entire nation. Model results are useful to indicate where potential "hot spots" may be located, but we often do not have verifying measurements from those areas. We also do not have any direct data quantitatively linking sources of atmospheric mercury with measured concentrations in soils, waterways, or aquatic species.

New field studies of mercury in the U.S. environment are just reaching fruition. Major work in Florida, funded by state and U.S. agencies, EPRI, and Florida utilities, is approaching completion, showing that a great deal of Florida mercury appears to originate globally, arriving in Florida with air masses traveling from Africa or southern Europe. A very large field study in the Lake Superior region began in mid-1998, and will continue for at least 2 years, involving researchers funded by a number of states, Federal agencies, EPRI, U.S. and Canadian utilities, and Canadian national and provincial agencies. These studies may begin to provide the extensive field data sets

needed to understand how mercury released from particular sources behaves in the environment.

Mercury in terrestrial and aquatic systems

Mercury in most parts of the environment is at extremely dilute levels, measured typically in trillionths of an ounce for each pint of water (or, nanograms per liter). Mercury entering U.S. waterways by atmospheric deposition or by runoff tends to wind up mostly in lake bottom sediments, with a small portion (perhaps one-one thousandth) eventually moving into fish tissue.

Some of the mercury that reaches lakes and wetlands is converted by bacterial action into an organic form called "methylmercury." Methylmercury is taken up by fish, and can be measured in some fish at concentrations that are very much higher than those in the water in which the fish live. As predatory fish eat other fish that contain some mercury, the concentrations of mercury in the predatory fish can increase many-fold, often reaching levels millions of times as high as the concentration in the surrounding water. High levels of mercury have been observed in predatory fish caught from remote lakes far removed from any point sources of mercury.

Despite our understanding in principle of how mercury enters fish caught for food, measurement data do not reveal the origins of the mercury found in these fish. We have no way of knowing how much originates from currently operating U.S. sources versus how much is recycled within the lake from the mercury "reservoir" in bottom sediments. This mercury in sediments may have originated decades or centuries earlier, or be due to releases from sources outside of the U.S.

Most importantly, we do not have a good understanding of the means by which open ocean fish, such as tuna or shark, take up and concentrate mercury. Indeed, one of the best-documented cases of elevated mercury levels in U.S. residents arose in a Wisconsin family that ate a diet rich in both locally-caught and imported fish. Subsequent studies showed that this family received its mercury dose primarily from supermarket-purchased Chilean seabass. The domestic fish consumed were found to have mercury levels of no concern.

Human exposure and health effects

A number of studies shows that nearly all the human exposure to methylmercury occurs via fish consumption. [There are two primary exceptions to this. One is accidental releases, usually in industrial processes, and usually for short periods. The second is mercury used in tooth filling amalgams; exposures from amalgams to developing fetuses are still under scrutiny.] This exposure may subject consumers to the organic form of mercury found in fish tissue. Such mercury typically resides in the human body for several weeks.

To date, mercury health risk estimates have primarily relied on data from a 1970 acute poisoning incident in Iraq that involved severe, rapid exposure from consumption of contaminated grain, and some deaths. These data are the basis for the current EPA

"Reference Dose" or health effects threshold level. This Reference Dose refers to a level of exposure that is without expected risk over a lifetime. A larger Reference Dose implies a less severe health effect from the substance, since it allows more mercury intake per day. The most sensitive individuals are children, who, even before birth, may suffer developmental effects from mercury entering their bloodstream from the mother. During pro- and post-natal development, mercury can act as a toxin to development of the central nervous system.

Recent research shows the current Reference Dose may be unnecessarily strict. By setting this threshold at a level well below that truly necessary to protect human health, unnecessarily stringent protective measures may be inadvertently required by regulatory agencies. In addition, there are proven health benefits from eating fish, not only for adult cardiovascular health, but for childhood neurological development. In addition, efforts to restrict mercury exposure may lead consumers to reduce their consumption of fish, even though the available evidence indicates that fish consumption has significant health benefits, even for children.

This reexamination of the Reference Dose is based on two new studies of children exposed to mercury via fish consumption (by themselves or their mothers, during children's gestation). These studies, in the Seychelle Islands in the Indian Ocean, and the Farce Islands in the North Atlantic Ocean, are of populations with diets that are highly dependent on marine life. The new studies are more relevant to U.S. populations that consume fish than are the data from the acute grain poisoning incident that took place in Iraq.

Results from these studies are still being analyzed. The initial findings from the Seychelles study indicate that no significant mercury effect was found over a wide range of pre-natal exposures to children. The Farces study has reported finding evidence of a neurological effect at the highest mercury levels. However, the biological significance of these findings remains unclear. Further analyses and refinements are expected in the results of these studies over the next 2 or 3 years.

Two independent analyses of the Seychelles results have suggested that the current EPA Reference Dose may be too severe by a factor of 3 to 5; that is, consumers can be exposed to mercury levels 3 to 5 times as great as the EPA level without harmful effect to children. This implies in turn a wider availability of fish from U.S. waters that can be considered safe for consumption.

Mercury Management Options

We do not yet have enough data to draw conclusions about which sources, or source types, contribute the most to mercury found in U.S. fish. Analyses indicate that background air emissions of mercury in the continental U.S., from natural plus "legacy" source areas, may be as large a source as all current industrial sources combined. In addition, global contributions to mercury are much larger than all U.S. sources combined. As a result, any potential changes in U.S. industrial emissions may leave the overall source term basically unchanged.

As indirect evidence of this, there are no data showing any overall lowering of mercury levels in fish from remote lakes over the last 35 years, despite an 85 percent drop in U.S. industrial mercury use in that time. Indeed, despite a relatively uniform national pattern of mercury deposition from the atmosphere, there are stark differences from lake to lake in the levels of mercury in fish, even the same fish species. For example, the State Health Department in Maine has noted that two adjacent lakes in Acadia National Park were found to have such different fish mercury levels that one lake carried a "no consumption" fish advisory, while the other lake was open to consumption of ail fish caught.

Additional Research

Our understanding of mercury has significantly advanced in the last decade, but a great deal remains to be done. It is important to remember that all aspects of the issue have critical uncertainties. It would be unwise, for example, to consider mercury health effects alone as the remaining uncertainty on the issue. Significant research is underway on other critical areas of uncertainty as well. Some of the major studies to be completed include:

- National studies of background mercury sources and fish consumption;
- Refined methods to evaluate the links between source types and fish occurrences of mercury;
- Completion and analyses of the new health effects studies in children by independent investigators

Conclusions

At the beginning of this discussion, I proposed three key questions that need to be examined. The first question suggested that we needed better information on mercury emissions from undocumented sources, particularly background sources.

That information is now emerging, and appears to represent a large contribution to the national total. The second question asked how responsive fish mercury levels in the U.S. were likely to be to changes in atmospheric input. Indirect evidence shows that these levels are likely to respond very slowly to emissions changes. Finally, I raised the question of how severe the health effects from mercury are likely to be at U.S. exposure levels. Initial findings indicate we may have to revise our understanding of these health effects. In the case of one study, indications are that the effects of mercury might be quite a bit less than we once thought.

Thus, our understanding of the sources and behavior of mercury in the environment, and of its potential health effects, is entering a new phase. Over the next 2 to 3 years, results from current studies will appear in the scientific literature and allow a more informed examination of whether there is a basis in health risks for managing mercury sources. Informed decisionmaking can then be based on the most relevant scientific information.

RESPONSES BY LEONARD LEVIN TO ADDITIONAL QUESTIONS FROM SENATOR INHOFE

Question 1. Do you agree that the fish consumption studies, rather than the Iraqi grain studies, more closely resemble the situations here in the United States that health agencies should be concerned with?

Response. Conclusions about the health effects of mercury used by EPA are currently based on an acute, high-dose mercury poisoning incident in Iraq over 25 years ago. Yet, consumption of fish is the most important route of mercury exposure for U.S. residents, and at much lower levels. Fish consumption is also the route by which fetuses may be exposed to mercury, due to their mothers' diets. Interestingly, many consumer and angler studies have shown that store-bought imported marine fish can be a much greater source of mercury than locally caught species.

Fish consumption studies elsewhere are applicable to U.S. exposures since they include (a) the same chronic, low-level exposure to mercury that may apply to U.S. residents; (b) the related beneficial health effects of fish consumption, particularly marine species, now documented for children as well as adults, (c) the concomitant exposure to selenium, a substance which may have a protective value for effects of mercury in humans (though this is still not well documented), and (d) the ability to do contemporaneous studies of actual exposure, rather than reconstructed exposures well after an accidental poisoning (as in Iraq).

Question 2. What specific information is needed in order to have a better scientific understanding of mercury and its health and environmental impact?

Response. Our ability to assess the impacts of mercury on U.S. residents depends on a full understanding of two key aspects of mercury in the environment. First, we need to improve our information on where mercury in the U.S. environment originates, how it moves into distant aquatic systems, and how it is concentrated in fish and ingested by humans. Second, we must accurately gauge the true impact of mercury on human health.

Our understanding of mercury in the environment—the exposure to mercury—is also progressing. New information from field studies shows that natural and legacy mercury emissions in the U.S. may total as much as all current industrial sources. These need to be better quantified. Our knowledge of human exposures in the U.S at both average and high levels. is inadequate; new studies of exposure are beginning this year.

The primary health concern about mercury arises from methylmercury in waterways, which is the organic form that finds its way through fish to human consumption. The process by which mercury is transformed from the inorganic form (dominant in source emissions and the atmosphere) to the organic methyl form, is not fundamentally understood.

Levels of mercury in fish appear to be dominated by local water conditions, rather than distant source inputs, and so may be insensitive to source changes. Fish mercury levels are remarkably uniform throughout the U.S., despite the fact that most of the industrial mercury is emitted to the atmosphere in the east. Fish mercury levels have not changed in recent decades despite a reduction of 85 percent in the industrial usage of mercury. There are research plans to investigate this question in the field.

The issue of mercury's health effects is being investigated in a number of studies The two most prominent of childhood development are those among fish- and whale-eating populations in the Faroe Islands of the North Atlantic, and among fish consumers in the Seychelle Islands of the Indian Ocean. It is expected that the analysis, interpretation, synthesis, and followup to these studies will proceed for about 3–4 more years. It is these studies that have already produced new findings indicat-

ing potentially lower levels of mercury health effects than had been previously believed.

Given the testimony received during the hearing, regarding the incompleteness of the scientific understanding of mercury, isn't it prudent to vigorously pursue scientific research which addresses the unresolved issues of mercury speciation, and the transport, fate, and effects of elemental mercury? Wouldn't it also be prudent to have a coordinated Federal effort which, among other things, determines the appropriate level for a mercury exposure reference dose?

In joint research meetings with a number of Federal agencies over a 10 year period, EPRI has advocated a comprehensive, integrated research effort on mercury. We have recommended an effort that focuses on key issues where understanding is lacking. This effort is underway, and our understanding of mercury emissions, atmospheric transport and fate, aquatic cycling, and human exposure and risk is greatly improved from ten or even 5 years ago. But we need to maintain this global research effort, to better inform policy and regulatory deliberations.

RESPONSES BY LEONARD LEVIN TO ADDITIONAL QUESTIONS FROM SENATOR LEAHY

Question 1. Submitted with your comments was an attached document from EPRI, "Health Advisory for Freshwater Fish, "questioning State fish advisories. What basis does EPRI have for initiation of a nationwide public health message in conflict with state programs?

Response. State fish advisories are based on existing conclusions concerning the severity of mercury health effects on both adults and children. The EPRI document referred to in the question was prepared as a summary of new findings concerning mercury health effects. Those findings were applied to mercury fish advisories in the State of Maine by fir. Andrew Smith of the Maine Bureau of Health. The Maine results, reproduced in the EPRI document, showed that many surveyed lakes currently under mercury fish advisories in Maine would be considered safe for unlimited consumption of caught fish if the new health findings were adapted EPRI is simply reporting those findings from the State of Maine.

The new findings, detailed at the hearing by Dr. Gary Myers of the University of Rochester, are the results of ongoing studies of children in the Seychelle Islands. Two independent teams of researchers, after analyzing the University of Rochester results, have concluded that mercury health effects on children may be only one-third to one-fifth as severe as previously believed. That is the basis for the EPRI document, and for my conclusion that these new findings if ultimately supported may significantly alter current fish advisory levels.

Question 2. Does EPRl have emission data from coal fired power plants showing the levels of mercury currently being emitted to support the position in the Levin Statement? Has this information been provided to states working on the mercury problem?

The position taken in the statement concerning power plant emissions is that EPRI and EPA (as well as many other agencies) are in essential agreement on the national total of utility mercury. Since 1990, EPRI (and the U.S. Department of Energy) have carried out a national program of method development and measurement for mercury in power plant emissions, fuels, and waste streams around the United States. These data have been made publicly available in EPRI reports since 1994, and also provided as detailed print and electronic files to EPA. The data have been entered into the EPA public docket, starting in November 1994, and are easily available to all members of the public, including staff of state and regional regulatory agencies. EPRI has provided summary and detailed reports to state regulatory staff in many states and regions, including New Jersey, Michigan, Arkansas, Minnesota, Wisconsin, and the NESCAUM organization.

Question 3. Your testimony indicates that studies in Florida show that the mercury is arriving from Africa or Southern Europe. Please provide us with the underlying meteorological and atmospheric circulation assumptions that you are relying on to reach this conclusion. What are the points of origin of these emissions? Are you aware that there are studies that show deposition in Florida from sources within the state?

Response. Research on the origins and fate of mercury on the Florida peninsula has been underway for 10 years, under joint sponsorship of the State of Florida, Florida utility companies, EPRI, the US EPA, the US Geological Survey, and others. Part of these studies involves field and modeling experiments to determine the level of mercury coming into the state from elsewhere (partially via the easterly trade winds) compared to the level originating from current and re-emitting sources with-

in the state. Analysis and interpretation of the data from these studies are still underway. Several investigations suggest that more than half of the mercury deposition occurring in the Everglades comes from global background.

Professor William Landing of the Department of Oceanography at Florida State University has concluded, based on 3 years' data on mercury deposition and related meteorology, that about 70 percent of the mercury depositing within the state has its origin in this long-range transport, from air masses beginning in the eastern Atlantic. Those air masses are likely to entrain mercury from source areas in the Mediterranean basin, especially southern Europe and northern Africa.

The matter is still under study, however. Dr. Gerald Keeler, of the University of Michigan, also involved in the south Florida studies, has reached the opposite conclusion, but based on a shorter data set from a pilot study. This is one of many open questions on mercury.

Question 4. What proportion of "legacy" mercury emissions in the global pool are attributable to emissions from facilities in the United States? Does your testimony create a misimpression that mercury in the global pool came from other places when in fact much of the mercury in the global pool was originally emitted by power plants, waste incinerators, and other sources in the United States?

Response. U.S. emissions from utilities currently make up about 1 percent of global emissions of mercury; U.S. emissions from all current industrial sources make up about 3 percent of global total emissions (from the EPA Mercury Study Report to Congress). Since mercury's lifetime in the global atmosphere is about 1 year, the U.S. contribution is also about 1 percent and 3 percent respectively. Indeed, it is probably somewhat less, since about 30 to 50 percent of U.S. emissions deposit within U.S. borders.

New measurements of emissions have been made from mercury background source areas. These include both natural areas, undisturbed by industrial activity, and mercury "legacy" areas. The latter include mineral extraction and industrial sites once active, but no longer operating (such as old gold mining areas). These legacy areas show present-day emissions that may total as much as all current industrial emissions in the U.S. From this, it is plausible to conclude that, when those areas were actively in use, emissions to the air were even greater. More research is underway to extend these measurements nationally.

U.S. industrial use of mercury has declined by about 85 percent in the last 40 years. These industrial uses of mercury are likely to have led to local (rather than global) circulation of the material, winding up in distributed industrial uses and later in landfills. Incineration of mercury contained in industrial and consumer products has tended to occur in facilities with low combustion temperatures and relatively low emission stacks, more likely leading to local and regional deposition, rather than entry into the global circulation.

Electric Power Research Institute

Setting a Safe Exposure Level for Mercury

environment division air toxics health and risk assessment target

Mercury is a metal that may induce toxic health effects, including neurological damage. To protect citizens, the U.S. Environmental Protection Agency (EPA) is charged with setting a "safe" exposure level for mercury. A safe exposure level based on historical data is in place, but emerging information from basic research is altering our understanding of mercury's impact on human health. This new information has led another Federal agency to propose a less restrictive safe exposure level.

Poisoning Accidents and EPA's Reference Dose The most common form of mercury found in fish is the organic form, called methylmercury. Two historical poisoning episodes highlight the toxicity of methylmercury at extremely high levels. In the 1950's, mercury discharged from a chemical plant into Japan's Minamata Bay poisoned people who ate contaminated marine life from the Bay, causing them to develop so-called "Minamata disease" from which 100 died and many more suffered nervous system disorders. In the early 1970's, Iraqis ate bread accidentally made with Hour milled from wheat treated with a mercury-based fungicide. Several hundred people died, and subsequent studies showed that mothers who were highly exposed to methylmercury by eating the bread during pregnancy gave birth to children who experienced developmental delays, such as walking months later than unexposed children. Because it took lower exposures to affect babies developing in the womb than to affect adults, the Iraqi episode led to the public health objective of

protecting women of childbearing age from unsafe exposure to methylmercury that would harm their babies.

To set protective exposure levels, public health agencies worldwide examined a variety of mercury data. EPA used analyses of the Iraqi poisoning episode, which showed that methylmercury affected babies developing in the womb when it was present in concentrations greater than 10 parts per million in their mothers' hair. To this threshold, EPA added an uncertainty factor of 10 to protect highly sensitive individuals. The resulting "reference dose" (the level of exposure that is virtually risk-free) adopted by EPA for methylmercury is 0.1 μg/kg-day. This means that EPA considers it safe to take into the body no more than 0.1 micrograms per day of methylmercury, per kilogram of body weight—or, for a 70 kilogram (145 pound) individual, 7 micrograms per day.

Well-Designed Studies and a Revised Safe Exposure Level

Since the historical poisoning episodes in Minamata Bay and Iraq, researchers have carefully designed new studies to give a more realistic picture of human exposure to methylmercury in routine daily life and detailed information about its potential long-term effects in children. These studies focus on populations who eat fish and seafood, which are the main sources of continuous, low-level human exposure to methylmercury. Study populations include people living in Peru, New Zealand, the Seychelles Islands, the Faroe Islands, and Canada. The Seychelles and Faroe Islands studies each involve nearly 1000 mother-child pairs, followed from pregnancy onward. At succeeding ages, children in these studies have taken tests designed to assess their psychomotor, cognitive, and social development.

In general, results to date from these contemporary studies do not support the need for a safe exposure level as cautious as the one EPA calculated based on the Iraqi poisoning episode. Indeed. the Agency for Toxic Substances and Disease Registry (ATSDR)—part of the U.S. Public Health Service—has calculated a revised safe exposure level based on information from the Seychelles Islands study, which it deems the most suitable for assessing childhood developmental effects. Data from the Seychelles Islands study reveal no adverse effects to children there from any measured level of exposure to methylmercury. On the basis of this study, the ATSDR has proposed a new safe exposure level of 0.5 μg/kg-day. This means that it is safe to rake into the body 0.5 micrograms per day of methylmercury, per kilogram of body weight or 5 times the amount permitted by the current EPA level.

Another recent study, using data from the Seychelles Islands but employing different methods, reached the same conclusion—that a safe exposure level of 0.5 μg/kg-day is appropriate. This second study, jointly sponsored by Alcoa, EPRI, and a number of U.S. utilities, has undergone external scientific peer review and is planned for publication.

Impacts of Current Analyses While ATSDR's revised safe exposure level of 0.5 μg/kg-day doesn't look that different from EPA's reference dose of 0.1 μg/kg-day, a revised safe exposure level would likely lift restrictions on fish consumption at many of the U.S. lakes and rivers where fishermen are currently warned of possible mercury contamination in fish they might catch and eat. At fishing sites where mercury contamination might prevail, state governments post advisories telling fishermen how many fish they may safely consume. In some cases, the advisories prohibit fish consumption. These advisories are often aimed at women of childbearing age and young children to protect normal, healthy development in early childhood. For example, in sampled lakes in the state of Maine (see Figure 1), a revised safe exposure level would remove bans on fish consumption, and would dramatically reduce advisories limiting fish consumption by children and by women of childbearing age.

Conclusion

Newly emerging data indicate that methylmercury exposure for pregnant women has much less impact on the early development of their children than previously believed. Independent analyses based on these data support a revised safe exposure level that is 5 times less stringent than the current EPA reference dose for mercury. This new recommendation sharply reduces the estimated number of U.S. women potentially exposed above safe levels and may have important impacts on related issues, such as recreational fishing in U.S. lakes.

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ELECTRIC POWER RESEARCH INSTITUTE

MERCURY FROM U.S. FOSSIL-FIRED POWER PLANTS: THE GLOBAL CONTEXT

ENVIRONMENT DIVISION AIR TOXICS HEALTH AND RISK ASSESSMENT TARGET

Exposure to the organic form of mercury (methylmercury) found in fish and shellfish may pose health risks, especially to children whose mothers eat these foods during pregnancy. For this reason, mercury is a substance of high concern among those designated as hazardous air pollutants in the 1990 Clean Air Act Amendments.

Yet, no one is certain that the amount of methylmercury in fish and shellfish is directly related to the amount of mercury currently released into the air by industrial and other human activities. In particular, it is unclear that lowering mercury emissions from power plants would markedly decrease the amount of methylmercury in fish. To explore these questions and further scientific understanding, the U.S. Environmental Protection Agency (EPA) has conducted an intensive study of mercury in the environment, summarizer its December, 1997 EPA Mercury Study Report to Congress.

Since scientists estimate that half of all mercury released to the atmosphere by human activity cycles around the globe, it is clear that mercury is a global issue. As part of the global picture, U.S. power plants contribute only a small percentage of the total mercury released to the earth's atmosphere in a given year. This Air Quality Brief places mercury emissions from U.S. utilities into the global context needed for scientific understanding and management decisionmaking.

Estimating Mercury Releases

Mercury in the atmosphere comes from natural sources and human activities (see Figure 1). Although global estimates are highly uncertain, they indicate that approximately 6000—7000 metric tons per year of mercury are released around the globe. Of that amount, 2000 metric tons per year come from the ocean surface, about 1000 metric tons per year from natural land sources, and about 4000 metric tons per year from human activities.

Human activities in the United States release roughly 150 metric tons per year of mercury to the atmosphere, according to a recent EPRI study. Of this total, about 40 metric tons per year come from U.S. fossil-fired power plants. Other sources include private and commercial fuel burning, municipal and medical waste burning, manufacturing/ smelting, and miscellaneous activities. In general, data On mercury releases from power plants are of higher quality than data on releases from other sources, due to extensive measurements at power plants by EPRI, the U.S. Department of Energy, and others.

Tracking Mercury

Tracking the movement of mercury away from power plants to its ultimate destination in the environment is as important as knowing how much is emitted. Unfortunately, researchers have not found an inert tracer for mercury that will follow it from release to the air, through cycling in water bodies, to deposition at environmental sites. Lacicing such a tracer, scientists must rely on atmospheric simulation models to translate mercury releases into estimates of deposition, human exposure, and risk.

Atmospheric simulation models deal with mercury on global, regional, and local scales. On the global scale, some of the mercury released to the atmosphere can travel long distances, even cycle the globe, before returning to earth. For instance, elemental mercury, released by combustion as a gas, stays in the atmosphere a long time and is only slightly soluble in water. These properties allow elemental mercury to travel great distances before it oxidizes and deposits to the earth's surface. Thus. atmospheric simulation models indicate that substantially more elemental mercury

is added to transport and deposition on the global and regional scales than on the local scale.

Using atmospheric simulation models to track mercury at regional and local scales is challenging for two reasons First, all forms of mercury enter the atmosphere ill very low concentrations. There, they may undergo chemical and physical transformations that are poorly understood, and therefore difficult to model. Second, modelers lack enough actual regional and local measurements to validate the predictive capacity of atmospheric simulation models used at those scales.

Despite these challenges, the newest regional modeling tools provide an opportunity to determine the relationship between utility mercury emissions and deposition at particular environmental sites. Researchers have applied one of these tools—a new reactive plume model developed under EPRI sponsorship—to estimate how much mercury emitted From a power plant stack would be deposited within a 100-km (60-mile) radius under different weather conditions. Results show that up to, but usually much less than, 18 percent of the emitted mercury deposits locally, depending on weather patterns. The rest enters regional and global circulation and travels hundreds or thousands of kilometers before reaching the earth's surface—open over the open ocean.

Conclusion

U.S. utility plants burning fossil fuels contribute about 1 percent of the mercury that human activities release to the global atmosphere in a given year, find less than 1 percent of mercury released from all sources. Estimates to date indicate that deposition of mercury in the local area around power plants is quite low. Much of the mercury leaving power plant stacks enters the global atmosphere and travels long distances before it reaches the earth.

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STATE OF COLORADO, OFFICE OF THE GOVERNOR,
Denver, Colorado 80203–1792, September 29, 1998.

HON. JAMES M. INHOFE, *Chairman,*
Clean Air, Wetlands, Private Property, and Nuclear Safety Subcommittee,
Environment and Public Works Committee,
U.S. Senate,
Washington, DC 20510.

DEAR CHAIRMAN INHOFE: I am writing to provide my input on the hearing that the Senate Subcommittee on Clean Air, Wetlands, Private Property, and Nuclear Safety is holding on EPA's proposed initiative to protect the air quality in the country's premier national parks and wilderness areas.

The citizens of Colorado and the American people overwhelmingly support protecting the magnificent vistas in our national parks and wilderness areas. Colorado State University recently published the results of a national public opinion poll which found that there is broad-based bipartisan support for cleaning up air pollution in the national parks. Indeed, in the Rocky Mountain West, it is the mountain vistas, scenic horizons and clear blue skies that inspire many to move here to raise their families, and that draws millions of visitors from across the country and the world Protecting, the air quality in the unique areas that are our nation's legacy is central to our quality of life, and our economy.

The key concern your subcommittee and others previously raised was the manner in which EPA proposed to address the recommendations of the Grand Canyon Visi-

bility Transport Commission The Commission, led principally by western Governors, issued a blueprint for protecting the air quality in the "Golden Circle" of national parks and wilderness areas on the Colorado Plateau, which includes not only the Grand Canyon but many spectacular areas in Colorado (Mesa Verde National Park, Black Canyon of the Gunnison National Monument, Snowmass-Maroon Bells Wilderness, Flat Tops Wilderness, Weminuche Wilderness, and West Elk Wilderness) This blueprint was developed in a bipartisan, ground-breaking, consensus-based process and enjoys the support of public officials, industry, tribes, environmentalists, and scientists from across the West.

On September 3, EPA responded to the criticism raised and, based on detailed comments from the Western Governors' Association, published a notice proposing to incorporate the Commission's recommendations into its air quality initiative. I appreciate EPA's response to include this important initiative that originated from the states and local citizens.

I support the course of action EPA charted in its September 3 public notice, and urge you to do the same.

Sincerely,

ROY ROMER,
Governor.

CLEARING THE AIR IN OUR NATIONAL PARKS

NATURAL RESOURCES DEFENSE COUNCIL; ENVIRONMENTAL DEFENSE FUND; SIERRA CLUB; NATIONAL PARKS AND CONSERVATION ASSOCIATION; LAND AND WATER FUND OF THE ROCKIES; PHYSICIANS FOR SOCIAL RESPONSIBILITY; DEFENDERS OF WILDLIFE; U.S. PUBLIC INTEREST RESEARCH GROUP; GRAND CANYON TRUST; NEW MEXICO CITIZENS FOR CLEAN AIR & WATER; APPALACHIAN MOUNTAIN CLUB

On October 1, the Senate Environment and Public Works clean air subcommittee is scheduled to hold its second hearing on EPA's proposal to protect the scenic vistas in premier national parks and wilderness areas. While the names of America's best-known National Parks—from the Great Smokies to the Grand Canyon to Mount Ranier—are likely to call up visions of spectacular scenery, many of these scenic vistas are often so clouded by air pollution that they are barely visible. The Clean Air Act requires EPA to issue regulations to eliminate the manmade pollution that clouds our nation's parks. The rule is already well past due. We urge you to support EPA's efforts to issue an enforceable rule that clears the air within our lifetimes.

In the 1977 Clean Air Act Amendments, Congress added a program to protect visibility, declaring and codifying the national goal of remedying existing problems and preventing future manmade visibility impairment in specially designated national parks and wilderness areas across the country. Yet, little progress has been made and in many areas the air has only gotten worse. Recognizing that its past efforts have been inadequate, in July 1997 EPA proposed a new initiative aimed at pollution from a variety of sources that contribute to haze over broad interstate regions. The National Academy of Sciences has indicated that this "regional haze" is the predominant form of visibility impairment in our national parks and wilderness areas.

A central feature of EPA's regional haze proposal is designed to promote accountability in realizing actual visibility protection. EPA proposed to prevent degradation of visibility during the clearest days. EPA also proposed that visibility during the worst impairment periods perceptibly be improved every ten to 15 years. However, this is only a presumptive level of protection. States would be allowed to establish a slower rate of improvement based on costs and other factors if they demonstrate that it is reasonable. A November 17, 1997 Congressional Research Service Report to Congress on EPA's proposal found that this feature in addition to state flexibility in designing control strategies provided extraordinary implementation flexibility. Nevertheless, polluters are seeking to weaken these minimally protective aspects of EPA's proposal by attacking EPA's reliance on visibility as a measure of progress, and by undermining the rate of progress.

The EPA proposal would establish perceptible change in visibility as a touchstone for program accountability over the duration of the long-term (10 to 15 year) planning period. At the same time, recognizing that there may be variability in visibility conditions during the shortterm that make it difficult to discern visibility trends, EPA proposed to allow state reliance on emissions reductions to inform whether progress is occurring over the short-term, and whether mid-course planning adjustments are needed. As its name implies, the purpose of the Clean Air Act's visibility program is to protect visual air quality. Better visibility must be the ultimate measure of success. While emissions reductions reasonably may inform short-term plan-

ning considerations, they should not be substituted for or confused with the fundamental programmatic goal—protecting the scenic vistas in national parks and wilderness areas.

EPA's performance objective is a critical aspect of its regional haze initiative. A sound measure of visibility progress enables the public to assess the integrity of governmental programs to protect the nation's grand vistas. Conversely, a governmental program without a strong, concrete measure of progress is a program without any purpose or aim and, ultimately, lacking any public accountability.

Even if EPA's proposed rate of progress is achieved, it would take hundreds of years to clear the manmade visibility impairment in our national parks and wildernesses. This rate of progress is especially inadequate in the East, where the current visibility conditions on the worst days are severely polluted.

EPA's supplemental proposal responds to earlier criticism from the Western Governors Association that the proposal does not adequately incorporate recommendations of the Grand Canyon Visibility Transport Commission. Environmentalists have worked together with the Western Governors Association and industry representatives to identify mutually agreeable strategies to improve visibility in the Grand Canyon region. On September 3, 1998, EPA issued a supplemental proposal that incorporates these strategies.

The Western Governors Association has acknowledged the importance of improving visibility in park areas. Places like Grand Canyon, Yellowstone and Yosemite are treasures of our national heritage and a legacy we must responsibly protect for our children. Our National Parks are visited by millions of tourists from across the country and, indeed, around the world, proving Important economic activity in many states.

We respectfully request your support for EPA's initiative to clear the air polluting national parks and wilderness areas. We especially seek your support for a sound measure of visibility progress. EPA should finalize its proposal to prohibit further degradation of clear visibility days. EPA should also establish a strong, presumptive rate of visibility improvement for the most impaired days that applies to western national parks and wilderness area, and that provides for a faster rate of progress in the East. Thank you for your consideration of this important matter.

Sincerely,

SHARON BUCCINO, *Attorney,*
Natural Resources Defense Council.

DEBBIE SEASE, *Legislative Director,*
Sierra Club.

JOHN NIELSON, *Policy Advisor,*
Land and Water Fund of the Rockies.

JIM WYERMAN, *Vice President for Program,*
Defenders of Wildlife.

TOM ROBINSON, *Director of Conservation Policy,*
Grand Canyon Trust.

BRUCE HILL, PH.D., *Senior Scientist,*
Appalachian Mountain Club.

VICKIE PATTON, *Attorney,*
Environmental Defense Fund.

WILLIAM J. CHANDLER, *Vice President, Conservation Policy,*
National Parks and Conservation Association.

SHARON NEWSOME, *Director, Environmental Program,*
Physicians for Social Responsibility.

REBECCA STANFIELD, *Energy Advocate,*
U.S. Public Interest Research Group.

JOHN BARTLIT, *State Chairman,*
New Mexico Citizens for Clean Air & Water.

CONFERENCE OF NEW ENGLAND GOVERNORS AND EASTERN CANADIAN PREMIERS

RESOLUTION 23–2—CONCERNING MERCURY AND ITS IMPACTS ON THE ENVIRONMENT

WHEREAS, mercury is a persistent bioaccumulative toxin that poses a serious health risk to humans, undermines the productivity and safety of fisheries, and diminishes the economic benefits of tourism in the region; and

WHEREAS, mercury is a transboundary air pollutant that, like sulfur dioxide and nitrogen oxides, calls for coordinated regional, national and international efforts to minimize contamination to the environment; and

WHEREAS, the New England states and Eastern Canadian provinces recognize the opportunity to reduce the release of mercury from human activity through cooperative activity between the two regions; and

WHEREAS, the Conference of New England Governors and Eastern Canadian Premiers Committee on the Environment convened a successful workshop in Portland, Maine, to share information and prepare recommendations for specific actions that the provinces and states can undertake to ensure significant progress is realized in the release of mercury from human activity, into the ecosystem; and

NOW, THEREFORE, BE IT RESOLVED THAT, the New England Governors and Eastern Canadian Premiers call upon their respective Federal Governments and the Commission for Environmental Cooperation to move forward without further delay to develop and implement national and continental measures for the virtual elimination of discharges of mercury from human activity, into the environment; and

BE IT FURTHER RESOLVED THAT, the New England Governors and Eastern Canadian Premiers adopt the proposed action plan that includes 45 recommendations addressing:

The establishment of a Regional Mercury Task Force to coordinate the implementation of the Mercury Action Plan;

mercury emissions reduction targets for identified sources, such as municipal solid waste combustors, medical waste incinerators, sludge incinerators, utility and nonutility boilers, industrial and area sources;

source reduction and safe waste management, including recycling;

outreach and education, especially for high-risk populations;

research, analysis, and strategic monitoring, to further identify and quantify sources of mercury deposition, and to monitor deposition patterns and develop meaningful environmental indicators to measure and track progress;

mercury stockpile management; and

BE IT FURTHER RESOLVED THAT the Committee on the Environment take immediate action to appoint the Mercury Task Force by June 30, 1998.

BE IT FURTHER RESOLVED THAT, the Committee on the Environment, working with the Secretariats, report on progress taken on the implementation of the Mercury Action Plan at the next annual meeting of the Conference of New England Governors and Eastern Canadian Premiers.

Adopted at the 23rd Annual Conference of New England Governors and Eastern Canadian Premiers, June 7–9, 1998.

STATE OF NEW JERSEY,
DEPARTMENT OF ENVIRONMENTAL PROTECTION,
October 1, 1998.

HON. SENATOR CHAFEE, *Chair,*
Committee on Environment and Public Works,
Washington, DC 20510.

SUBJECT: HEARING ON REGIONAL HAZE AND MERCURY

DEAR SENATOR CHAFEE: I am writing to express New Jersey Department of Environmental Protection's concerns on the issues of environmental and public health impacts of mercury. We agree sound science is the foundation of sound regulatory determinations. Further, efficient and effective technology needs to be readily available when control technology is mandated. Nonetheless, there are urgent facts and affordable initiatives that may justify regulatory determinations that need to be included in this discussion.

The background mercury levels, particularly in the northeast, as documented in the USEPA Mercury Report (commissioned by Congress and reviewed and accepted by the SAB) and the Northeast State and Easterly Canadian Provinces Mercury Studies are of significant public health concerns particularly to human embryo development and young children.

2. Combustion sources are the single largest category source of anthropogenic mercury emissions.

3. Source reduction, recycling and control technology in combination are beginning to successfully lower mercury emissions fi own some combustion sources, such as MSW and medical waste incinerators in significant quantities.

4. Other sources such as utilities, steel and iron and refineries are becoming proportionally a larger component of the total emissions.

5. Out-of-region sources contribute significantly to our regional concerns.

While we agree that pending research and in some cases baseline assessments need to be completed, that is no reason to delay prudent action. There are valid concerns whether currently available control technologies are cost effective for all combustion sources. However, these technologies are maturing quickly. Advances in innovative environmental technology are developed across a broad spectrum of media areas and programs. A technology solution in one field may be modified and spur on advances in the field of mercury control or vice verse. Regulatory initiatives can be developed to help spur on efficient and effective controls and pollution prevention approaches. Establishing restrictions on regulatory actions in one area of mercury control is likely to have an unintended chilling effect on research and development for technology that are needed in this area and other associated environmental technology areas.

There are initiatives that could be implemented through a partnership between the USEPA, the state environmental agencies, the combustion industries such as the waste management industry, steel mills, refineries or utilities and their subsidiary energy service contractor companies. These initiatives have the potential to affordably and effectively lower overall mercury emissions now while waiting for the completion of more research. However, these initiatives may require regulatory determinations as follows:

1. Collection and recycling of mercury containing gas regulators. This would require a regulatory change to allow this material to be properly managed as a universal waste. This would eliminate this source of mercury and is solely managed by utilities.

2. Continued expansion of the Energy Star program for energy efficient lighting systems with low mercury content. This would require a regulatory determination of the energy savings and mercury reduction through the USEPA in their Energy Wise program. This is a program that is endorsed by the utilities and their service contractors.

3. Collection and recycling of mercury containing lamps. This would require a regulatory change to allow this material to be properly managed as a universal waste. Energy efficient lighting is fundamental to the demand side management programs of utilities and energy contractors. Closing the loop on this source of mercury would be beneficial.

4. Collection and recycling of mercury containing thermostats and mercury switches.

This material is a universal waste but to provide for its reuse as a product may require the USEPA or state environmental agencies through reciprocal agreements to make a regulatory determination.

These are flexible, low cost regulatory programs that could quickly lower overall mercury emissions across combustion sources. I urge you not to underestimate how effective these initiatives can be, if the concerned patties walk in partnership. New Jersey was the first state to propose and adopt a mercury emission standard from MSW incinerators. These standards are the lowest in the country.

This ambitious control limit was established through a stakeholder process that respected the concerns of all the patties involved. We developed a creative and flexible regulatory determination for source reduction, SOU2 ce separation/recycling and control technology. The results have been, literally, more than we hoped for. Currently, the emissions from 3 of the 5 MSW incinerators reach into the single digit micrograms level, below our year 2000 standard, with approximately 99 percent removal. The inlet concentration of mercury from this source in some test runs is lower than the standard required after controls. When we began discussing concerns about MSW emissions the industry sincerely believed emissions as low as we leave today were impossible to achieve. Our success is rooted in regulatory flexibility that encourages innovation. Today in New Jersey we have over a two order of magnitude (100 X's) reduction in mercury concentrations and emissions from this source. This cost-effective solution is now being adopted by the New England Governors and Eastern Canadian Premiers, by the Southeastern and Great Lake States. This program could not have been developed if we restricted regulatory determinations or approaches.

We are not asking that you bring out the legislative hammer and bang utilities or other combustion sources over the head to comply in a command and control response. We are asking that you help us, state environmental agencies in the development of sensible, creative programs that may require regulatory determination to create a level playing field. In the increasingly deregulated markets of today, even the most conscientious companies are unwilling to risk competitive disadvantage by shouldering environmental obligations their competitors can lawfully shun. Industries are unlikely to object to the modest but effective mercury emission reduction measures we have suggested, as long as all utilities have to meet the same requirements.

For all these reasons we ask that allow for creative and innovative solutions to the mercury emissions issue while we wait for cost effective control technology and more research to catch up to our goals.

ROBERT C. SHINN JR., *Commissioner.*

WESTERN REGIONAL COUNCIL,
October 14, 1998.

HON. JAMES M. INHOFE, *Chairman,*
Subcommittee on Clean Air, Wetlands, Private Property And Nuclear Safety,
Senate Office Building,
Washington, DC 20510.

DEAR SENATOR INHOFE: Enclosed is a copy of the Western Regional Council's (WRC) October 5 comments regarding the Environmental Protection Agency's recent Notice of Availability of Additional Information Related to Proposed Regional Haze Regulations, 40 CFR Part 51 (Docket Number A–95–38).

The WRC respectfully requests the opportunity to submit our comments for the record of the Clean Air Subcommittee's October 1 hearing on regional haze.

WRC has been the leading multi-industry organization working on the regional haze issue since Congress established the Grand Canyon Visibility Transport Commission in the 1990 Clean Air Act Amendments. We believe our comments regarding the Western Governors' Association's proposed alternative to EPA's regional haze rule, the Inhofe amendment to the TEA–21 legislation, and other issues related to the EPA notice, may be of interest to members of the committee.

If you have any questions regarding the WRC comments, please contact Ruth McCormick at 703–549–1466.

Sincerely,

ED BARTLETT, *Chairman,*
Clean Air Committee.

BRIEF DISCUSSION OF METHYLMERCURY EXPOSURE GUIDELINE DEBATE

(By C. Mark Smith)

Although toxicologists generally view mercury as a potent toxin, considerable debate exists over the precise level of risk that exposures to this toxin may cause. At higher dose levels there is extensive evidence that organic forms of mercury such as methylmercury, the primary type found in fish, are extremely toxic. The developing nervous systems of the fetus and children are particularly sensitive to these effects. Numerous epidemics have occurred around the world where many people have died or been permanently injured as a result of exposures to methylmercury in their diets. Most notably these include the tragic mass poisonings in Iraq, due to grain contaminated with methylmercury, and at Minamata and Nigata Bays in Japan, due to fish contamination. In these cases thousands of people were seriously injured or killed. More locally and recently, a renowned scientist at an Ivy League College tragically died from extensive brain damage as the result of an accidental exposure to a relatively few drops (a "large" dose for this compound) of a related mercury compound, dimethylmercury.

There is much current debate about the precise level of risk associated with exposures to mercury at lower doses. The scientific evidence on this issue is by no means clear-cut and is open to differing interpretations. Ongoing debates on this issue largely focus on two recent research projects where people exposed to mercury in their diets at environmentally relevant levels were studied. Although each project has limitations both are, by and large, of excellent quality. To be very brief, the results of one of these studies, conducted at the Faroe Islands, indicates that the nervous system of babies can be injured by low levels of methylmercury in the mothers

diet. In contrast, the second study, at the Seychelles Islands, did not detect any significant effects associated with such exposures. The reason(s) why these studies are reaching different conclusions has not been determined but may relate to the use of different experimental methods or to differences in the populations studied, such as lifestyles, exposures to other toxins or in their inherent susceptibility (perhaps due to genetic differences).

Recently, the Agency for Toxic Substances and Disease Registry (ATSDR) proposed a chronic methylmercury exposure guideline (referred to as the Minimum Risk Level or MRL). This guideline is 5 times higher than the ATSDR intermediate exposure MRL as well as the equivalent EPA chronic exposure guideline (the reference dose or RfD).

Briefly, ATSDR largely relied on results from the negative Seychelles Island Study in deriving this new MRL value. The toxic effects reported in the Faroe Islands Study are at this time not adequately reflected in their analysis since new information has become available from this study. This is a significant limitation as there are several reasons that suggest the Faroe study may provide a better, or at least an equally valid, basis for evaluating mercury exposure risk. Before any conclusion is reached that higher mercury exposures are acceptable, the different results between these studies should be explored more fully, addressing in particular the following issues:

1) Measure of effect: The Faroe Island and Seychelles Island Studies used different measures of effects. As noted in the attached letter to the editor of the Journal of the American Medical Association from Dr. Philippe Grandjean (a principal investigator in the Faroe Island Study) there are outstanding questions about the sensitivity of the battery of neurobehavioural tests used in the Seychelles Island Study. Those used in the Faroe Island investigation were likely to have been more sensitive and this could well explain the differences in results. Resolution of this issue is very important to the appropriate interpretation of these studies.

2) Measure of dose: In the Faroe Island study mercury levels in umbilical cord blood and maternal hair were used as measures of fetal mercury exposure. Umbilical cord measurements provide a more precise measure of delivered dose to the fetus in comparison to maternal hair mercury levels, which were relied on in the Seychelles study. Less accurate measures of dose can lead to exposure misclassifications (e.g., incorrectly concluding that someone was exposed to a low level of mercury when they were in fact exposed to higher levels). This can make dose/effect relationships more difficult to detect (i.e., biases the results toward the null hypothesis of no effect.) This again suggests caution in relying on the Seychelles Island Study results to evaluate methylmercury risk.

3) Dose rate: The dose rate in the Faroe Islands was likely to have been higher, with more episodic exposures, than in the Seychelles Islands (the fish from the Seychelles Islands have been reported to contain lower levels of mercury but were eaten regularly vs. the whale meat in the Faroes, which was eaten less frequently but had higher mercury concentrations). The Faroe Island experience may well be more representative of the situation in the Northeast US, where fish mercury levels are also high. This raises questions about the degree of confidence one should have in extrapolating the Seychelles Island results to other exposure situations.

In addition to these issues relating to data quality and sufficiency, other limitations in the ATSDR proposed MRL revision exist. Potential differences in susceptibilities within the human population, which could arise due to lifestyle factors (e.g., alcohol consumption); exposures to other environmental toxins; and the potential for genetically determined variability in responses, also exist.

In short all of these factors raise questions as to the appropriateness of the proposed ATSDR MRL. Specifically, ATSDR did not adequately account for the many uncertainties, including interindividual variability and data limitations, as noted above. In fact, depending on how the these inherent uncertainties are accounted for, one can quite legitimately reach different conclusions regarding the dangers of lower dose exposures to methylmercury: it is possible to interpret the data as suggesting that exposures to methyl mercury are somewhat less "risky" or alternatively even somewhat more "risky" than previously thought. Although there is no clear definitive answer, taken together these uncertainties support the use of an uncertainty factor substantially greater than that used by ATSDR in their MRL derivation. This would lower the proposed value by a factor of at least 3, essentially bringing it back in line with current values.

In conclusion, from a public health perspective and especially because children are most at risk and could be permanently harmed, the uncertainties in the precise risks attributable to mercury exposures should not interfere with efforts to reduce mercury levels in the environment. This is especially true from the Northeast per-

spective as levels of mercury in fish in our region are high enough to be of concern no matter what the resolution of this debate.

WESTERN REGIONAL COUNCIL: COMMENTS ON THE ENVIRONMENTAL PROTECTION AGENCY NOTICE OF AVAILABILITY OF ADDITIONAL INFORMATION

RELATED TO PROPOSED REGIONAL HAZE REGULATIONS

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I. Introduction

The Western Regional Council ("WRC") respectfully submits the following comments regarding the Environmental Protection Agency ("EPA" or "Agency") Notice of Availability of Additional Information Related to Proposed Regional Haze Regulations ("Notice"). The Notice solicits comments on the recommendations related to the Grand Canyon Visibility Transport Commission ("GCVTC" or "Commission") contained in the June 29, 1998, letter from the Western Governors' Association ("WGA"), the draft translation of the WGA recommendations into regulatory language by EPA, and the Transportation Equity Act for the 21st Century, Pub. L. No. 105–178 ("TEA–21") legislation provisions affecting the regional haze program.

WRC Background

As you know, WRC is an organization of chief executive officers of approximately thirty companies with significant business activities in the western United States, including accounting, construction, engineering, financial, manufacturing, mining, oil and gas, utility and other enterprises. The purpose of WRC is to protect the quality of life in our region, recognizing the need for both a safe and clean environment and a healthy economy.

WRC has been involved in the visibility issue since 1977, when the national visibility goal was first included as part of the Clean Air Act. During the 1980's we worked on numerous legislative and regulatory measures to address visibility in our region. In the 101st Congress, during the congressional debate over the Clean Air Act Amendments of 1990 ("CAAA"), WRC was one of the first organizations to formally support the establishment of the GCVTC.

WRC and its member companies were actively involved in the Commission's activities, deliberations, meetings and process, with individuals serving on the Commission's Technical, Alternatives Assessment, Communications and Public Advisory Committees, as well as on several of the Commission's subcommittees. WRC supported the Commission's final June 1996 report to EPA as a compromise, consensus product that provided a sound approach for addressing visibility in Class I areas on the Colorado Plateau.

WRC continues to be actively involved with the Commission's successor, the Western Regional Air Partnership ("WRAP"), to monitor implementation of the Commission's recommendations.

The Grand Canyon Visibility Transport Commission Process Was Successful and Produced a Sound Visibility Improvement Strategy

Westerners take pride in the world-renowned beauty of the American West. We recognize that maintaining, and improving, our already superior visibility is an important objective.

This western attitude about the importance of visibility explains why there was such heavy participation in the Commission process by so many individuals and organizations. WRC, along with a number of its member companies, participated in the GCVTC process from start to finish.

WRC invested a large quantity of both human and financial resources in the process. An atmosphere of "pragmatic optimism" seemed to permeate the GCVTC process as westerners of diverse backgrounds worked toward a common goal. The process focused on identifying all of the sources of visibility impairment on the Colorado Plateau and negotiating a number of strategies to reduce the impacts of these various sources. The consensus of participants and observers is that the process was very successful.

Previous WRC Comments on EPA's Regional Haze Proposal

WRC shares the concern and perspective of many westerners that the regional haze regulations proposed by EPA on July 31, 1997 ignore the GCVTC process and

threaten to thwart the common objective of visibility improvement on the Colorado Plateau by the use of narrowly focused and inflexible regulatory prescriptions. WRC submitted extensive comments on the Agency's proposal, which are incorporated herein by reference (See "Comments of the Western Regional Council Regarding the Environmental Protection Agency Regional Haze Regulations; Proposed Rule, 40 CFR Part 51, Docket Number A–95–38, December 5, 1997"). WRC continues to support the positions and recommendations in those formal comments to EPA, including our opposition to the proposed deciview target and group BART.

Impact of Visibility Regulations on the West

The western reaction to EPA's originally proposed regional haze rule arises from the fact that most westerners agree that visibility regulation strikes at the very heart of the important issue of future economic growth. This is not an issue of private versus public interests. Moreover, this is certainly not an issue of EPA versus big industry as some have attempted to assert. Rather, it is a state, tribal, and regional issue of determining how to best accommodate economic growth and the commonly shared objective of visibility improvement.

The issue of economic growth and visibility improvement in the West arises in ways different from every other part of the United States. This is true because, as a region, the West has been and continues to be one of the fastest growing areas of the country. At the same time, the West also enjoys the clearest air in the country from a visibility standpoint. EPA's visibility monitoring network, the IMPROVE network, has documented that the states of Arizona, Colorado,

Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming have the best visibility in the country. The relatively small visibility impairment in the West is caused mainly by roughly equal contributions of sulfate, coarse particles, and organics (see page 6 of the GCVTC, enclosed in Appendix A). Excellent visibility exists, in part, because of low population densities, low humidity, and the use of low-sulfur coal for power generation. In general, western coal contains one-tenth the sulfur contained in coals used to generate power in the East. In fact, the sulfur dioxide ("SO_2") emitted by just one eastern power company is nearly equal to the total SOP emissions of the entire western United States. According to EPA's 1995 acid rain data base, a total of 13.4 million tons of SO_2 was emitted from U.S. power plants. Of that amount, only 475,000 tons—or 3.5 percent of the national total—came from power plants in the original Commission states.

Congress recognized these unique characteristics of western visibility and required EPA not to develop its regional haze program until after the GCVTC had deliberated and provided its recommendations to EPA. Until recently, EPA has not, in our view, accounted for the GCVTC recommendations in its proposed rule. Rather, the non-WGA/GCVTC provisions of EPA's July 31, 1997 proposed rule would impose the greatest costs and burdens on the governments, industry and people of the cleanest, western states.

The GCVTC recommendations effectively address the issue of economic growth and visibility improvement in the GCVTC states by focusing on a strategy (rather than inflexible standards and targets). The GCVTC strategy focuses on a wide array of sources for purposes of ensuring true progress toward the visibility goal, given the unique circumstances of the GCVTC states. WRC believes that the flexible, strategy-oriented process recommended by the GCVTC is the approach that is fair and will work best in the West. By contrast, the inflexible EPA approach penalizes the West by requiring the region to achieve, maintain and improve visibility at higher levels, and higher cost, than any other region of the country.

WGA Process/Proposal

The Agency's failure to recognize the GCVTC partnership and the recommendations that it produced was the motivating factor behind the WGA effort to develop its 'Proposed Changes to the Regional Haze Rule to Facilitate Implementation of the Grand Canyon Visibility Transport Commission Recommendations." The WGA document represents significant progress over the EPA proposal on many of the issues related to the Commission's recommendations.

However, due to the rapid pace of the discussions and other limitations, the WGA process did not allow for participation by all interested stakeholders or for resolution of all critical issues.

Consequently, WRC appreciates the opportunity to provide the following comments, which address outstanding issues and WRC concerns regarding the WGA proposal.

In summary, we encourage EPA to:

- incorporate the WGA proposed revisions into the regional haze rule as revised and refined by these comments;

- address the timing issues related to the regional haze provision of the TEA–21 legislation by harmonizing the schedule for regional haze SIPs with SIPs required for the $PM_{2.5}$ ambient air quality standards;
- revise other aspects of the July 31, 1997 regional haze proposal as recommended in our December 5, 1997 comments to the agency, including eliminate the deciview target and group BART requirement, require reasonable smoke prevention and abatement by FLMs, etc.; and
- significantly revise and re-propose the rule for further comment.

II. Conformity with §51.309 (the rule based on the GCVTC) will be Sufficient to Assure Reasonable Progress for the Transport Region States; the Balance of EPA's Regional Haze Rule Shall Not Apply to GCVTC States

The GCVTC recommendations provide a comprehensive plan for making reasonable progress toward the national visibility goal. No other requirements should be imposed on states in the Transport Region that implement the GCVTC recommendations, as amplified by the WGA recommendations and codified in the proposed 40 CFR 51.309. Proposed §51.309 should apply instead of, not in addition to, the regional haze rule EPA proposed on July 31, 1997. This was certainly the WGA's intent, and WRC trusts it is EPA's intent as well. However, the Federal Register notice and draft regulatory language are not clear on this point. WRC requests that EPA clarify in the preamble to the final rule and in the final rule itself that compliance with §51.309 fulfills all of the obligations of Transport Region states with regard to addressing regional haze, including the planning and coordination requirements proposed in §51.302, and the requirements for a long-term strategy proposed in §51.306, but the monitoring requirements proposed in §51.305 would apply to Transport Region States. WRC suggests the following changes to proposed §51.309:

§51.309 Requirements Related to the Grand Canyon Visibility Transport Commission

(a) Purpose and Applicability. The purpose of this section is to establish the requirements for implementation plan revisions and periodic progress reviews to address regional haze visibility impairment in the 16 Class I areas addressed by the Grand Canyon Visibility Transport Commission Report for the years 2003 to 2018. This section applies to Transport Region States, which are regulated by this section and not by §51.302 or by §51.306. §51.305 applies to Transport Region States.

Similarly, the following sentence should be added at the beginning of final §51.302 and §51.306:

Transport Region States are subject to §51.309 and not to this section.

It may also be necessary to move the definition of Transport Region States to §51.301.

The final rule must make clear that the emission management strategies in §51.309, if included in a State Implementation Plan ("SIP"), will assure reasonable progress.

The final rule should also provide a mechanism for states outside the Transport Region to form other visibility transport commissions, which could develop recommendations appropriate to their regions for eventual incorporation into the Federal visibility regulations. The Commission's process should serve as a model for remedying visibility in Class I Areas throughout the United States. Visibility is a regional issue and will be best dealt with through a regional approach with participation by all stakeholders to create a flexible and scientific approach to improved visibility. Stakeholders outside the Colorado Plateau Transport Region should be given the opportunity to benefit from the extensive work product developed by the GCVTC.

III. EPA Should Clarify That the Commission's Election to Include Other Class I Areas With the Annex Under §51.309(F)(2) Satisfies all Other Requirements in the Regional Haze Rule Under §51.3XX

WRC anticipates that western states that have both Colorado plateau and non-Colorado plateau Class I areas will want the Annex and therefore the regional planning process, to cover all of their Class I areas. This will minimize duplication of SIPs, state duplication of the regional planning process, and help the WRAP provide a meaningful service to its member states. It is therefore critical to states participating in the regional planning process that the Annex be all encompassing. WRC supports the proposed language in §51.309(f)(2) except that the decision to add Class I areas should be deliberated by the GCVTC, which will provide the technical and policy justification consistent with the expectation of achieving Reasonable Progress for the 16 Class I areas currently within the Commission's jurisdiction.

WRC suggests the following language:

§ 51.309(f)(2) The Commission may elect, at the same time it submits the Annex, to make recommendations intended to demonstrate reasonable progress for other mandatory Class I Federal areas (beyond the original 16) within the Transport Region States, including the technical and policy justification for these additional mandatory Class I Federal areas.

IV. EPA Must Provide Adequate Funding to Bring Class I Areas Outside the Colorado

Plateau Into the WGA Proposed Program

§ 51.309(f)(2) of EPA's draft regulatory language ("Draft") as currently written states:

The Commission may elect, at the same time it submits the annex, to make recommendations intended to demonstrate reasonable progress for other mandatory Class I areas (beyond the original 16) within the Transport Region States, including the technical and policy justification for these additional mandatory Class I Federal areas in accordance with the provisions of 51.3xx.

The technical requirements are included in Draft § 51.309(g):

Plans submitted in 2003 by Transport Region States, which implement the provisions of this section related to the Commission agree meets and recommendations in their long-term strategy, may be the basis for demonstrating reasonable progress for additional Class I areas in their jurisdiction, if the plans submitted by December 31, 2003:

(1) Include a modeling demonstration of expected visibility conditions for the most-impaired and least impaired days at the Class I areas in their jurisdiction, which may be based on refined technical studies conducted by the States and/or regional entity.

(2) Identify those Class I areas where reasonable progress may not be achieved and establish a schedule and process for more detailed review and development of additional measures which may be needed to demonstrate reasonable progress as required in 51.3xx.

(3) Provide for updates in 2008 and 2013 plans to implement any additional measures necessary to demonstrate reasonable progress.

WRC Comment: Conceptually, the above language is good. However, it is very restrictive and unworkable unless revised. The section states "may elect, at the same time it submits the annex. . ." The annex is due October 1, 2000, or only about 2 years away. EPA has cut funding for the WRAP in fiscal year 1999 to only $150,000, while the WRAP has said it will need $1.0 million for each of the next 2 year's work. The EPA funding level is inadequate to perform the necessary work in this short amount of time—essentially ensuring that the annex will not include additional Class I areas. Accordingly, EPA must provide revised language in the final rule that provides some flexibility on when the technical data can be submitted.

V. The Annex to the Commission Report (§ 51.309(f)) Should Discuss All Visibility Impairing Pollutants and All Sources of Visibility Impairment, not Simply Stationary Sources of SO_2

EPA's proposed § 51.309(f) requires an Annex by October 1, 2000, containing quantitative emission reductions for stationary sources of SO_2 with programs to achieve emission reduction milestones. WRC believes the Annex should include an analysis of all sources of all visibility impairing pollutants.

Enclosed as Appendix A are diagrams from the Grand Canyon Visibility Transport Commission showing pollutants and source categories that adversely impact visibility. It is obvious from these diagrams that western states and regulatory authorities must also focus attention on reducing emissions of organic carbon, elemental carbon, reactive organic gases, NOx and $PM_{2.5}$ in order to make reasonable progress toward attaining the national visibility goal. It is inappropriate to commit significant resources to the reduction of a single contributor to visibility impairment while emissions from other sources go uncontrolled or lack attention. The establishment of milestones for SO_2 should be matched with the establishment of milestones, other reasonable progress metrics, or other long-term strategies for other contributors to visibility impairment such as fires and mobile sources.

WRC asks EPA to add language to § 51.309(f)(1) as follows:

(iii) The Annex should contain an analysis of all visibility impairing pollutants, their sources, and long-term strategies, and a process for further evaluation to include them in the SIP. This documentation must include model rules, memoranda of understanding or other documentation describing in detail how emissions reduction progress will be monitored, what conditions will require the market trading program to be activated, how allocations will be performed, and how the program will operate.

VI. EPA Regulatory References to the GCVTC Report, and Baseline Forecast Scenario ("BFS") Must be Accurate

§ 51.309(f)(1)(i) of EPA's Draft rule entitled, "Annex to the Commission Report," currently provides as follows:

The annex must contain quantitative emission reduction milestones for stationary source sulfur dioxide emissions for the 2003–2018 time period. In setting these milestones, the Grand Canyon Visibility Transport Commission must consider its definition of reasonable progress, the 50–70 percent reduction in sulfur dioxide emissions from 1990 actual emission levels by 2040, applicable requirements under the Clean Air Act, and the timing of implementation plan assessments of progress and identification of deficiencies which will be due in the years 2008, 2013, and 2018.

WRC Comment: EPA's regulatory recognition of the GCVTC report is commendable.

WRC wholeheartedly endorses EPA's recognition of the GCVTC process. However, extreme care should be taken in putting GCVTC report language into regulation. WRC comments in this area are for EPA to include precise GCVTC language as necessary in quotations, but interpretations of GCVTC words should be avoided. In fact, it would be appropriate for the preamble to mention any attempts to interpret GCVTC language are not binding upon the Commission. In lieu of the foregoing language, WRC suggests the following language for § 51.309(f)(1)(i):

The Annex should contain quantitative emission reduction milestones for a 15-year review period, with assessments at 5-year intervals. In setting these milestones, the Commission should consider its definition of reasonable progress, its own recommendations, applicable requirements under the CAA, and 5 year implementation plan assessments of progress and identification of deficiencies and unnecessary regulation.

WRC believes it is unnecessary and inaccurate to include in the regulation a requirement for a "50–70 percent reduction in sulfur dioxide emissions" without qualification. Nevertheless, if EPA refers to a 50–70 percent reduction, EPA must at least include a reference to footnote 5 from the Commission's Report (Appendix B). WRC believes it would be better for EPA to replace the phrase "the 50 to 70 percent reduction in sulfur dioxide emissions from 1990 emission levels by 2040," with the phrase, "the stationary source section of the Commission's recommendations."

WGA developed provisions based upon the Integrated Assessment System ("IAS") model to forecast activity in emissions throughout the region. The IAS was developed as part of the GCVTC report. Like any model, the IAS relied upon a number of assumptions to conclude that reductions of 50 to 70 percent would be feasible by 2040. WRC supports the WRAP process to reconcile the IAS model assumptions. Assumptions which should be reviewed include such basic data as maximum plant utilization rates, individual plant repowering dates and configurations and cost for competing generation and emission control technologies. WRC recommends that the model be corrected as part of the Annex effort and, if required for visibility improvement, that quantitative emission reduction milestones be established based upon an accurate model with well documented and disclosed assumptions.

VII. EPA Should Acknowledge and Fulfill Its Obligations with Regard to Transboundary and Mobile Source Emissions

Several important contributors to visibility impairment are not within the power of states and tribes to regulate or control. One of these is decisions by FLMs concerning fire. EPA should require reasonable smoke prevention and abatement by FLMs and should not count necessary prescribed fire against reasonable progress toward the national visibility goal.

Other important contributors outside the control of states and tribes include:

- emissions transported across international boundaries, notably into the United States from Mexico, which are entirely outside the jurisdiction of states and tribes;
- emissions from mobile sources, which are regulated primarily by the Federal Government,2 although state and local government can impose inspection and maintenance and traffic control requirements.

Transboundary Emissions

In its June 25, 1998 letter, WGA requested the following from EPA with regard to transboundary emissions:

Note in the preamble that the Commission recommendations related to transboundary emissions noted that emissions from Mexico may be a significant contributor to visibility impairment. The EPA should note in the preamble the steps which have been taken to address the Commission recommendations, and the future steps the EPA is planning to deal with transboundary emissions.

WRC can find no attempt in either EPA's Notice of Availability or EPA's draft regulatory language to address this request. We reiterate the request here, and emphasize that there is broad agreement among participants in the GCVTC process that emissions transported from Mexico are a significant and growing part of visibility degradation in at least some of the Class I areas on the Colorado Plateau.

Mobile Source Emissions

In its June 25, 1998 letter, WGA requested the following from EPA with regard to mobile sources:

NOTE: The Commission's Report identified several national mobile source-related emission reduction strategies under consideration by EPA that are important to visibility conditions in the Class I areas on the Colorado Plateau. The Commission agreed to promote these initiatives on a national level. In accordance with this recommendation, EPA is requested to make a binding commitment in its final regional haze rule to fully consider the Commission's recommendations related to the following national mobile source emissions control strategies:

Adoption of the 49-state LEV standard in 2001 and Tier II vehicle emission standards in year 2004 (if determined to be more effective);

Support of EPA's current proposal for new on-road, heavy-duty vehicles emission standards that reduce NOx and particulate emissions by at least 50 percent over the 1998 requirements in the Clean Air Act, while maintaining current stringent PM emission limits;

Pursue additional PM reductions from on-road vehicles;

Pursue additional engine emission standards for new off-road vehicles (heavy-duty, construction-type) that provide reasonably achievable reductions;

Explore broader application of and additional reductions in the sulfur content of both gasoline and diesel fuel;

Promotion of cleaner burning fuels;

Pursue fuel standards and control strategies for diesel locomotives, marine vessels/pleasure craft, airplanes, and Federal vehicles as described in the Commission's Report; and

Support requirements for effective refueling vapor recovery systems that capture evaporative emissions."

In its Notice of Availability (63 Fed. Reg. 46953, column 1), EPA addressed the WGA request as follows:

In drafting the regulatory language, we have attempted to incorporate all of the WGA's recommendations for specific regulatory requirements into regulatory text except for the recommendation to include a binding commitment on EPA to fully consider certain national mobile source measures. While we are not expressing a position on this recommendation, we are unsure of how or whether the regulatory structure of the regional haze proposal can incorporate this provision, and we request comment on how and whether this should be done.

WRC believes EPA should make a binding commitment to fully consider the GCVTC recommended national mobile source measures. Potential visibility gains that result from the anticipated massive capital investments required by the SO_2 milestones within the WGA proposal could be easily compromised by the emissions from fires, mobile sources or transboundary sources.

The rule pertaining to SIPs may not be the appropriate place to do so, but in the preamble EPA should do the following: acknowledge that mobile source emissions are a significant contributor to visibility impairment in Class I areas on the Colorado Plateau, and possibly other Class I areas as well (this includes mobile sources within and near the Class I areas as well as emissions in urban areas more distant from the Class I areas); explain relevant measures the Agency has already taken (since 1990) to reduce mobile source emissions; explain relevant measures the Agency plans to take in the next several years to reduce mobile emissions; commit to consider visibility impacts in future decisions about control of mobile sources.

VIII. The WGA Proposal Should be Clarified to State That the GCVTC Recommendation Outlined Goals For Pollution Prevention. The Proposal Should Clarify the Role of State Public Utility Commissions ("PUCs") in Establishing Pollution Prevention and Renewable Resources Programs

On the subject of "Pollution Prevention," Draft § 51.309(d)(8)(vi) currently provides:

A planning assessment describing the programs being relied on to achieve the State's contribution toward the Commission's goal that renewable energy will comprise 10 percent of the regional power needs by 2005 and 20 percent by 2015, and a demonstration of the progress toward or achievement of the renewable energy goals in the years 2003, 2008, 2013, and 2018, including documentation describing

the potential for renewable energy resources, the percentage of renewable energy associated with new power generation projects implemented or planned, and the renewable energy generation capacity and production in use and planned in the State. To the extent that it is not feasible for a State to meet its contribution to the regional renewable energy goals, the State must, in the planning assessments, identify the measures implemented to achieve its contribution and must explain why meeting the State's contribution was not feasible.

WRC Comment: This section needs to be clarified that it is not the intent of the rule to delegate this assessment/authority for these assessments away from the Public Service Commission/Public Utility Commissions and to the state Departments of Environmental Quality ("DEQ"). Typically, the DEQ is in charge of protecting environmental resources and is not equipped for major technical analyses and assessments regarding electricity generation. In fact, any change may require state legislation. The language also needs to include any incremental change (increase) in power costs associated with renewables, as well as an assessment of the impact on consumers and loss of tax revenues to local and state governments. Finally, the 10 to 20 percent "goal" is for the region as a whole, and was not intended to delegate any specific target to an individual state. The proposed language implies that each state will have a quantified goal (i.e., "To the extent that it is not feasible for a State to meet its contribution. . ." etc). It is recognized that not all of the states may be willing to participate in the WRAP, and as the number of states declines, the opportunity for pooling the renewables diminishes, and quickly becomes a mandate for the remaining state(s).

The targets for renewable generation are proposed in response to regional haze, so appropriate technologies would be limited to solar, wind and geothermal (renewable combustion technologies would present particulate emissions). Intermittent technologies (wind and solar) would displace intermediate and peaking gas-fired generation, not baseload coal-fired generation. Because of its operating characteristics, wind generation, which is intermittent, must be limited to anywhere from 3 percent to 7 percent of the generation mix. Consequently, electricity generated from wind would have little impact on regional SO_2 emissions.

WRC believes that much more thought and consideration must be given to the renewable goals before codifying them, as proposed in this notice. Renewable goals presented in the name of visibility improvement simply must meet the intended goal. Setting energy policy, disguised as a visibility program, is unacceptable. This section should be modified by removing the specific targets and inserting language calling for a review of the renewable goals in the context of a visibility program.

IX. WRC Agrees With Congress That "EPA's Public Statements That the Schedule for the State Implementation Plan Due Pursuant to Section 169B(e)(2)" of the Clean Air Act "Should be Harmonized With the Schedule for State Implementation Plan Submissions Required for $PM_{2.5}$ Ambient Air Quality Standard Promulgated July, 1997." See Congressional Record H3928-H3929 (May 22, 1998).

A. Congress' Intent is for the $PM_{2.5}$ and Regional Haze Timetables to be Consistent

TEA–21's purpose (relevant to this discussion) is:

To ensure that the schedule for implementation of the July 1997 revisions to the ambient air quality standards for particulate matter and the schedule for the Environmental Protection Agency's visibility regulations related to regional haze are consistent with the timetable for implementation of such particulate matter standards as set forth in the President's Implementation Memorandum dated July 16, 1997 (TEA–21 at § 6101(b)(3)).

The full language of TEA–21 Title VI—Ozone and Particulate Matter Standards, and the relevant legislative history, are attached as Appendix C to these comments.

The clear intent of Congress is to make state visibility SIPs due at or after the state $PM_{2.5}$ SIPs. The TEA–21 "Inhofe Amendment" and CAA § 172(b) provide that $PM_{2.5}$ SIPs in nonattainment areas shall be due in 2007. Therefore, it follows that Congress intends state visibility SIPs for states with $PM_{2.5}$ nonattainment areas to be due at or after 2007.

Nevertheless, under EPA's proposed July 31, 1997 regional haze rule, attainment area visibility SIPs are due in 2005. The 2005 date must be changed to 2007 to be compatible with the $PM_{2.5}$ implementation schedule and the TEA–21 language.

EPA has asked for comments on SIP deadlines for regional planning areas. WRC agrees that Congress did not intend that regional planning efforts be inhibited by requiring area-by-area visibility SIP submittals for those states expected to have both $PM_{2.5}$ attainment and non-attainment areas. WRC also agrees with EPA to "allow states to first submit SIP revisions which commit to specific integrated regional planning efforts but which do not set forth control strategies." This would

allow states to coordinate deadlines for both attainment and nonattainment visibility SIPs within a planning region.

WRC believes this can be accomplished within EPA's final regional haze rule as follows:

1. Reiterate the October 1, 2000 WGA Annex as a regional planning goal.

2. Reiterate the December 31, 2003 submittal is a regional planning goal with state only commitments.

3. Promulgate a regional planning commitment deadline of 2003, consistent with the state deadline for designating $PM_{2.5}$ areas as attainment or nonattainment, consistent with TEA–21.

A. Promulgate a deadline for state visibility SIPs as 2004–2008, consistent with TEA–21, which becomes federally enforceable.

This schedule does not "preclude the implementation of the agreements and recommendations set forth in the Grand Canyon Visibility Transport Commission report dated June 1996." See Attachment C. In fact, the early submittals committed to by WGA acknowledge the commitment of western states and stakeholders to lead the country on visibility protection issues.

B. The Final Regulations Must Provide More Flexibility to Allow the WGA Process to Work Consistent With Congress' Intent Under TEA–21

That the current language of EPA's Draft rule is inconsistent with TEA–21 is clear from a reading of the following subsections.

Draft § 51.309(b)(2) defines the term "Transport Region State" to mean:

One of the States that is included within the Transport Region addressed by the Grand Canyon Visibility Transport Commission (Arizona, California, Idaho, Nevada, New Mexico, Oregon, Utah, and Wyoming).

To understand this definition's impact it must be read in conjunction with Draft § 51.309(c):

Plan Revision Schedule. Each Transport Region State must submit a plan revision addressing regional haze visibility impairment in the 16 Class I areas no later than December 31, 2003. The plan revision must comply, to the satisfaction of the Administrator, with the requirements set forth in 51.309(d) and (e)" (emphasis added).

WRC Comment: This language improperly ensures that, regardless of TEA–21, visibility SIPs will be due for Transport Region states by December 31, 2004–2008. Those states are defined above, regardless of whether they participate in the WRAP or not. This simply will not work. To remedy the situation, Draft § 51.309(c) should be amended to read as follows:

Plan Revision Schedule. Each participating Transport Region State must submit a plan revision addressing regional haze visibility impairment in the 16 Class I areas, and any additional Class I areas, no later than December 31, 2003. The plan revision must be a regional planning goal with state-only commitments.

X. General Comments

A. More Flexibility is Needed in EPA's Draft Rule

Draft § 51.309(d) contains the following heading: "Requirements of the Initial Plan Revision for States Electing to Adopt all of the Commission Recommendations."

WRC Comment: Note the word "all." The GCVTC contained a number of hard and fast recommendations, as well as a number of recommendations that require further thought and study; and ultimately may not be of sufficient impact to warrant implementation or may not be completed in time to be included in the annex or the initial SIP submittal. This heading infers that all recommendations, no matter how relevant are to be included in the initial SIP submittal. This heading should be revised to state "Requirements of the Initial Plan Revisions to Adopt the Relevant Commission Recommendations."

B. The Deciview Target and Mandatory Language Must be Eliminated for the WGA/GCVTC Process to Work.

Draft § 51.309(d)(2) currently contains the following language on state plans:

"Projection of visibility improvement. The plan must include a projection of the visibility conditions (expressed in deciviews) expected through the year 2018 for the most-impaired and the least-impaired days for the subset of the 16 mandatory Class I areas located within the State, calculated based on the implementation of all measures as required in the Commission report and the provisions in 51.209. The projections must be made in consultation with other Transport Region States having sources or activities reasonably anticipated to contribute to visibility impairment in these Class I areas. The States must rely on projections resulting from a regional modeling procedure deemed acceptable by all Transport Region States and the Administrator."

WRC Comment: There is a major problem with this language—EPA is still demanding a deciview metric, which is in direct contradiction with the recommenda-

tions of the Grand Canyon Visibility Transport Commission recommendations, as well as with the comments of the Western Governors' Association and the Western Regional Council. Restricting use of any visibility metric to deciview may be shortsighted because there may be other metrics the WRAP or other Visibility Transport Commissions may choose between now and 2018. The parenthetical phrase "(expressed in deciviews)" should be deleted from the language. Projections of visibility impairment conditions should be expressed in all appropriate units of measure (standard visual range, light extinction, deciview).

C. The Final Regulatory Language Must be Consistent With the Intent of the GCVTC Recommendations

Draft § 51.309(d)(9) currently provides:

Implementation of Additional Recommendations. The plan must provide for implementation of all other recommendations in the Commission report that can be practicably included as enforceable emission limits, schedules of compliance, or other enforceable measures (including economic incentives) to make reasonable progress toward remedying existing and preventing future regional haze in the 16 Class I areas. The State must provide a report to EPA and the public in 2003, 2008, 2013, and 2018 on the progress toward developing and implementing policy or strategy options recommended in the Commission Report.

WRC Comment: This requirement is simply too open-ended, and does not take into account the Executive Summary of the Grand Canyon Visibility Transport Commission recommendations. The Executive Summary states that the document contains items which are ripe for implementation while others need study. EPA's language improperly pushes all policy items and recommendations.

D. The Definition of Milestone Must Be Corrected

§ 51.309(b)(5) of EPA's draft regulatory language states:

"Milestone" means an annual percentage reduction in emissions for a given year, compared to a 1990 baseline.

The definition for milestone must be corrected to read:

"Milestone" means a percentage reduction in emissions for a given time period, compared to a 1990 baseline for which the Commission will perform an assessment.

E. States May Opt Out of the Program

The last sentence of Draft § 51.309(d)(11) currently states: "Conversely, States may elect to develop their own programs without relying on work products from a regional entity."

WRC Comment: This was the intent of the GCVTC and the WRAP. However, it is moot due to other requirements contained in EPA's proposed language due to the definition of Transport Region State and the codified requirements proposed on those states. The final rule should allow states to opt out.

F. Clean Air Corridors

The GCVTC conducted studies that showed that while Clean Air Corridors exist, they are not of serious concern at this time. The modeling study showed that even with a 25 percent increase in emissions, visibility would not be materially impacted on the Colorado Plateau. We need to make sure that the level of commitment of resources to address Clean Air Corridors is commensurate with the anticipated benefits. In addition, the plan for addressing Clean Air Corridors states "(iii) In areas outside of clean-air corridors, an identification of significant emissions growth that could begin, or is beginning, to impair the quality of air in the corridor and thereby reduce the frequency of clean air days at one or more of the 16 Class I areas." WRC believes this sentence should be eliminated. While this language appears consistent with that submitted by WGA, it significantly expands the boundaries of the Class I areas, essentially making clean-air corridors de facto Class I areas.

BART Language

EPA should add language that deals with cost, non-air impacts, life of facility, etc. (See 40CFR § 51.301(c) and Clean Air Act § 169A(g)(2)). This type of language would serve as a useful reminder that this program is about visibility, and not about nonattainment areas.

H. Gubernatorial/State Review

EPA should also propose language that provides for final review by individual western Governors and states prior to the implementation of any backstop cap and trade program. WRC recognizes that the proposed language in this public notice is largely based on a major stationary source control strategy, which is primarily focused on SO_2. WRC continues to urge EPA and WGA to also focus on other sources

of visibility impairing emissions. Since there are many factors that contribute to visibility impairment, WRC urges EPA to add the proposed language as follows:

51.309(f)(1)(iii) The States shall clearly identify and discuss the review by the Governors, and any legislative body prior to the implementation of any backstop market trading program.

XI. EPA Should Significantly Revise and Re-propose the Rule for Further Comment

Given the extensive comments EPA has received from states and the regulated community and the significant revisions that are needed, WRC believes EPA should significantly revise and repropose the ruled This can be achieved in a timely manner, while giving the public an opportunity to provide input on the necessary revisions to this important rulemaking.

Incorporating the WGA proposal into the proposed regional haze rule makes the need for re-proposal even more critical. While WRC appreciates the opportunity to provide comment on the WGA proposal, and on other information such as the TEA–21 legislative language, we believe the public must have an opportunity to comment on the proposed regional haze rule as a package, rather than on separate pieces of that package. Furthermore, as stated in the EPA notice:

The WGA letter contains numerous suggestions for preamble discussions to accompany the final regional haze rule. These preamble suggestions include clarifications of the rationale for certain conclusions, explanations to clarify WGA's regulatory language suggestions, and discussions of a number of WGA's suggested policy interpretations for implementation of the final rule.

EPA has not drafted the preamble language that was suggested by WGA. WRC believes that such preamble language is a critical element to the final rule. The rule should also be re-proposed to provide the public an opportunity to comment on such language.

Please forward questions or requests for additional information to Ruth McCormick: tel. 703–5491466; fax 703–549–1574.

1. In item (3) above, 2003 should be 2013. The typographical error needs to be corrected.

2. E.g., American Automobile Manufacturers Association v. Cahill, No. 97–7972 (U.S. Ct. of Apls., 2d. Cir., Aug. 11, 1998) (states preempted from promulgating emission standards for new motor vehicles).

3. E.g., Shell Oil Co. v E.P.A., 950 F.2d 741 (D.C. Cir. 1991) (additional comment period required where features of the final rule contain significant changes from the proposed rule).

NEW ENGLAND GOVERNORS/EASTERN CANADIAN PREMIERS MERCURY ACTION PLAN 1998

JUNE 1998

Committee on the Environment of The Conference of New England Governors and Eastern Canadian Premiers

Summary of Goals and Basis for Action

In June 1997, the Conference of the New England Governors and Eastern Canadian Premiers (NEG/ECP) charged its Committee on the Environment to: "continue to advance the understanding of mercury in this region;" "support cooperative action. . . to begin to address mercury releases and resulting public health and environmental impacts;" and develop a regional Mercury Action Plan. A draft framework for the Mercury Action Plan was subsequently developed by representatives of the New England states and Eastern Canadian provinces. This draft was refined following the NEG/ECP Workshop on Acid Rain and Mercury in February 1998 in Portland, Maine.

The Conference of New England Governors and Eastern Canadian Premiers has concluded that aggressive and concerted actions are needed to reduce potential health risks attributable to mercury exposures and to expand scientific information on mercury sources, controls and environmental impacts. This conclusion is based on extensive scientific data that indicate that mercury is pervasive in freshwater fish in the Northeast at levels that pose plausible health risks to people and some species of fish eating wildlife. In addition to the potential health effects caused by this contamination, there are important economic consequences, including reducing the recreational and commercial value of fisheries resources across the region.

This Mercury Action Plan identifies steps to address those aspects of the mercury problem in the Northeast that are within the region's control or influence. The Gov-

ernors and Premiers support and endorse the action plan's ultimate goal of virtual elimination of anthropogenic mercury releases in the region. By adequately addressing those sources within the region, we can move toward reducing mercury contamination to levels that are safe for people and wildlife, and provide an example for other regions.[1] To achieve this goal, it is essential that efforts to reduce mercury use, emissions, and discharges be initiated now. The steps outlined in this Action Plan focus on achieving such reductions over time, with a target of virtual elimination of anthropogenic mercury releases in the region through a combination of source reduction, safe waste management practices, and aggressive emissions controls. Another important goal of the Plan is the collection of additional scientific information on mercury emissions, cycling and environmental impacts, to allow for documentation and evaluation of the effectiveness of regional actions on mercury.

To monitor progress, interim goals or milestones have been established pertaining to overall mercury emissions and source reduction efforts, as well as for specific source categories. This Plan builds upon important initiatives already underway to reduce emissions of this pollutant. These include efforts to go beyond currently mandated mercury emission limits for municipal waste combustors and medical waste incinerators; to develop emission limits for other sources: to expand programs to effectively separate, collect and appropriately manage mercury-containing wastes; to pursue efforts for source reductions in products; to educate the public about mercury; and to expand and coordinate monitoring and research efforts.

The Action Plan calls for the establishment of a Mercury Task Force which will serve as the technical coordinating committee responsible for implementation of the Plan. The Task Force will report to the NEG/ECP Committee on the Environment, which is responsible for overall efforts to reduce mercury released into the environment and to minimize the public health and environmental risk associated with mercury exposure, in particular methylmercury (which is the most toxic form).

Basis for Action

The need for this Plan is supported by numerous studies that document elevated levels of methylmercury in freshwater fish across the Northeast United States and Canada. Mercury levels in freshwater fish have been monitored in the northeast U.S. region since the 1 970's. The results of these monitoring programs indicate that levels of mercury significantly exceed acceptable values in fish species from certain waterbodies in the region. This information has led public health officials in the northeast U.S. to issue advisories recommending that people limit their consumption of potentially contaminated fish. Pregnant women, women of childbearing age, and children are at particular risk because the developing nervous system of fetuses and children are very sensitive to the toxic effects of mercury. Wildlife in the region may also be adversely affected, as high levels of mercury have been measured in fish eating birds, such as loons and eagles.

There are many sources of mercury in the environment. Although natural sources of mercury exist, recent research suggests that background concentrations of this metal in the atmosphere and sediments have increased by a factor of two to five since pre-industrial times. This suggests that anthropogenic sources have significantly increased mercury levels in the environment.

Much of the mercury entering the waters of the region settles from the air or is deposited in rain or other precipitation. The mercury in the air originates from many sources both within and outside of the region. In the ambient air, mercury levels are not dangerous; it is the cumulative amount of mercury deposited to waterbodies and its subsequent chemical transformation to methylmercury, that creates problems. Fish absorb and retain methylmercury, causing it to bioaccumulate until it is concentrated up to millions of times above the level in the surrounding water, particularly in older, predatory fish.

Ingestion of contaminated fish is the primary pathway of human exposure to methylmercury. In addition, people can be exposed to other dangerous forms of mercury at work, in school science laboratories and in their homes. Such exposures can occur following the breakage and improper cleanup of mercury containing products or as a result of children finding spilling and playing with improperly stored or maintained elemental mercury. In addition to the tragic health effects that can be caused by such exposures, the costs of cleaning up the resulting mercury contamina-

[1] For several reasons, it will take considerable time for current successes in reducing mercury use and emissions to be translated into significant improvements in mercury levels in fish. This is due to the fact that mercury is very persistent once released and cycles through land, air, and water. Thus, the ability of the environment to "cleanse" itself of past mercury contamination is a long-term process. Additionally, there are sources of mercury, including natural and out-of-region sources, that are beyond our immediate control.

tion can be considerable. Reduced use of mercury and better education of workers and the public about the dangers of mercury and proper handling procedures for it would help reduce the number of incidences as well as the health. environmental and economic costs of these exposures.

As noted earlier, much of the mercury entering the region's waterbodies comes from the air. Rates of mercury deposition are estimated to be higher in the northeastern U.S. relative to most other parts of the country. This situation is in part due to the existence of significant sources of mercury within the region. There is also strong evidence showing that7 similar to other pollutants, airborne mercury emitted by upwind sources is transported by prevailing winds into the region. Two other factors also thought to exacerbate the mercury problem in the region include (1) the acidified condition of many waters of the region, brought on by excess acid deposition, is associated with higher levels of methylmercury in fish in impacted lakes; and (2) elevated summertime levels of tropospheric ozone exacerbate the conversion of elemental mercury in the atmosphere to chemical forms that are more susceptible to deposition.

Analyses suggest that a wide array of sources of mercury emissions contribute to overall deposition in the region. Municipal waste combustors are currently the largest emission source sector in the northeast states; utility and industrial boilers are the largest source sector in the remainder of the United States, primarily from the combustion of coal; and non-ferrous metal production (i.e., nickel, aluminum) is the major source of airborne mercury emissions in Eastern Canada.

Computer modeling conducted for the Northeast States and Eastern Canadian Provinces Mercury Study (NESCAUM/NEWMOA/NEIWPCC/EMAN 1998)[2] indicates that 30 percent or more of the mercury deposited in the Northeast originates from sources outside of the region. Because of the transboundary nature of mercury pollution, no single state or province will be able to solve its mercury problem alone. Concerted and coordinated regional efforts are needed. Ultimately, national and international efforts will be required to address transboundary mercury emissions, particularly from the utility sector. However7 because the majority of the deposited mercury is from sources in the region, much can be done locally to address this problem. It is hoped that the aggressive commitments embodied in the regional action plan that follows will provide leadership to encourage similar actions to reduce mercury emissions nationally and internationally.

Intergovernmental Coordination/Cooperation

Given the regional and international implications and concerns about mercury emissions and deposition New England states and Eastern Canadian provinces will expand collaboration with other jurisdictions and institutions. including the Great Lakes states. Specifically. the New England Secretariat of the Conference of New England Governors and Eastern Canadian Premiers will invite the participation of the Governors of New Jersey and New York and the Eastern Canadian Secretariat of the Conference of New England Governors and Eastern Canadian Premiers will monitor activities in other provinces. Because mercury has an important transboundary component, the states and provinces will also seek to work with national and international environmental agencies such as the U.S. Environmental Protection Agency, Environment Canada, and the Commission for Environmental Cooperation. This agreement endorses an active partnership with Federal counterparts from the United States and Canada to meet the challenges presented in this document.

Given the concern over high levels of mercury deposited in the region as a result of emissions from out-of-region sources, the states and provinces will coordinate with the U.S. EPA and Environment Canada in pursuing appropriate national controls for these sources. The New England state and Eastern Canadian provincial environmental agencies will seek to build alliances with their counterparts in other regions to promote and advocate for effective national controls. Similarly, the Secretariats of the Conference of New England Governors Conference and Eastern Canadian Premiers will promote and advocate such controls within the National Governors Association and the Association of Canadian Premiers.

Regional Goal: The virtual elimination of the discharge of anthropogenic mercury into the environment, which is required to ensure that serious or irreversible damage attributable to these sources is not inflicted upon human health and the environment.

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[2] Northeast States for Coordinated Air Use Management (NESCAUM), Northeast Waste Management Officials' Association (NEWMOA), New England Interstate Water Pollution Control Commission (NEIWPCC), and Canadian Ecological Monitoring and Assessment Network (EMAN).

Guiding Principles of the NEG/ECP Mercury Action Plan

The New England Governors and Eastern Canadian Premiers recognize the following principles as the guidelines for action on mercury in the region:

In order to protect human health and the environment, the precautionary principle shall be used. Where there are threats of serious and irreversible damage, lack of full scientific certainty shall not be a rationale for postponing measures to prevent environmental degradation and to protect public health.

Efforts to eliminate mercury contamination in one environmental media should not result in significant contamination of another media.

Coordination of the efforts of the New England states and Eastern Canadian provinces is necessary for effective response strategies to address mercury issues.

Environmental goals and objectives. in keeping with sustainable development, shall be formulated and implemented in ways that achieve high levels of ecological and human health benefit.

While mercury is a regional problem that requires regional solutions out-of-region sources are also a major contributor to this environmental threat; the New England states and Eastern Canadian provinces stress the need for appropriate controls on sources outside the region. However, the need to coordinate efforts and work with other regions should not be viewed as a reason to delay action within the region.

In keeping with these guidelines, the following objectives and recommendations shall be pursued.

Action Item 1: Regional Mercury Task Force

Objective: The Secretariats of the Conference of New England Governors and Eastern Canadian Premiers will establish a regional Mercury Task Force by September 1 998.

Under the direction of the NEG/ECP Committee on the Environment, the Mercury Task Force shall:

1. Coordinate and prioritize the implementation of the actions in the Mercury Action Plan, based on the availability of funding and other resources.
2. Monitor and report on the progress toward achieving the Plan's objectives.
3. Propose any necessary revisions, redefinitions, and adjustments to the objectives and recommendations of the Plan.
4. Examine proposed or enacted state and provincial mercury reduction legislation within and outside the region, develop model legislation on mercury, and coordinate the development of pertinent pollution prevention and control regulations and requirements in the states and provinces.
5. Monitor the development of Federal emissions and waste regulations and/or guidelines, and provide comments and recommendations on proposed standards and regulations.
6. Coordinate, as appropriate, the regional actions of the Mercury Action Plan with other programs and efforts outside the region, and with Federal initiatives.
7. Reassess the reporting protocols for the U.S. Toxics Release Inventory (TRI) and the Canadian National Pollution Release Inventory (NPRI) for mercury by the beginning of 1999, and make recommendations for any necessary revisions.

Action Item 2: Mercury Emissions Reductions

Overall Regional Objective: BY the year 2003. reduce mercury emissions through the implementation of the actions herein which, if completed, are expected to achieve a reduction of at least 50 percent, through reductions as well as source reductions and safe waste management.

Source Specific Emission Reduction Goals [3]

A. MUNICIPAL SOLID WASTE COMBUSTORS:

Objective: By 2003, reduce the overall amount of mercury emitted from MSW combustion sources in the region through a combination of source reduction, waste segregation and emissions controls.

[3] It is important to note that source reduction/recycling efforts are preferable to emission controls The potential tor mercury pollution can be more effectively reduced this way. Because source reduction efforts take time to establish and are not applicable in all cases, improved emission controls will be needed to achieve substantial immediate reductions in mercury releases. It should also be recognized that complete inbrrnation is not available on all sources.

Recommendations

1. Regionally, adopt a 0.028 mg/dscm (milligrams per dry standard cubic meter) mercury emission limit for facilities that have the capacity to burn 250 tons/day or more of municipal solid waste.[4]

2. Mercury emission limits for existing and new facilities under 250 tons/day will be evaluated regarding the feasibility of adopting the 0.028 mg/dscm on a case-by-case basis.

3. Perform at least annual emissions monitoring and stack testing.

B. MEDICAL WASTE INCINERATORS:

Objective: By 2003, reduce—to the maximum extent feasible—the overall amount of mercury emitted from medical waste incinerators in the region through a combination of source reduction, waste segregation and emissions controls.

Recommendations

4. Regionally adopt a 0.055 mg/dscm emission limit for medical waste incinerators. The region will evaluate the feasibility of adopting the 0.028 mg/dscm emission limit or lower for these facilities within 3 years.

5. Perform at least annual emissions monitoring and stack testing.

6. Require, through facility permits or other suitable means, that all medical waste treatment facility customers have in place effective mercury source reduction and separation programs. This requirement shall be implemented on a consistent basis throughout the region. These source separation plans shall also be stipulated by contract between the facility and its customers.

C. SLUDGE INCINERATORS:

Objective: By 2003, reduce—to the maximum extent feasible—the overall amount of mercury emitted from municipal sludge incinerators in the region through a combination of source reduction, waste segregation and emissions controls.

Recommendations

7. Evaluate the feasibility of adopting a 0.1 mg/dsem emission limit or lower for municipal sludge incinerators.

8. Adopt source reduction, recycling measures, and pretreatment, to reduce mercury loading to municipal waste water.

9. Perform at least annual emissions monitoring and stack testing.

D. UTILITY AND NONUTILITY BOILERS:

Objective: Utility and nonutility boilers—particularly coal-fired units[5]—are a significant overall source of mercury emissions and deposition. Because of the transboundary nature of mercury pollution from these sources, out-of-region boilers have been identified as a significant contributor to the northeast's mercury problem. In light of this, the primary objectives of this plan are the timely adoption of national reduction programs for this source category and the reduction of our own region's emissions. This goal will be achieved by promoting the application of best available measures within the northeast and adopting technologically and economically feasible control strategies or practices to reduce emissions from these sources.

Recommendations

10. The NEG/ECP Committee on the Environment should promote the establishment and implementation of national and international strategies to reduce mercury emissions from utility and nonutility boilers.

11. The Mercury Task Force shall identify mercury emission control options and regional emission reduction targets for these sources within 1 year, using the best available information. This evaluation should include an assessment of any national actions in this area and, as necessary, pilot studies of the effectiveness and feasibility of identified emission control technologies.

12. Based on these evaluations, the respective jurisdictions will develop and implement regional strategies to promote maximum economically and technically fea-

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[4] Most Eastern Canadian and some U.S. facilities in this category already meet or surpass this standard, therefore most of the reductions from this goal will be obtained from U.S. facilities that are not currently controlled to this level. Also, it should be noted that the 0.028 mg/dscm standard is based on EPA protocols; adjustments may need to be made to apply this figure to Eastern Canadian sources.

[5] Mercury emissions from coal-fired boilers are estimated to account for 33 percent and less than 20 percent of the total in the United States and Canada respectively. In the northeast states total annual mercury emissions are estimated to be 15,903 kg, and the contribution from utility boilers amounts to 2,008 kg. In the Eastern Canadian provinces total annual mercury emissions are estimated at 2,356 kg, with emissions from utility boilers estimated to be 292 kg (based on the Northeast States and Eastern Canadian Provinces Mercury Study).

sible reductions in mercury emissions from utilities and other boilers in the northeast. The implementation of these efforts should commence within 5 years (by the year 2003).

E. INDUSTRIAL SOURCES:

Objective: Maximum achievable emission reductions for individual facilities should be achieved in the shortest feasible timeframe. Specific industrial sector emission limits and control requirements will be recommended by the Mercury Task Force.

Recommendations

13. Encourage the expeditious adoption of maximum achievable standards for major industrial sources, such as chlor-alkali plants and non-ferrous metals production.

F: AREA SOURCES:

Objective: Maximum achievable reductions in mercury emissions will be achieved for each subcategory—general lab use, dental preparation and use, paint use, crematories, and landfills—as noted in the Northeast States and Eastern Canadian Provinces Mercury Study within the shortest possible timeframe.

Recommendations

14. Develop targets and timelines with an emphasis on source reduction, segregation and safe waste management efforts, including recycling.

Action Item 3: Source Reduction and Safe Waste Management, including Recycling

Overall Regional Objective: Eliminate or reduce nonessential uses of mercury in household, institutional and industrial products and processes. Segregate and recycle mercury attributable to the remaining uses and or products to the maximum degree possible.

Objective No. 1: By 2003, reduce the overall amount of mercury-containing wastes from household, commercial and industrial sources, through source reduction, segregation and safe waste management, including recycling.

Recommendations

15. Reduce/eliminate the use of mercury in medical and consumer products to the extent feasible.

16. Identify and implement source reduction programs and develop model legislation.

17. Reduce the use of mercury and the generation of mercury-containing wastes by expanding state and provincial pollution prevention technical assistance to institutions such as dental clinics, hospitals, schools and laboratories.

18. Draft model legislation implementing coordinated labeling and manufacture take-back programs to help consumers identify products containing mercury and how to properly dispose of them, and work with the New England congressional delegation and members the Canadian Parliament from Eastern Canada to enact labeling legislation.

19. Eliminate the use of mercury in school science programs through the initiation of programs and/or legislation, and encourage the recycling and safe management of existing stocks.

2U. Adopt measures to curtail the sale of elemental mercury and educate affected populations as to the risks involved with cultural uses.

Objective No. 2: In those instances where source reduction is not currently feasible, promote the safe management and recycling of mercury-containing wastes.

Recommendations

21. Evaluate the effectiveness of existing mercury collection and recycling efforts and develop strategies to increase the effectiveness of existing state and local efforts.

22. Develop additional recycling and reclamation programs for mercury-containing products by establishing innovative public/private partnerships with combustion facilities, businesses, institutions and municipalities.

23. Institute collection programs for elemental mercury used by dentists? water suppliers and other identified users, and establish safe handling practices for the collected mercury.

24. Develop strategies to minimize crossmedia impacts of mercury management policies by coordinating efforts and facilitating discussions among air. water, and waste programs.

25. Support regional collaboration to resolve regulatory issues and barriers associated with safe waste management and recycling of mercury containing wastes and to enhance state and provincial implementation of improved regulatory programs.

Action Item 4: Outreach and Education

Objective No. 1: Educate the public about the adverse health and environmental effects of mercury and ways to reduce the risk of exposure. Develop effective outreach programs for at-risk populations.

Recommendations

26. Develop and implement a communications strategy to contact and educate sensitive populations about the health effects of consuming mercury contaminated fish and ways to reduce their risk.

27. Develop and implement a communication strategy to address health effects of exposure to elemental mercury from incidental/accidental exposure and through ritualistic uses of mercury.

28. Develop consistent and/or compatible health advisories for States and Provinces with shared waterbodies and publicize them.

Objective No. 2: Educate the public and industry about products that contain mercury and recommend appropriate substitutes and other methods of reducing their use of mercury and proper recycling and waste management techniques.

Recommendations

29. Develop brochures on products containing mercury. and alternatives.

30. Develop a regional educational programs for commercial and institutional sectors that generate substantial mercury waste, and promote the use of low or no mercury products and processes and, if necessary, proper recycling and waste management.

31. Develop a regional guide to the state and provincial agency mercury contacts.

Action Item 5: Research, Analysis and Strategic Monitoring

Objective No. 1: Support and expand research and analysis to improve our understanding of mercury sources, impacts and cycling in the environment.

Recommendations

32. Establish a binational mercury research workgroup which will identify regional research priorities, interface with Canadian and U.S. national research efforts, and initiate/implement region-specific research.

33. Develop or refine mercury inventories in all states and provinces. Coordinate with Federal authorities to improve emissions estimates for source categories with uncertain projections and collect more accurate and representative data to enable the development of inventories for sources that are not currently included in the mercury inventory, including refineries and mobile sources.

34. Coordinate and facilitate information exchange, in order to achieve the same level of quality among inventories and ensure uniformity with the RELMAP inputs.

35. Develop a systematic approach for quantifying the expected reductions from existing and planned emissions control strategies and updating the emission estimates for the affected sources.

36. Promote the collection of more emissions test data for sources such as utility and nonutility boilers, mobile sources, and oil refineries.

37. Coordinate with Federal authorities to develop an updated inventory of the sources of mercury in municipal solid waste.

38. Promote the development of a viable mercury dispersion model for use by researchers and regulators.

39. Encourage research on green chemistries for safe alternatives.

Objective No. 2: Support and expand strategic monitoring of mercury emissions, deposition and fish tissue levels and develop meaningful environmental indicators to measure and track progress.

Recommendations

40. Develop a comprehensive set of regional indicators to evaluate the effectiveness of reduction strategies and measure environmental results.

41. Develop a regional long-term atmospheric transport monitoring network that would measure mercury, acid rain, and fine particulate matter at each site.

Integrate the existing and forthcoming New England and Eastern Canadian regional mercury deposition networks and maintain these networks for at least 5 years. Adjust network components as necessary.

43. Develop standard protocols for fish and wildlife tissue sampling and analysis to ensure consistent and comparable data. Conduct additional fish tissue monitoring as necessary, and develop a comprehensive data base for the Eastern Canadian provinces and NewEngland states.

Action Item 6: Mercury Stockpile Management

Objective: Minimize mercury stockpile entry into commercial marketplace to reduce future emissions.

Recommendations

44. Under the auspices of the NEG/ECP, advocate for the safe management of U.S. Department of Defense mercury stockpiles.

45. Seek to identify any other mercury stockpiles, both public and private, and ensure their safe management.

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