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AP-BA-02-26 1457

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AM-Clean Air, Bjt,660

Senate May Act On Clean Air Bill Without Administration Agreement

By H. JOSEF HEBERT

Associated Press Writer

WASHINGTON (AP) Senate leaders pressed ahead Monday with final private talks with the White House over the clean air bill, but said the measure will go the Senate floor for debate this week _ with or without an agreement.

The closed-door negotiations between senators and key Bush administration officials on a compromise air pollution control package have been under way for nearly a month with major differences still to be overcome, according to both sides.

"We are making progress," said Senate Majority Leader George Mitchell, D-Maine. But he acknowledged that he may have to bring the bill to the Senate floor without the administration support he has sought through the bargaining.

Mitchell said if a compromise package cannot be worked out early this week he would terminate the discussions with the administration and take his chance on a bill emerging through Senate floor debate, beginning Thursday.

"We started the (private) talks three weeks ago and at some point we need to reach a conclusion," said Mitchell shortly after meeting with White House Chief of Staff John Sununu and William Reilly, head of the Environmental Protection Agency.

Sununu said after the meeting that the two sides are "getting closer and closer" toward working out a compromise bill aimed at cleaning up the nation's air by the end of the decade. But Sununu, alluding to Mitchell's threat to end the discussions, criticized having to work under "the deadline of a clock."

Mitchell turned to the private discussions on Feb. 2 in hopes of counteracting strong regional opposition to parts of the clean air bill by enlisting the Bush administration. A compromise bill that had the support of the administration and Democratic leadership would likely overcome regional threats of a filibuster, he theorized.

The negotiations made early progress with tentative agreements on provisions that would sharply reduce toxic and smog-causing pollution from industrial sources. But the talks bogged down over tougher emission controls on automobiles, with the White House opposed to a second round of tailpipe controls that would go into effect early in the next century.

Another politically sensitive area _ requirements for a major reduction in acid rain pollutants from coal-burning electric power plants _ has still to be discussed in detail, according to sources.

And even in some areas where an informal consensus had been reached, there seemed to be new problems Monday. Mitchell said both the provisions on toxic chemical releases and smog-causing industrial pollution are being re-examined, although tentative agreements on both areas had been reached earlier.

"We think a lot of progress has been made. We think we're getting closer and closer," Sununu said after his meeting with Mitchell. But he expressed concern that bringing the measure to the Senate floor without agreement with the administration might threaten key parts of the bill, including the tough provisions on acid rain.

The Senate bill and administration proposals agree on a call for cutting sulfur dioxide emissions by 10 million tons a year by the end of the decade.

More than a dozen senators, primarily from the Midwest, have threatened to filibuster unless some sort of cost-sharing provision is included to blunt the expenses many Midwest utilities will face from having to install new acid rain control equipment.

Mitchell bristled at Sununu's suggestion that bringing the measure to the Senate floor might cause it to be weakened.

"It is the administration that has insisted on changing the bill," declared Mitchell. "Every single (weakening) concession that has been made ... has been made at the insistence of the administration, every single one."

The Senate bill, which cleared committee last November, was the toughest being considered by Congress. It includes more stringent pollution controls on automobiles and industrial pollution than either the House version or a proposal sent to Capitol Hill by President Bush.

Bush has said the Senate version is too costly and includes some provisions such as expensive second-stage automobile emission controls that he might be forced to veto.

AP-BA-02-26 1457EST

American Iron and Steel Institute

1133 15TH STREET, N.W., WASHINGTON, D.C. 20005-2701

WHY The 10^{-4} "Maximum Exposed Actual Person" Compromise will not work.

The air toxics "compromise" contains a shutdown requirement based on a 10^{-4} Maximum Exposed Actual Person standard. This will not resolve the problems faced by the steel industry.

o The "actual" Maximum Exposed Individual concept is an improvement over the current Senate bill, since it would premise any risk assessments on realistic exposure data. But those improvements will be marginal at best.

o Current risk assessment methodology is based on numerous extremely conservative assumptions. The assumptions on exposure (for example, 70 years of exposure, 24 hours a day) are only part of the problem, and improving those assumptions will not change the basic flaws in the MEI methodology.

o A risk of 1×10^{-4} for the Maximum Exposed Individual (whether actual or hypothetical) translates into a risk of one cancer incidence over 700,000 years for a source -- or a risk of one cancer incidence over the lifetime of human history. It is absurd to have a "shutdown" standard at this level of risk.

o For coke ovens, most plants will still be unable to meet the 10^{-4} actual test.

o To achieve the 10^{-4} actual test, the steel industry would have to attain, on average, a five fold reduction in emissions from their already controlled levels. This would require coke ovens to move to the 99% control range. EPA's best estimate is that the 96% control range is what is technologically feasible for coke ovens.

o The "compromise" also retains the 10^{-4} hypothetical standard for new and reconstructed sources. This creates an intolerable Catch-22 for coke ovens. Coke ovens may have to be rebuilt to meet the actual 10^{-4} test. Reconstruction would subject them to an immediate 10^{-6} standard. There is no one who even argues that coke ovens can meet that standard. The bill's arbitrary use of MEI numbers thus creates a shutdown requirement for the industry within seven years of enactment. It does not, as some have claimed, allow reasonable time for the development of new research and technology.

(more)



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What are the solutions needed:

o The MEI concept, whether framed as actual or hypothetical, should not function as an automatic shutdown number. The methodology underlying MEI calculations is too uncertain and capricious to support the kind of "up or down" provisions in the Senate bill.

o Before any plant is shut down and jobs are lost, there must be a consideration by EPA of an array of factors beyond the MEI, such as aggregate population risk, the time needed to research and develop new, feasible technologies and the strength of the evidence of human health risk.

o Plant reconstructions undertaken in order to meet any MACT or residual risk standard should not be subject to the new plant standards.

February 8, 1990

American Iron and Steel Institute

1133 15TH STREET, N.W., WASHINGTON, D.C. 20005-2701

February 2, 1990

Phone (202) 452-7100

Fax (202) 463-6573

INDIVIDUALLY ADDRESSED TO ALL U.S. SENATORS

Dear :

Steel is committed to improvements in America's Clean Air program. To date, U.S. steelmakers have spent about \$4 billion on air pollution control efforts, and we've succeeded in eliminating roughly 90 percent of coke oven emissions (our most serious environmental challenge).

Under the Administration's Maximum Achievable Control Technology (MACT) proposal, which the industry supports, we face additional costs of up to \$5 billion (EPA's estimate) to control another 6-7 percent of total coke oven pollution. We're willing to make these expenditures. And we're also willing to address the matter of further controls based on scientific risk assessment, technology and economic feasibility. We strongly oppose, however, S. 1630's numerical maximum individual risk standards for air toxics. They would eventually shut down the making of coke (an essential steelmaking ingredient) in America, and that would threaten the future viability of integrated steelmaking in the U.S.

In the Congressional and public debate over proposed Clean Air Act amendments, one issue that is of critical concern to the domestic steel industry is the need to get the science right in the "residual risk" air toxics section of proposed legislation.

To explain this issue clearly, we have developed a brief analysis (enclosed with this letter). It explains: (1) why proposed maximum individual risk standards for air toxics are based on unrealistic assessments of technology and risk; (2) why the methodology used to assess maximum individual risk is scientifically flawed; and (3) why Congress, therefore, should reject maximum individual risk standards for air toxics.



- 2 -

I respectfully urge that you consider the enclosed paper carefully. We are confident it will effectively correct the many errors and misrepresentations that have arisen in the debate.

Industry representatives and I would welcome any questions or comments you might have on the analysis we have prepared, and would be most happy to meet with you or your staff at any time to discuss it further.

Sincerely,



Milton Deaner
President

Enclosure

American Iron and Steel Institute

1133 15TH STREET, N.W., WASHINGTON, D.C. 20005-2701

THE CLEAN AIR BILL'S MAXIMUM INDIVIDUAL RISK STANDARDS FOR AIR TOXICS ARE UNREALISTIC AND UNSCIENTIFIC AND SHOULD BE REJECTED

The domestic steel industry is committed to our nation's urgent pursuit of a stronger clean air program. We support implementation of "Maximum Achievable Control Technology" (MACT) to limit certain air toxics, even though EPA estimates that it could cost our industry up to \$5 billion in additional expenditures to control coke oven emissions. Effective Clean Air amendments, however, must be realistic and based on scientific standards of risk assessment. That's why Congress should reject the $10^{-4}/10^{-6}$ maximum individual risk "bright line" standards in the air toxics section of S. 1630: these assessments of "residual risk" to the maximally exposed individual (following implementation of MACT) are neither realistic nor scientific.

NOT REALISTIC

The $10^{-4}/10^{-6}$ amendment would force the shutdown of domestic coke ovens based on unrealistic assessments of technology and risk.

- * There is no coke technology anywhere in the world today that can meet a 10^{-6} (1-in-a-million chance of contracting cancer) maximum individual risk standard.
- * It is ridiculous to measure the cancer risk from chemical air pollution based on a hypothetical "most exposed individual" who lives at the fenceline of a coke battery for 70 years, never once leaving it.
- * Epidemiological studies done of communities surrounding coke oven batteries, such as Allegheny County, Pennsylvania, have found no correlation between coke oven emissions and increased cancer rates.
- * Because the bill's risk standard is based on the concept of "most exposed individual" (rather than exposed population), the 1-in-10 thousand (10^{-4}) maximum individual risk level does not mean that 1-in-10 thousand people exposed to coke oven emissions will contract cancer -- what it really means is that 1-in-10 million people exposed will contract cancer. Likewise, the 1-in-1 million (10^{-6}) maximum individual risk level does not mean that 1-in-1 million people exposed will contract cancer -- it really means that 1-in-100 million people exposed will contract cancer, if they all live 10 lifetimes (700 years) with the exposure!



NOT SCIENTIFIC

The methodology used to assess maximum individual risk is not scientific, because there are huge magnitudes of uncertainty that such an assessment is correct -- even using the best scientific tools available.

- * EPA admits that the way they calculate the risk to the individual most exposed to coke oven emissions has "an uncertainty level" of at least five orders of magnitude (i.e. there's only a 1-in-100 thousand chance of its being correct).
- * Given further likely assumptions and inaccuracies, the uncertainty level of such risk assessment grows to eight orders of magnitude -- i.e., there's only a 1-in-100 million chance of its being right!

Before Congress imposes unrealistic toxic air pollution standards that would force the shutdown of the domestic coke industry and cause irreparable harm to our steel industry, we ask it to think again about the "science" and uncertainties of determining residual risk after installation of MACT. Instead of mandating unscientific risk standards for air toxics, the only rational approach is to allow experts well versed in the scientific process to determine on a case-by-case basis whether the residual pollution after MACT poses an "unreasonable risk" to public health.

American Iron and Steel Institute

1133 15TH STREET, N.W., WASHINGTON, D.C. 20005-2701

Phone (202) 452-7100
Fax (202) 463-6573

February 5, 1990

Dear :

We are aware that some observers are suggesting that the successful development of a direct steelmaking process will make it possible for steelmakers to comply with the numerical residual risk criteria contained in several versions of the clean air legislation now being considered in the Congress (S. 1630, for example).

Collectively having devoted more than 50 years to the pursuit and management of research in our two companies, we maintain current awareness of world-wide developments in steelmaking processes. On the basis of our personal experience in the development of direct smelting processes, we sense that the approach the steel industry is pursuing with DOE to develop an economic direct steelmaking process has a reasonable chance of success. However, even with the active participation in this project of companies such as IBM and North American Refractories, it will be 3 years before we know if such a process is feasible and, if so, more than a decade before its commercial demonstration.

The successful development of a direct steelmaking process is a key step towards our future vision of an environmentally benign and energy efficient steel plant. One important advantage of this process is its use of coal rather than coke as in iron blast furnaces. Therefore a coke plant would not be an upstream component of such a future steelmaking plant. However, even the most optimistic projections on the development of this technology has most coke ovens operating well into the next century to support today's modern steelmaking methods. It is entirely possible that the direct steelmaking research will fail to develop a suitable process. For that reason our industry aggressively continues to develop alternative energy sources to replace coke in blast furnace operations.



American Iron and Steel Institute

- 2 -

As the enclosed paper explains, direct steelmaking represents a long term but unproven opportunity. It is not a solution to the S. 1630 maximum risk standard for air toxics. Enactment of such legislation will not advance our research and will certainly threaten the future of the domestic integrated steel industry by sounding the death knell of this country's coke ovens.

We would welcome your reaction and offer to meet with you or your staff to clarify or expand on our position.

Sincerely,



Frank W. Luerksen
Chairman



Robert E. Boni
Chairman, Armco Inc.

Enclosure

American Iron and Steel Institute

1133 15TH STREET, N.W., WASHINGTON, D.C. 20005-2701

"DIRECT STEELMAKING" -- NOT A SOLUTION TO COKE PLANT SHUTDOWNS

If the numerical (10⁻⁴/10⁻⁶) "residual risk" air toxics provisions of S. 1630 become law, the domestic steel industry will face the eventual shutdown of its coke-making facilities -- and this will almost certainly occur at a time when coke will still be needed to make steel in integrated plants. Unfortunately, this is being rationalized on the basis of misunderstandings, and misrepresentations of the facts, about steel technology. Provision proponents say that the new technology of "direct" or "one-step" steelmaking will succeed (if it does, it will eliminate the need for coke ovens). They also suggest that it can be implemented widely within the time limits of the Clean Air bill (15 years). They're wrong. Consider these facts:

- * AISI is committing substantial resources to, and working closely with the U.S. Department of Energy on, research and development of the "leapfrog" new technology of direct steelmaking (to the best of our knowledge, we're the only steel industry working on this). Foreign steel industries and their governments are working on direct ironmaking projects. But anyone with scientific understanding knows that no R&D project is ever assured -- nor can there ever be any certainty as to the time period in which success can be achieved. Success of our direct steelmaking initiative is, at best, uncertain.
- * Conclusions about direct steelmaking being the answer to the industry's coke oven emissions problem as it relates to compliance with S. 1630's maximum individual risk standards are not based on science -- they're based on the mistaken belief that the (1) technological success, (2) widespread commercial application and (3) economics of this new technology are all already assured.
- * There is no certainty that direct steelmaking will solve our environmental problems and that it will be a major in-use production tool by the year 2000, because it remains a long term, high risk, commercially unproven technology.
- * Compounding the problem is the additional cost burden that steel will face in just complying with the Maximum Achievable Control Technology (MACT) standards for coke oven emissions. EPA estimates that MACT alone, which U.S. steelmakers support, could cost the

(MORE)



industry up to an additional \$5 billion to control coke oven emissions -- investments that, from a business standpoint, the industry would need to recover over the estimated 20-year life of rebuilt coke ovens even if direct steelmaking were available.

* Based on the rate at which two earlier technologies (basic oxygen furnaces and continuous casting) were put in place, some argue that the time frame required for development of direct steelmaking likely falls within the 15-year period set by S. 1630 for compliance with maximum individual risk standards for air toxics. But there is no scientific basis for thinking that that rate of installation of earlier new technologies provides any kind of useful precedent for the successful establishment of this technology -- unlike earlier new technologies, which were simply refinements of already proven technology, direct steelmaking represents a fundamental change in the basic steelmaking process.

In sum, widespread commercial application of direct steelmaking is far from certain. It makes no sense to enact legislation that will force coke plant shutdowns based simply on theoretical possibilities -- especially when the result would be irreparable harm to one of America's critical industries.

Coalition Sees High Costs, Lost Jobs in AQMD Clean Air Plan

By STEVE PADILLA
TIMES STAFF WRITER

A coalition of builders, manufacturers and labor unions charged Tuesday that a plan to clean Southern California skies will burden industry with costly and cumbersome regulations that could force at least 350,000 people out of work.

The South Coast Air Quality Management District should crack down on smog-producing vehicles, the main source of the region's air pollution, rather than place unreasonable demands on industry, which accounts for one-third of the problem, said William T. Huston, a builder and spokesman for the Community Air Quality Task Force.

"We need to have jobs and clean air," Huston said. "They have to go hand in hand."

The coalition created the task force about a year ago, shortly after the AQMD adopted a 20-year air quality management plan designed to bring the counties of Los Angeles, Orange, Riverside and San Bernardino into compliance with federal clean air standards.

At the time, a study by the Southern California Assn. of Governments suggested that there would be a net gain of more than 80,000 jobs and an industry study predicted the region would lose only 55,700 jobs.

But on Tuesday, in its first attempt to

Please see CLEAN AIR, B3

CLEAN AIR: High Price in Loss of Jobs Predicted

Continued from B1

create widespread opposition to the plan, the task force released an 86-page study predicting that the loss would be much higher—350,000 positions immediately and the potential for a ripple effect that could displace 1.4 million in all.

The report said unnecessary regulation will drive businesses out of Southern California and into regions where government regulations are less stringent.

But Claudia Keith, an AQMD spokeswoman, said a district analysis done when the plan was approved showed that any loss of industry would be offset by overall economic growth. The AQMD analysis predicted an additional 3 million jobs in the region over 20 years.

"Some of the assumptions [the task force] made we wouldn't agree with," Keith said.

Speaking for the task force at a press conference were representatives of the California Manufacturers Assn.; the AFL-CIO Oil, Chem-

ical and Atomic Workers International Union; the Construction Industry Air Quality Coalition; the Los Angeles County Federation of Labor, and a few owners of small businesses.

The air quality plan includes 120 rules which, among other things, restrict the use of certain chemicals or mandate extra pollution controls on manufacturing. Some rules already are in effect, such as car-pooling incentives and new controls on industrial emissions. Other rules still must be approved after public hearings, Keith said.

If all 120 rules are adopted, the aerospace industry would be hardest hit, losing at least 82,000 jobs, said Joseph E. Haring, an economist with the Pasadena Research Institute, which analyzed the potential impact of the plan on eight industries for the task force.

The task force report said the electric and electronics industry would lose 77,000 jobs; the fabricated metal products industry 62,000; the chemical, rubber and

**'We need to have jobs
and clean air. They have
to go hand in hand.'**

WILLIAM T. HUSTON

plastics industry 45,000; furniture makers 45,000, and the construction industry 24,000. The plan would displace 13,000 workers in the motion picture industry but have a negligible effect on restaurants, the report said.

The figures were based on census data and surveys of the companies themselves, Haring said.

Huston said the task force is trying to find supporters in the state Legislature to introduce legislation that would require an independent analysis of the air-quality plan and its potential impact on jobs.

David Finegood, owner of a furniture company, said AQMD rules are forcing him to move a manufacturing plant from Compton to Tijuana, where he can still produce furniture at competitive prices. He said he laid off 200 workers at the Compton plant two weeks ago and expects to lay off 100 others. "We really cannot stay here," he said.



515 South Flower Street
Los Angeles, California 90071
Telephone 213 486 2533

L. M. Cook
Chairman and
Chief Executive Officer

February 7, 1990

Governor John H. Sununu
Chief of Staff
Executive Office of the President
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

Dear Governor Sununu:

The Senate Clean Air bill, S. 1630, would require the use of 3.1 weight percent oxygen in gasoline in carbon monoxide (CO) nonattainment areas. Under current EPA regulations, ethanol is the only oxygenate that can achieve that level of oxygen. With these circumstances S. 1630 becomes a mandate for ethanol.

We would hope that the Administration would continue its support for an oxygenate program that allows all fuels to compete in the marketplace. As you know, the Administration's proposal did not specify a required oxygenate level which is an excellent competition inducing decision. If it becomes necessary to specify a given level of oxygen content, we believe that this requirement should not exceed 2.7%.

We have several specific concerns with a 3.1% oxygen requirement.

- o Ethanol is "splash blended" with finished gasoline when loaded into delivery trucks. This results in a higher volatility fuel which increases hydrocarbon emissions - a problem in ozone nonattainment areas (many CO nonattainment areas are also ozone nonattainment areas). Please see the attached chart for blending comparisons.
- o The use of other oxygenates such as MTBE (methyl tertiary butyl ether) is precluded. Current EPA regulation limits the use of MTBE to 2.7% oxygen.

We believe that MTBE fuel blended at a refinery at 2.0% oxygen will achieve a similar CO reduction to ethanol "splash blended" at 3.5% oxygen.

- o Cost of producing our new reformulated gasoline, EC-1, would increase by about 5¢ per gallon if we had to use ethanol rather than MTBE. This cost would no doubt increase consumer prices.

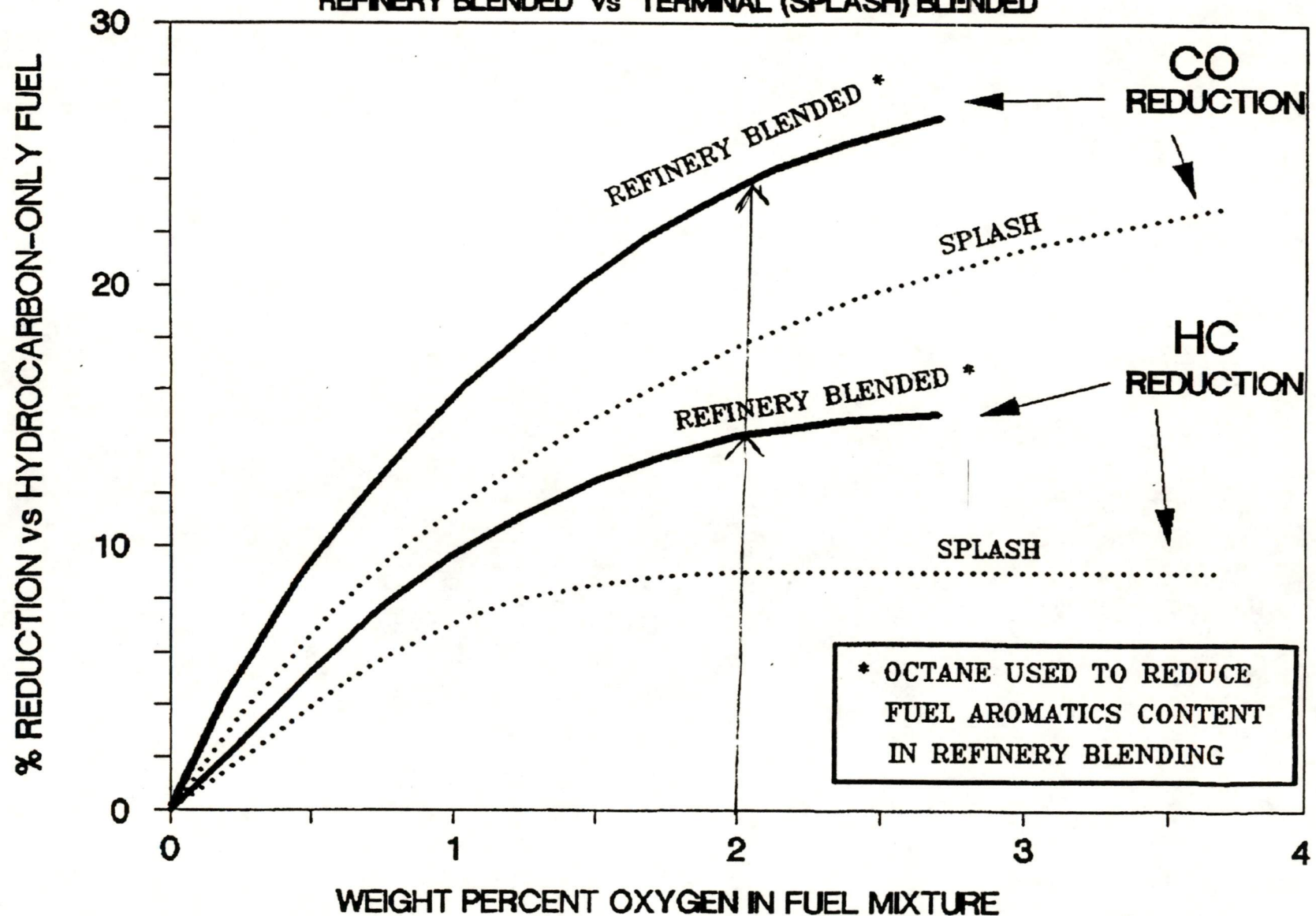
Even though ARCO supports the current Administration proposal, we recognize that a compromise may be required. If so, the attached alternative oxygenate concept would support the use of ethanol in some areas of the country while permitting a wider range of oxygenates to be used in areas where ozone forming emissions are a problem. If a compromise is necessary, we could support the attached alternative.

Sincerely,

L. M. Cook

TAILPIPE EMISSION REDUCTION vs FUEL OXYGEN CONTENT

REFINERY BLENDED vs TERMINAL (SPLASH) BLENDED



Alternative Oxygenate Proposal

For Carbon Monoxide Nonattainment Areas

- o Oxygenate Requirement:
 - 3.1% oxygen in CO nonattainment areas with no ozone problem
 - 2.7% oxygen in CO nonattainment areas with moderate ozone problems
 - 2.0% oxygen in CO nonattainment areas with serious, severe and extreme ozone problems.
- o Any oxygenate requirement would cease when an area becomes a CO attainment area.
- o Legislative waiver for alcohol/ether blends (excluding methanol) or individual components up to 3.1 wt% oxygen.
- o Legislative language that makes ETBE eligible for alcohol tax credit if Treasury fails to grant credit. This would make ETBE a cost-effective blending component for reformulated gasoline and would continue demand for ethanol as carbon monoxide problem diminishes as new cars replace old cars.
- o Below are estimated seasonal ethanol demands:

Oxygen Area <u>wt%</u>	Ethanol Demand <u>MB/D</u>
3.1	40
2.7	35
2.0	60

Note: Current Ethanol Capacity: 55 MB/D Operating
80 MB/D Total

WAYNE H. VALIS

VALIS ASSOCIATES
1747 PENNSYLVANIA AVE., NW, #1201
WASHINGTON, D.C. 20006
(202) 833-5055

February 6, 1990

MEMORANDUM FOR: Ed Rogers

FROM: Wayne Valis *Wayne*

SUBJECT: Coalition Supporting the
President's Clean Air Act

For some months, I have been working with a number of business leaders to organize a coalition in support of the President's Clean Air Act. As you can see, the coalition is now in action. The attached letter of support has been sent to every member of the Senate.

Please let me know about specific steps we can take to help in the immediate future.

FYI

We want to help.

February 5, 1990

The Honorable George J. Mitchell
The Honorable Robert Dole
United States Senate
Washington, D.C. 20510

Dear Senators:

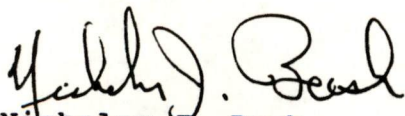
Like the President, we believe that reauthorizing an improved Clean Air Act is one of the most pressing public policy tasks before Congress.

We applaud the balanced approach of the President's Clean Air Bill and we agree that environmental protection, economic growth, and health considerations are not only compatible, but essential in the decade ahead.

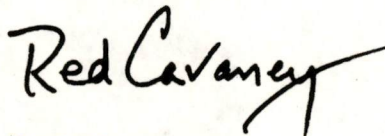
We believe that the Congress should act expeditiously in consideration of this legislation, balancing concerns for a cleaner environment with those for increased jobs and economic expansion. The principles detailed in President Bush's letter of January 19 to you provides an excellent starting point for consideration of this vitally important legislation.

Therefore, we are prepared to work on a bipartisan basis with members of both the Senate and the House to achieve a Clean Air Act that the President can sign.

Sincerely,



Nicholas J. Bush
President
Natural Gas Supply Association
Co-Chairman



Red Cavaney
President
American Paper Institute
Co-Chairman



J. Andrew Doyle
Executive Director
National Paint & Coatings Assn.
Co-Chairman



Wayne Valis
Coalition Executive Director

page 2

Regis Delmontagne
President
National Printing Equipment & Supply Association

Don Fuqua
President
Aerospace Industries Association

Joseph G. Gerard
Vice President for Government Affairs
American Furniture Manufacturers Association

Barry K. Rogstad
President
American Business Conference

Dan Shipp
Vice President, Public Affairs
National Electrical Manufacturers Association

Bill Taylor
President
American Society of Association Executives

Larry Thomas
President
The Society of the Plastics Industry

C. Richard Titus
Executive Vice President
National Kitchen Cabinet Association

cc: Members of U.S. Senate

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106134

TEELEY & ASSOCIATES, INC.

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TEL: (202) 452-7055

TELEX: 248441

FAX: (202) 452-7074

January 19, 1990

TO: Governor John Sununu
FROM: Peter Teeley
RE: Clean Air Act/Acid Rain Provisions

I am attaching a copy of a memo given to me by an executive of Burlington Northern Railroad which outlines the negotiations between the offices of Senators Mitchell & Byrd to reach a compromise agreement regarding the acid rain provisions of the Clean Air Act. In addition, I have enclosed the latest version of the Byrd Amendments which were drafted on January 13, 1990.

As you know both Senators have strong constituent interests at stake here. However, those interests are in strong opposition to each other. If Byrd prevails in these negotiations it will seriously undermine the President's goals regarding the clean air provisions of the bill.

FYI: BNRR is a client who is actively supporting the President's Bill. If we can be of assistance regarding this measure please let me know.

PBT:mm

MEMORANDUM

SUBJECT: Senate Acid Rain Compromise

Negotiations are proceeding between staffs of Senators Mitchell and Byrd on an acid rain compromise which would modify the current provision in significant ways. Senator Byrd's staff has revealed the following details thusfar:

--A reversion to a first phase under which 20 plants are controlled to 1.1 lbs. SO₂/MMBtu by 1995. (S.1630 now requires a reduction at 107 plants to 2.5 lbs.SO₂.) The change would essentially require scrubbers on most of the 20 plants, although intra-system trading would be allowed. This would permit utilities to spread their reductions more broadly than the 20 targetted plants --to approximately 80 units.

--Plants which comply with their reductions through the use of "technology" receive an additional 2 years (to 1997) to comply, and also receive double emission allowances for reductions below the 1.1 lb. emission requirement. Technology is defined broadly to include cofiring with natural gas, and any clean coal technology being funded by DOE now.

--The emissions "cap" on growth in SO₂ emissions from existing and new facilities is retained. Any plant which adds new SO₂ emissions to the atmosphere above a specified baseline (i.e. 1985 emissions) must provide an offsetting SO₂ reduction by reducing at another of its facilities or by purchasing emission credits from another source. (This concept is retained from S.1630).

--The allowance system of S.1630 is modified to address concerns that utilities will hoard allowances, making it difficult or impossible for cleaner utilities and industries to expand or build new plants. Utilities which receive 2 for 1 credits must put half of them into play in the market; they

may retain the other half for future use or future sale.

--The second phase is unchanged--all utilities must reduce SO₂ emissions to 1.2 lbs. SO₂ by 2000. The emission reduction level may go down to 1.1 lbs. if needed to achieve a 10 million ton reduction.

Additional details of the compromise have not yet been worked out. However, at first glance the biggest loser in this compromise would appear to be low sulfur coal. (Natural gas also loses, but did not project major increases in sales as a result of any acid rain bill.)

Without requiring scrubbers explicitly the compromise provides very strong incentives for their use. For this reason it is not at all certain that this proposal will be embraced immediately by Westerners or members with interests in increased natural gas use. In addition, because it does represent major concessions by those with an interest in protecting high sulfur coal markets and associated mining jobs, it may not be acceptable to that group either.

1/13/90

Proposed Changes in Title IV of S. 1630

The amendments listed below are offered as amendments to Title IV of S. 1630. It is intended that those provisions of Title IV of S. 1630 not directly addressed by these proposed amendments, such as Section 406 and the repeal of percent reduction, shall remain unchanged.

The amendments listed below are designed and intended to conform with the purpose of Title IV, which is to achieve a 10-million ton reduction in annual emissions of sulfur dioxide from 1980 levels, and to "cap" sulfur dioxide emissions in the year 2000, so as to preserve any emissions reductions achieved prior to that year.

PROPOSED AMENDMENTS

- 1) Section 404: Amend language so as to make the annual emission limitation for affected units in Phase I equal to the product of each unit's baseline multiplied by an emission rate of 1.1 lbs/mmBtu.
- 2) Section 404: Amend language so as to list only the top 18 SO₂ emitters in Table A. (See Table A in original Mitchell-Baucus draft, deleting the Clifty Creek and Kyger Creek facilities.)
- 3) Section 404: Add subsection requiring all DOE facilities (Clifty Creek, Kyger Creek and Joppa) to install and begin operation of a technological system of continuous emission reduction, achieving 90% emissions reduction, by January 1, 1995.
- 4) Section 404: Add subsection providing a two-year delay in the Phase I deadline for listed units that elect to install a technological system of continuous emission reduction for the purpose of meeting the emissions limitations of the bill.
- 5) Section 403: Add subsection(s):
 - establishing an EPA-administered allowance trading system;
 - providing that for each "base" allowance placed in the EPA-administered trading pool during Phase I by a listed unit employing a technological system of continuous emission reduction for the purpose of meeting the emissions limitations requirements of the bill, the EPA shall award the owner or operator of the unit one "incentive" allowance;
 - providing that allowances, once deposited in the EPA-administered trading pool, can only be withdrawn or removed from the pool through an open auction, or other means approved by the EPA Administrator;

- prohibiting the use of allowances obtained through the EPA-administered trading pool by a unit depositing allowances in the EPA-administered trading pool during Phase I for the purpose of complying with the Phase I

emissions limitations requirements of the bill; and

- providing that all proceeds from the sale of allowances from the EPA-administered pool shall be distributed to owners of allowances in the pool, in proportion to the distribution of ownership at the time of a sale.

- 6) Section 402 (l) and 409 (a): Amend language so as to require the publication of a list, not later than December 31, 1992, of eligible clean coal technologies, and provide for the possibility of subsequent additions of other technologies on that list. Further amend language so as to include retrofitting and replacement, in addition to repowering, technologies on the list of eligible clean coal technologies.
- 7) Section 409 (b): Add section providing that any affected unit granted an extension under Section 409 shall not forfeit its extension as a result of its inability to install and operate a clean coal technology which the EPA Administrator finds to be economically and/or technologically infeasible.
- 8) Section : Add section providing WEPCO "fix" for clean coal demonstration projects.

ITEMS FOR FURTHER DISCUSSION

- 9) Section 403(b): Amend language so as to remove geographic limitations on trading of emissions allowances.
- 10) Section 403: Amend language so as to prohibit the EPA Administrator from revoking, suspending, or terminating emissions allowances already awarded.
- 11) Section 405: Amend language so as to make the annual emission limitation for affected units in Phase II equal to the product of each unit's baseline multiplied by an emission rate of 1.2 lbs/mmBTU or the product of each unit's average annual fuel consumption in 1980-1982 multiplied by an emission rate of 1.1 lbs/mmBTU. Any owner or operator selecting the latter tonnage limitation shall be required to apply such limitation systemwide.
- 12) Section 409(c): Add subsection providing an exemption for retrofitted clean coal units from section 111
- 13) Section 409(c): Add subsection providing an exemption for retrofitted clean coal units, with post-retrofit emission's levels below their pre-retrofit emissions levels, from the requirements of parts C and D of title I.

Date: Jan 12, 1990



To:

Governor Sununu

You were absolutely right
about the CO₂ issue. Attached
is a copy of a letter I sent to
19 Senators. I hope this is
the kind of thing you were
thinking about

Charlie DiBona

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005
202-682-8100



Charles J. DiBona
President

January 12, 1990

The Honorable
Lloyd Bentsen
United States Senate
Washington, DC 20510

Dear Senator Bentsen:

There are a number of provisions in the clean air bill (S.1630) reported by the Senate Environmental Committee that concern us. One that I have not previously communicated with you about is a particularly onerous provision which would regulate, for the first time, emissions of carbon dioxide from passenger vehicles. Because of the very close linkage between emissions of carbon dioxide and vehicle mileage per gallon, emissions standards for carbon dioxide are implicitly a vehicle mileage standard. The Senate bill would imply a major increase in the corporate fuel economy standard (CAFE) for conventional gasoline fueled vehicles. The American Petroleum Institute believes that this provision is unwarranted and premature and would impose substantial costs on the U.S. without yielding demonstrated environmental benefits.

To comply with this provision, based on evidence to date, cars would be required for the 1996 to 1999 model years to average about 36 miles per gallon, and in subsequent years to average about 43 miles per gallon. Meeting such a requirement would have very serious consequences for consumers and for the auto industry.

Carbon dioxide emissions are not classified as hazardous and do not contribute to problems of acid rain or nonattainment -- the principal issues addressed in clean air act amendments. However, scientists have associated carbon dioxide emissions with a possible build-up of greenhouse gases and global warming. There is much scientific uncertainty about the extent of any global warming which may be occurring and what its impacts might be. For example, in contrast to some widely publicized analyses, a recent comprehensive study of ocean temperatures by MIT climatologists concluded that "there appears to have been little or no global warming over the past century." Last month, a NASA study determined that the snow and ice sheet in Greenland has not been diminishing as global warming would cause, but has been growing by about nine inches per year over the past decade.

The Honorable Lloyd Bentsen
January 12, 1990
Page Two

In any event, global warming is an issue that must be addressed by nations together. The U.S. appropriately is a participant and leader in the Intergovernmental Panel on Climate Change which has been formed to evaluate the science and develop an international plan of action. In view of the scientific uncertainty and the existence of this panel, it would be premature for the U.S. government to take far-reaching unilateral action to address the issue. Indeed it could seriously hamper the ability of the U.S. to negotiate an equitable international program of greenhouse gas reductions if, before negotiations begin, the U.S. takes unilateral action such as that proposed in S.1630. Further, if after negotiations were completed, the U.S. were to make a decision to reduce carbon dioxide emissions, all sources then would need to be considered so that reductions take place in a cost-effective manner. This has not been done. Indeed, there has been virtually no explanation to the public or evaluation of the Senate proposal.

While the benefits from reducing carbon dioxide have yet to be adequately documented, the costs to the U.S. consumer of the implied high mileage standards are clear. The empirical evidence indicates that these costs include decreased safety, job losses, and reductions in consumer satisfaction.

Analysts of automobile performance have consistently found that achieving higher mileage means reducing weight, and this means increasing passenger fatality risk. A study by the Brookings Institution has shown that the 1989 fuel economy standards -- moderate in comparison to that implied by S.1630 -- will be responsible for a 14 to 27 percent increase in fatality risk, or 2,200 to 3,900 additional deaths, and 11,000 to 19,500 additional serious injuries over the 10 year lifetime of 1989 cars.

Mandated fuel standards also cause the loss of jobs in the domestic auto industry. Since small fuel-efficient cars are mostly produced abroad, raising the standards induces the transfer of auto production overseas, to the detriment of U.S. workers. And, by reducing the variety of automobiles available to the consumer, mandated fuel standards create losses in consumer satisfaction. This occurs because some consumers purchase automobiles that they would not have chosen if the standards were not in effect. Taken together, these effects of the proposed carbon dioxide limits could impose very large costs on consumers, according to analyses of mileage standards by DOE and others.

The Honorable Lloyd Bentsen
January 12, 1990
Page Three

The American Petroleum Institute agrees that a cleaner environment is a worthy goal to pursue. However, regulating emissions of carbon dioxide and therefore implicitly mandating severe fuel economy standards appears to be a premature and costly action that is not warranted.

Sincerely,



Charles J. DiBona

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005
(202) 682-8450



Marc Himmelstein
Federal Agencies Department

THE WHITE HOUSE

WASHINGTON

January 24, 1990

MEMORANDUM FOR ED RODGERS

FROM: BOBBIE KILBERG ^{BK}
KATHY JEAVONS ^{VJS}

SUBJECT: Clean Air Coalition Building

In regard to the attached meeting request, David Sloane has now advised us that, because of the changing situation on the Hill, we need to hold off on a meeting with the Clean Air "Kitchen Cabinet" until next week.

cc: David Demarest
David Sloane

Attachments

THE WHITE HOUSE

WASHINGTON

January 22, 1990

MEMORANDUM FOR GOVERNOR SUNUNU

THROUGH: DAVID DEMAREST
ASSISTANT TO THE PRESIDENT FOR COMMUNICATIONS

FROM: BOBBIE KILBERG BK
DEPUTY ASSISTANT TO THE PRESIDENT
FOR PUBLIC LIAISON

KATHY JEAVONS
ASSISTANT DIRECTOR FOR PUBLIC LIAISON

SUBJECT: Clean Air Legislation - Coalition Building

On Thursday, January 18, representatives from the offices of Public Liaison, Policy Development, Legislative Affairs, Intergovernmental Affairs, Political Affairs, OMB, CEQ, the Department of Energy, and EPA mapped out a plan to develop coalitions to support the Administration's clean air objectives.

It was decided that the first step should be to form a "kitchen cabinet," a group of ten to fifteen insiders who will work with the Administration and can be counted on to galvanize support for our positions on the different provisions of the bill (i.e. air toxics, acid rain, and non-attainment). This group should come to the White House for a high-level meeting, the suggested date being Friday, January 26. The list of "kitchen cabinet" members will be final by COB tomorrow. We suggest that the White House meeting include yourself, Director Darman, Administrator Reilly, and Admiral Watkins, and that the President drop by as well. We have submitted a schedule proposal to Joe Hagin requesting the President's participation.

The "kitchen cabinet" will work to galvanize support among various constituencies and oversee five coalitions formed around the following provisions of the bill -- air toxics, acid rain, non-attainment mobile and stationary sources, and alternative fuels. These individual coalitions will work with the appropriate White House and EPA officials as various amendments and portions of the bill come up before the Senate. This mechanism will then allow us to be prepared when the bill moves to the House.

THE WHITE HOUSE

WASHINGTON

SCHEDULE PROPOSAL

JANUARY 22, 1990

TO: JOSEPH HAGIN
DEPUTY ASSISTANT TO THE PRESIDENT
FOR APPOINTMENTS AND SCHEDULING

THROUGH: DAVID DEMAREST ~~TH~~
ASSISTANT TO THE PRESIDENT FOR COMMUNICATIONS

FROM: BOBBIE KILBERG BK
DEPUTY ASSISTANT TO THE PRESIDENT
FOR PUBLIC LIAISON

KATHY JEAVONS (4)
ASSISTANT DIRECTOR FOR PUBLIC LIAISON

REQUEST: Drop-By Clean Air Coalition Building Meeting

PURPOSE: For the President to ask for help in building coalitions to support the Administration's clean air objectives.

BACKGROUND: It is imperative that the Administration work to establish supportive coalitions to ensure an environmentally responsible and economically sound bill.

The White House and EPA have developed a "kitchen cabinet," advocates of the Administration's bill, who will work with us to galvanize support. The group will oversee five coalitions being formed around the following provisions of the bill - air toxics, acid rain, non-attainment mobile and stationary sources, and alternative fuels). This kitchen cabinet of roughly ten key individuals will meet with high level Administration officials on Friday.

DATE AND TIME: Friday, January 26, 1990
Time flexible (10 minutes)

LOCATION: Roosevelt Room

PARTICIPANTS: The President
Governor Sununu

OMB Director Darman
EPA Administrator Reilly
Energy Secretary Watkins
10 key individuals who are advocates of the
Administration's clean air interests

SEQUENCE:

- The President enters the Roosevelt Room and greets the participants.
- The President thanks them for their support and willingness to work on the Administration's behalf for responsible clean air legislation.
- The President departs the Roosevelt Room.

MEDIA:

Press Pool



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

January 22, 1990
(Senate)

STATEMENT OF ADMINISTRATION POLICY

(THIS STATEMENT HAS BEEN COORDINATED BY OMB WITH THE CONCERNED AGENCIES.)

S. 1630 - Clean Air Restoration and Standards
Attainment Act of 1989
(Baucus (D) Montana and 12 others)

The President, in a letter to Senate Minority Leader Dole dated January 19, 1990, reaffirmed his support for reauthorizing and strengthening the Clean Air Act.

Text of the President's Letter

Last July I submitted to the Congress a comprehensive proposal for reauthorizing and strengthening the Clean Air Act. That proposal was the result of a long and careful debate within the Administration, and reflected extensive consultation with Members of the House and Senate, representatives of affected industries, state and local governments, and environmental and public health groups.

Consistent with my belief that environmental protection and economic growth can be compatible, the Administration's Clean Air bill seeks to achieve public health and environmental protection in an economically efficient way by making extensive use of market principles. My comprehensive proposal carefully balanced our mutual desire for enhanced public health, a cleaner environment, and sustained economic growth. Even so, the cost estimate of the Administration's bill to the American economy is approximately \$19 billion annually when fully phased-in.

As the Senate moves toward floor consideration of the Clean Air Act, I am convinced that we must maintain the balance reflected in the Administration's bill. Initial cost estimates of the Clean Air bill reported by the Senate Environment and Public Works Committee exceed \$40 billion annually -- more than double the cost of the Administration's bill. Yet the Committee bill provides little incremental environmental benefit above that proposed by the Administration. And the additional costs of some of the Committee bill's far-reaching provisions have yet to be incorporated in these estimates.

I want to sign a Clean Air bill this year -- so that the 1990s can indeed be known as the "Clean Air decade." But I will only sign legislation that balances environmental and economic progress.

Specifically, I will only approve legislation which meets the following minimum tests of balance and reasonableness:

1.) The important environmental protections afforded by the Administration's bill must be maintained in the final legislation and preserved over time. The Administration proposes to: reduce sulfur dioxide emissions permanently by 10 million tons; achieve attainment of ozone, carbon monoxide and particulate matters standards; and sharply curtail the hazards posed by air toxics emissions. These represent critically important steps in achieving clean and healthy air for all Americans. In view of the environmental and health risks posed by acid rain; the fact that 100 million Americans now live in cities which are out of attainment with public health standards for ozone; and the estimate that current excessive levels of air toxics emissions may result in premature cancer deaths and other serious adverse health effects; it is vital that we move quickly and decisively to reduce these pollutants. The Administration's proposed bill would do just that.

2.) The bill should not impose aggregate costs on the economy that exceed the already considerable costs embodied in the Administration's bill -- with an adjustment of no more than ten percent to reflect certain mobile source provisions added in the House Energy and Commerce Subcommittee on Health and the Environment. The House subcommittee added certain provisions affecting mobile sources to the titles of the bill which relate to non-attainment that will modestly increase the cost of these titles. Unfortunately, several provisions currently contained in the Senate Environment and Public Works Committee's bill -- such as mandatory nationwide second phase tailpipe standards for automobiles, an inflexible second phase of air toxics control, and carbon dioxide emissions standards for mobile sources -- cause the Senate bill to exceed substantially the cost of the Administration bill. The result of an excessively costly bill will be a less competitive American economy with fewer jobs for American workers.

The Administration has received letters from around the country, for example, indicating that a considerable number of plant closings could result from adoption of the Senate's air toxics provisions. The Administration has set up a task force under the chairmanship of the Council of Economic Advisers, and including the Environmental Protection Agency, the Office of Management and Budget, the Department of Energy, and the White House Office of Policy Development, to monitor and estimate the economic cost of various clean air proposals as the debate proceeds.

3.) Controls in the bill should be designed to achieve reductions in the most cost-efficient way -- that is, for the least cost per ton of reduced pollutant. By incorporating flexibility and innovation in its recommended control strategies, the Administration's bill would allow environmental and health standards to be met in a way that creates maximum choice for both states and regulated industries and places fewer burdens on consumers. For example, the Administration's alternative fuels proposal will challenge the automobile and oil industries to produce cleaner vehicles and cleaner fuels at the lowest cost to the consumer.

The "command and control" approach embodied in several provisions of the Environment and Public Works Committee's bill -- such as that which disallows "netting" for factories and commercial facilities seeking to meet ozone non-attainment standards in the most cost-effective way -- results in the same environmental benefit, but at greatly increased cost and with sharply increased impediments to economic growth. Similarly, the provisions in the Environment and Public Works Committee's bill which move up emissions reduction deadlines while failing to provide incentives for clean coal technology needlessly inflate the cost of acid rain control.

4.) The system of emissions trading, which allows acid rain reductions to be achieved in the least costly and most equitable fashion, must be allowed to work. The Administration's proposed acid rain emissions trading program inherently reduces the cost of any given level of sulfur dioxide or nitrogen oxide reduction, and provides an efficient mechanism for balancing the burdens imposed on any given region of the country. The Administration has provided information to several Senators which indicates that this trading system can dramatically reduce the impact of acid rain controls on electric utility rates in any given state, while at the same time reducing the cost of the overall bill by up to billions of dollars per year. In the first phase, the initial allocation of required reductions to 107 plants is essential to ensuring that effective trading opportunities exist. The trading system must survive in a form that achieves environmental benefits comparable to those in the Administration's bill and involves a sufficient number of plants in the first phase to ensure its workability.

5.) The legislation must not include a national electricity tax to pay for controls, which would penalize consumers in those states which have already undertaken reductions by making them in effect "pay twice" for clean air. Supporters of such "cost sharing" argue that it is needed to address regional inequities. Any imbalance in control costs can be addressed far more effectively, efficiently, and equitably through the operation of a robust emissions trading system -- which would not require new taxes.

The Administration took substantial time and effort to craft a balanced proposal. My staff and I stand ready to assist you and the other Members of both the House and Senate as you work to develop legislation which maintains this vitally important balance, and which does not violate one or more of the above mentioned "tests."

I look forward to signing legislation that will accelerate progress toward cleaner air for a growing America at the earliest possible opportunity.

* * * * *

(Not to be Distributed Outside Executive Office of the President)

The above floor position was prepared by LR (Fitter). An information copy has been provided to WHGC, NR, NRES/SS, OIRA, ES, EPA, CEA, Commerce, Treasury, Justice, Energy, Transportation, OSTP, DOD, State, Interior, CEQ, USDA, HHS, HUD, NRC, Labor, GSA, and SBA.

A description and critique of S. 1630 has been prepared by EPA in its "Administration Report on S. 1630," and "Administration and Senate Clean Air Act Cost Comparison."

Ed Rogers

October 2, 1989

*Per your request, here
are the industry comments.
Jim Johnston - GM*

THE FOLLOWING IS A GENERAL MOTORS RESPONSE TO TODAY'S ACTION BY THE HOUSE
SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT

While we have supported new clean air legislation along the lines of the
original bipartisan approach (represented by H.R. 3030), today's action goes
to an extreme which will bring virtually no significant benefits over what the
bipartisan bill provides, but will mean huge costs to the consumer and high
risks for the industry.

#

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PAGE.02

For Immediate Release
October 2, 1989



Chrysler Motors Corporation
12000 Chrysler Drive
Highland Park, MI 48288-1919

Contact: Tom Houston
(313) 956-2894
John Guiniven
(202) 862-5409

STATEMENT ON THE DINGELL/WAXMAN CLEAN AIR COMPROMISE

Chrysler Corporation is deeply concerned about the compromise announced today by the House Subcommittee on Health and the Environment. The basis of our concerns are twofold. First, the proposed standards stretch the limits of technological feasibility, and we presently lack assurance that these standards can be met at the levels of reliability and quality the American public demands.

Second, the proposed compromise imposes significant costs on the American consumer, even in regions of the country that are meeting national air quality goals.

No industry has come close to the auto industry's effort to clean up the air. Today's cars have reduced hydrocarbon emissions by 96 percent, compared to pre-1970 vehicles. This has not been a debate about clean air versus dirty air; rather, it is a debate about the best means of achieving air quality goals at the least burden to the consumer.

Q & A

FOR USE ON INQUIRY

**Public Affairs**

FORD RESPONSE TO HOUSE ENVIRONMENT SUBCOMMITTEE'S ACTION

Following is a statement by Harold A. Poling, vice chairman of the Board and chief operating officer, Ford Motor Company, in response to today's action by the House Environment subcommittee.

We supported the President's original proposal as a valuable contribution to improving air quality, although it would have put a severe strain on our human and technological resources. However, this action goes well beyond that proposal.

- . First, it would set California auto standards nationwide, even though such standards are tailored to California's unique problems and could actually increase smog in many metropolitan areas.
- . Second, unless the Environmental Protection Agency determines otherwise, it would make the standards twice as stringent -- despite the fact that the United States Office of Technology Assessment and other respected sources have determined that the standards are not feasible and that such a doubling would improve air quality by only less than one percent compared with the President's proposal.
- . Third, it would mandate onboard vapor recovery systems. Government safety agencies have said there are serious safety questions with these systems; respected economists have said they are not cost-effective; and respected environmental sources have said that the problem is more quickly and better solved by controls on the pumps at local gasoline stations.

* * *

10/02/89 17:48

003

OCT 3 '89 15:03 FROM GARY RELS DBN 5541900 TO WASH GA

PAGE.003 003

- 2 -

Q. What are you for?

A. We support the thrust of the President's original proposal -- tough as that is. There is so little to be accomplished by tighter tailpipe standards, that we believe the alternative-fuels program is a more promising real-world approach than the standards contemplated for 2003. (Consider adding EPA's cost estimate: \$7.5 billion for the Senate bill, which is very similar to the revised House provisions; \$1 billion for the President's bill with very similar environmental effects. See Senator Levin's testimony.)

Q. Who are the environmental sources and economists?

A. Sierra Research and Lester Lave.

Q. What are the governmental safety agencies?

A. The National Highway Traffic Safety Administration and the National Transportation Safety Board. Also, the National Safety Council and the Insurance Institute for Highway

OCT 3 '89 17:13

PAGE.003

CLEAN AIR ACT LEGISLATION COST EVALUATION

Prepared for:
The Business Roundtable

Prepared by:
Denny Technical Services
5001 Hollyridge Drive
Raleigh, N.C. 27612

January 8, 1990



**CLEAN AIR ACT LEGISLATION
COST EVALUATION**

Prepared for
The Business Roundtable

Prepared by
Denny Technical Services

PROPOSED CLEAN AIR ACT LEGISLATION COST EVALUATION

Executive Summary

This report, supported by The Business Roundtable, contains a compilation and analysis of cost estimates for the three major provisions contained in various proposed amendments to the Clean Air Act. The major provisions include changes to attempt to achieve compliance with ambient air quality standards for ozone, acid deposition provisions, and toxic air pollutant provisions. A unique feature of this report is that it provides a comprehensive cost perspective for the many proposed modifications to the Clean Air Act. The estimated cost for all three provisions could be as much as \$104 billion per year. A "Best Estimate," representing a middle ground of possible requirements, would be about \$54 billion per year for the provisions evaluated. Cost estimates are not included for Administration bill elements such as the PM10 requirements and provisions related to enforcement and permit amendments. These items could substantially increase the "Best Estimate."

The Administration bill, H.R. 3030 in the House of Representatives and S. 1490 in the Senate, could be less costly than the "Best Estimate" of \$54 billion per year. Various combinations of bills before Congress could lower or raise the estimated cost. The Senate Environment and Public Works legislation, S. 1630, reported on November 19th, would be significantly more expensive than the Administration bill.

The basis for the evaluation is a series of cost estimates generated by several organizations. To the extent possible, this evaluation has been reviewed by the cost study authors or sponsors and their comments have been considered in the conclusions reached.

Acid Deposition Provisions

The range of costs and a best estimate for the acid rain, air toxics and ozone provisions are contained in Figure ES-1. The electric utility acid deposition rain cost range

estimate of \$3 billion to \$8 billion per year covers estimates generated by Temple, Barker, and Sloane (TBS) for the Edison Electric Institute and by ICF Resources and Pechan Associates for EPA. The "Best Estimate" was generated in this report following discussions with TBS, electric utility personnel, EPA staff, and electric utility management consultants. The electric utility "Best Estimate" of \$5 billion per year is at the high end of the ICF range and at the low end of the TBS range. Uncertainties in the availability and cost of low sulfur coal, extent of allowance trading that would occur, and differences in scrubber costs among the studies led to the conclusion that the most likely cost would be at the high end of the ICF range.

The "Best Estimate" and range of costs for acid rain provisions include \$0.8 billion per year for increased natural gas prices. The natural gas price increase estimate was included in the ICF report.

Clean Air Act Modification Cost Summary

Provision	Cost Range (\$ Billions/year)	Best Estimate (\$ Billions/year)
Acid Rain	3 - 8	5
Ozone	6 - 34	24
Air Toxics	<u>5 - 62</u>	<u>25</u>
Totals	14 - 104	54

Figure ES-1

Ozone Non-Attainment Provisions

The ozone control cost range would be from \$6 to \$34 billion per year. The lower value is based on an analysis conducted for EPA by Pechan and Associates. The \$6 billion

per year was the lowest estimate to implement the original Administration bill. The high end of the cost range, \$34 billion per year, represents the high Pechan estimate for the original Administration bill plus costs for the Waxman-Dingell compromise for motor vehicle emissions controls and additional costs for ozone non-attainment cities that are far from compliance.

A "Best Estimate" for ozone compliance costs was calculated to be \$24 billion per year. The Pechan average estimate to comply with Administration proposal, as introduced, was adjusted to account for additional motor vehicle emissions controls, alternate fuel amendments, and for estimated control costs to comply with ozone air quality standards in southern California. No cost estimates were included for the Waxman-Dingell compromise requirement for a 0.2 grams per mile motor vehicle tailpipe nitrogen oxides emission limit.

Air Toxics Provisions

Toxics air pollutant control costs were projected to range from \$5 to \$62 billion per year. The lower cost of \$5 billion was the lowest cost to implement the air toxics Maximum Available Control Technology provisions as contained in the Administration bill. The low estimate was taken from a report prepared by Energy and Environmental Analysis, Incorporated for EPA. The \$62 billion per year upper end of the range is based upon compliance with a one in a million residual risk requirement as would be required by S. 1630. A "Best Estimate" of \$25 billion per year includes EPA's average estimate for the Administration bill plus an incremental cost to comply with a one in one hundred thousand residual risk requirement. The incremental residual risk estimates are based on analyses performed by the American Petroleum Institute and by Denny Technical Services for the Chemical Manufacturers Association (CMA). The incremental residual risk compliance cost estimates are for VOC carcinogens only. No cost estimates were made for carcinogenic particulates, radionuclides, or threshold pollutant controls.

Comparison to the Administration Bill as Introduced

The "Best Estimate" cost increments to the Administration bill, as introduced, are shown graphically in Figure ES-2. There is little difference between the Administration proposal acid deposition costs and those included in the "Best Estimate." The ozone attainment provisions in the "Best Estimate" are more than twice those for the Administration bill. There seems to be little disagreement regarding the magnitude of the incremental \$9 billion per year for motor vehicle tail pipe emissions controls. The \$5 billion per year increment for high ozone cities is less certain. EPA staff indicated they agree there may be some cost increment above the average estimate for the Administration bill. They had not estimated the value for that incremental cost.

The largest difference between the "Best Estimate" and estimates for the Administration bill is the \$18 billion per year for air toxics residual risk controls. Residual risk controls cost estimates are very sensitive to the risk level selected. S. 1630 would mandate the establishment of two simultaneous residual risk standards. The first residual risk standard would be one in ten thousand and all facilities would be required to comply. The second residual risk standard would be one in one million and all facilities would be required to attempt to achieve that standard. The "Best Estimate" assumes an intermediate compliance level at a one in one hundred thousand residual risk level. If the residual risk requirement were to be one in ten thousand as stipulated in S. 1630, the control cost increment would be \$7 billion per year. If the residual risk requirement were one in a million as also stipulated in S. 1630, the incremental cost would be \$55 billion per year. CMA member company representatives estimated the residual risk cost estimate uncertainty to be plus or minus 50 percent.

In many instances, compliance with residual risk requirements may not be technically feasible. Figure ES-3 contains a list of some industries that EPA has indicated may not be able to comply with the S. 1630 residual risk requirements without new control technologies or new manufacturing processes.

COSTS -- INCREMENTAL TO THE ADMINISTRATION BILL AS INTRODUCED

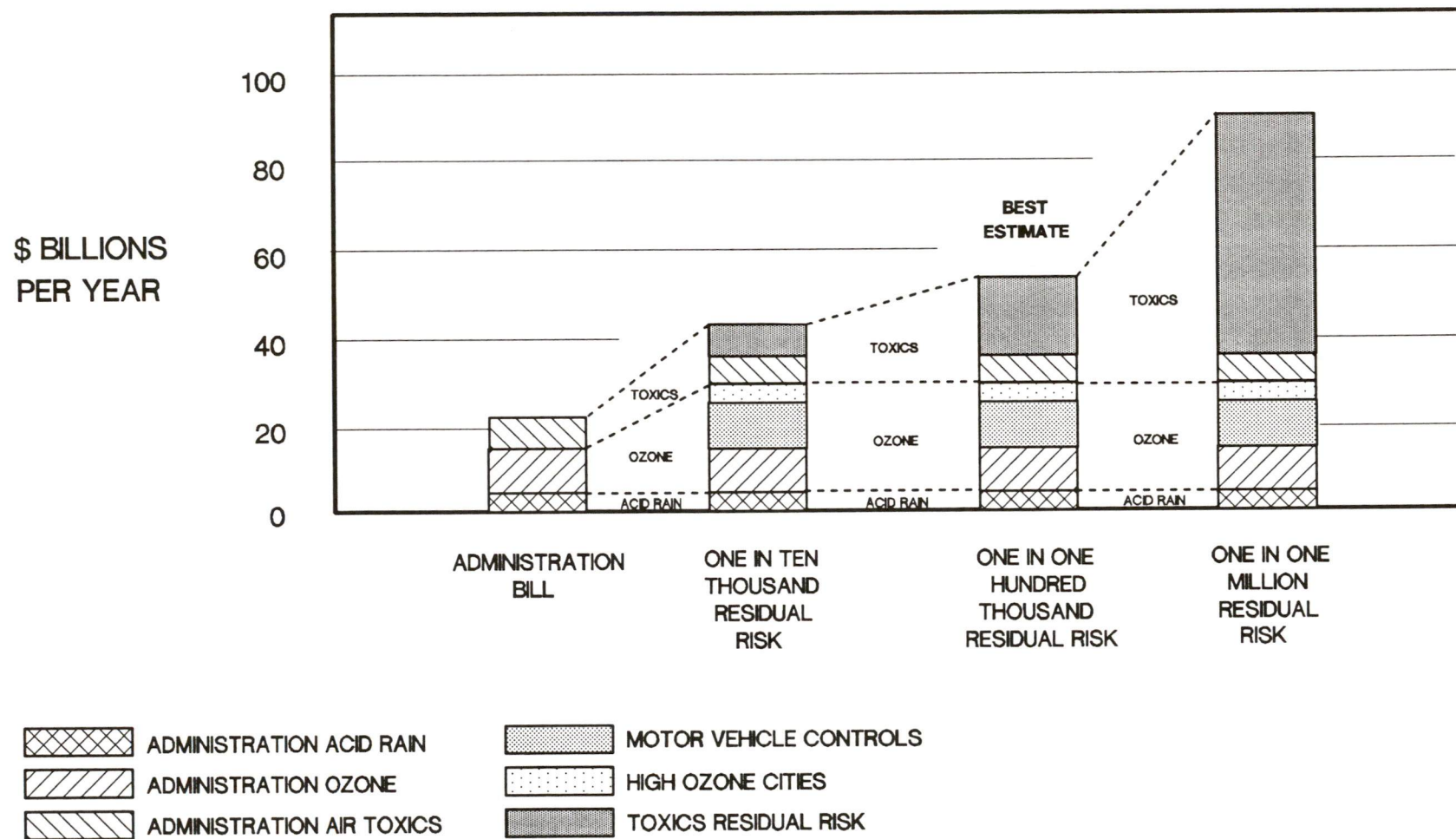


FIGURE ES-2

INDUSTRIES WITH RESIDUAL RISK COMPLIANCE TECHNOLOGY LIMITATIONS

ONE IN TEN THOUSAND RESIDUAL RISK

BUTADIENE PRODUCTION
NEOPRENE PRODUCTION
POLYBUTADIENE PRODUCTION
STYRENE-BUTADIENE RESINS
METHYLENE CHLORIDE USE AND PRODUCTION
PHARMACEUTICAL
ETHYLENE DICHLORIDE PRODUCTION
CHLORINATED HYDROCARBON PRODUCTION
CHLORINATED HYDROCARBON USE

ETHYLENE OXIDE PRODUCTION
PRIMARY COPPER SMELTERS
PRIMARY LEAD SMELTERS
ZINC OXIDE PRODUCTION
CHROMIUM PRODUCTION
VINYLIDIENE CHLORIDE POLYMER
COKE OVENS
FERROCHROME PRODUCTION
PESTICIDE PRODUCTION

ONE IN ONE MILLION RESIDUAL RISK

CHROMIUM PRODUCTION
CHLORINE PRODUCTION
REFRACTORIES
COKE BYPRODUCTS PROCESSING
ELEMENTAL PHOSPHORUS PLANTS
ARSENIC CHEMICAL PRODUCTION

GLASS MANUFACTURING
SECONDARY LEAD SMELTERS
SPECIALTY STEEL PRODUCTION
MILL TAILINGS PILES
UNDERGROUND URANIUM MINES
ETHYLENE DICHLORIDE PRODUCTION

Conclusions

The Administration bill, as introduced, implementation cost estimate would be about \$22 billion per year. Motor vehicle control amendments to the Administration bill would increase the implementation cost to \$31 billion per year. Adjustments to the ozone provisions cost estimate for high ozone cities would likely add another \$5 billion per year. The "Best Estimate" of \$54 billion per year could dramatically increase or decrease depending on the final form of the residual risk requirements that are currently not specified in the amended Administration bill. If the one in a million residual specified in S. 1630 were to be required, the total costs could approach \$104 billion per year. This requirement could result in shutdown or significantly reduced production in United States industries whose total revenues exceed \$100 billion annually. Several cost items, some potentially major, have not been evaluated and would increase the costs further.

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INDIVIDUAL PROVISION COST ESTIMATES

Introduction

This report contains individual provision cost estimates for various Clean Air Act amendment proposals. The pollutants covered include acid deposition, ozone, and air toxics. The analyses are organized by pollutant. H. R. 3030/S. 1490 is used as a base for cost comparisons. The Administration acid rain bill costs have been modified to include costs for increased natural gas prices. Ozone non-attainment costs have been modified to incorporate the recent Waxman-Dingell compromise, which includes motor vehicle tail pipe and on-board emissions controls. Ozone non-attainment costs have also been modified to reflect cost estimates reported by the National Association of Manufacturers, Siemon, Larsen, & Marsh, and Portney for southern California. Air toxics costs are based on the Administration bill with the range of the estimate reflecting residual risk requirements that are included in S. 1630. Cost estimates are identified by the organization performing them. The major assumptions made and conclusions reached by the evaluator have been summarized. A best cost estimate and supporting rationale is provided for each pollutant.

To the extent possible this evaluation has been reviewed by the cost study authors or sponsors and their comments have been considered in the conclusions reached. The bills considered are under going frequent revisions. The provisions included here are believed to be accurate as of mid December 1989. In most cases, cost estimates are expressed to the nearest \$0.1 billion. The uncertainties associated with some of the estimates are of the order of plus or minus 50 percent. The uncertainties should be kept in mind when interpreting the report contents.

Acid Deposition

Title V of the Administration bill is entitled Acid Deposition Control. The Administration Bill would require the reduction of SO₂ emissions by 10 million tons per year from 1980 levels and the reduction of NO_x emissions by about 2 millions tons per year relative to their levels in the year 2000. Sulfur oxides emission allowances would be established for each existing affected electric utility unit. Emissions reductions would take place in two phases. The first phase would be completed by 1995 and the second by the year 2000. Emission allowances specified in the bill could be transferred among owners or operators of affected sources. During the first phase of emissions reductions, the allowances could be transferred among affected sources within a single state or among affected facilities with common ownership irrespective of state boundaries. During the second phase of emission reductions, allowances may be transferred among affected sources within each of the geographic regions of the country as prescribed by regulation.

There is a long list of affected facilities in the legislation for which allowances are specified. Unlisted affected units would be issued allowances based on a baseline of average fuel consumption during the years 1985, 1986, and 1987. Owners of new units would be required to hold allowances equal to the annual tonnage of sulfur dioxide emitted by the unit after December 31, 2000. New units may obtain allowances from any unit without regard to geographic restrictions.

Three different organizations, Temple, Barker, and Sloane, for the Edison Electric Institute, and ICF, and Pechan for EPA have conducted studies to estimate the costs to implement the Administration proposal. Sulfur dioxide control approaches include coal switching from high to low sulfur, scrubbers and partial scrubbers, fuel blending, fuel substitution, and clean coal technologies. Nitrogen oxides control approaches used were primarily combustion controls.

All three organizations have made estimates of the costs to implement the provisions contained in the Administration acid deposition bill. Each study generated a range of costs

dependent on assumptions included by the investigator. All the studies appear to have incorporated the EPA high and low case for emissions growth as a basis for calculation. The major differences in the assumptions used are the costs for scrubbers, cost of coal, and the extent of allowance trading that will take place. The three studies are summarized below.

Edison Electric Institute--Temple, Barker, and Sloane

Temple Barker and Sloane, Inc. (TBS) prepared a report for the Edison Electric Institute (EEI) analyzing the requirements and associated costs for H. R. 3030. TBS used optimized methodology with a unit-by unit, plant-by plant, utility-by-utility cost buildup. Electric Power Research Institute cost data for scrubbers, clean coal technologies, and other controls were used. The methodology was extensively reviewed by the U. S. Environmental Protection Agency (EPA), The Department of Energy (DOE), the Congressional Research Service (CRS), and others. TBS used higher scrubber costs, apparently higher coal costs, and very limited allowance trading relative to ICF the assumptions.

A low and high cost scenario were examined. The range of costs was estimated from \$5.0 to \$7.1 billion/year with a mean value of \$6 billion/year. Capital requirements would range from \$13.6 to \$22.8 billion. Costs included were for SO₂ and NO_x emissions reductions, permit fees, and emissions offsets to allow for growth during the period 2001 to 2010. The study found that the bill, as structured, would result in 12.4 million tons per year SO₂ reductions from 1980 levels, 2.4 million tons per year more than the President's goal of 10 million tons per year. Virtually all the additional emissions reductions would come from the utility industry. TBS estimated that both the low and high cost estimates could be reduced by more than 30 percent if the total emissions reduction were reduced to the original goal.

TBS estimated that compliance would be attained at 26 to 31 percent of affected capacity by coal switching. Scrubbers, including upgrades and partial scrubbers, would be employed at 42 to 52 percent of affected capacity and all forms of innovative technology are

estimated for 11 to 18 percent of affected capacity. In the analysis, TBS assumed that coal switching would account for only 20 to 25 percent of current usage because of provisions that would permit state governors to require the use of in-state coal. Total coal switching was projected to reach between 91 and 109 million tons per year. Removing the restriction requiring the use of in-state coal would increase the amount of coal switching to 149 million tons per year.

Indiana, Missouri, Ohio, Pennsylvania, and Tennessee would incur 44 percent of the total national costs for acid deposition control. Fifteen eastern states would incur 84 percent of the total costs. Thirty six of 100 major utilities would have rate increases greater than 10 percent. Twelve utilities would have rate increases over 25 percent.

TBS estimated costs would be reduced by as much as 25 to 30 percent with modifications to the existing legislative language. It is the TBS opinion that short time schedules, potential limits on coal switching, offset provisions, and the proposed permit program all would inhibit allowance trading and would add to the bill's cost.

Environmental Protection Agency -- ICF

The second organization, ICF Resources, under contract to the Environmental Protection Agency (EPA), estimated the cost to implement the Administration bill for four cases. Two alternative future utility emissions levels were selected by EPA to present a reasonable base range for future utility emissions. These were designated "High" and "Low" emissions scenarios. The "Low" base case included an assumption that moderate repowering with clean coal technologies would occur in the year 2004. Each base case was evaluated for two sets of conditions. The first set of conditions was called "Flexible" and assumed full exploitation of all economic emissions trading opportunities. The second set of conditions was called "Constrained" and assumed only intra-utility trading. The "Constrained" case also assumed some plants in Ohio, Indiana, and Illinois would be restricted from using out of state coals. ICF used lower scrubber costs and apparently lower coal costs than TBS.

By the year 2004, utility SO₂ emissions were predicted to be 8.2 to 8.7 million tons per year below 1980 levels. Total SO₂ emissions were forecasted to reach 9.7 to 10.2 million tons per year below 1980 levels. The total reduction takes into account an estimated 1 million ton per year reduction from other sectors since 1980 (e. g., smelters). The total reduction also includes 0.5 million tons per year reduction from diesel fuel desulfurization. Utility NO_x emissions were forecasted to be reduced by 2.0 to 2.1 million tons per year as required by the bill.

Peak year utility revenue requirements were estimated to range from \$3.1 to \$5.2 billion per year depending on the base case used and the regulatory/institutional restrictions in place during implementation. The \$3.1 billion represents the EPA "Low" base case and a "Flexible" environment. The \$5.2 billion represents the EPA "High" base case and a "Constrained" environment. The estimated present value of costs through 2010 in 1988 dollars ranged from \$13 to \$22 billion.

National electricity rate increases were projected to increase by 1 to 2 percent on a levelized basis. Several states are projected to have rate increases higher than the national average. All states except West Virginia and Missouri under the "High" EPA base case are projected to have levelized rate increases less than 5 percent. ICF recognized that individual utilities could have rate increases much higher than 5 percent but no specifics were given.

Coal market switching was projected by ICF to range from 109 to 119 million tons per year under "Flexible" implementation conditions. The switch would be from high sulfur coal production to low sulfur coal production with the total coal market remaining nearly constant. Between 15,000 and 17,000 jobs would be shifted from Northern Appalachia and the Midwest to other regions. Western Kentucky, Pennsylvania, and Illinois were forecasted to lose the greatest number of coal mining jobs. ICF has also indicated that an additional \$0.8 billion per year cost to residential and commercial natural gas consumers under the "High" scenarios. This cost is due to the increase in natural gas prices caused by increased demand in the utility sector.

Environmental Protection Agency -- Pechan

The Environmental Protection Agency also had a second contractor, Pechan and Associates, estimate the relative cost to implement several acid deposition legislative proposals. The Administration proposal was one of the six proposals evaluated and is the only one included in this report.

To estimate costs, Pechan evaluated several options for each affected facility. Technologies or fuel switching in order of least cost were applied at facilities until the sulfur dioxide emissions reduction goal was reached. Facilities with more costly alternatives above the goal limit in reductions were assumed to purchase allowances from facilities that had excess emissions reductions above their allowance. The allowance purchase price was taken as the approximate marginal cost per ton of the last ton of SO₂ removed under the regional emission reduction targets. Allowance trading was modeled to comply with the Administration bill requirements. Three multi-state utilities were assumed to trade only among themselves and not with other state utilities in Phase I. Projected new units by the year 2010 would be subjected to a "revised" new source performance standard that would require a 95 percent SO₂ removal rather than the currently mandated 90 percent. Combustion modification was the assumed method for nitrogen oxides control. The maximum control efficiency used was 50 percent.

Total costs for the Administration bill were calculated to be \$2.6 to \$4.0 billion per year in the year 2000 and from \$2.2 to \$4.8 billion per year in 2010. Sulfur dioxide emission reductions from 1980 levels were calculated to be from 8.7 to 9.2 million tons per year depending on the growth calculation basis used. The estimated scrubber capacity that would be installed was from 41 to 73 gigawatts of electrical generating capacity.

Bush Administration

The Administration estimated the acid rain provisions in H. R. 3030/S. 1490 would be \$3.8 billion/year. The cost estimate was contained in a press release that accompanied

the announcement of the legislation. According to EPA staff, an earlier version of the ICF analysis is the basis for the Administration cost estimate.

Individual Utility Estimates

Two studies performed by individual companies are included in this report. The Duke Power study is included to illustrate a needed change in the baseline basis for allowance allocation calculation. The Public Service Indiana study is included because it contains cost information that is used for comparison purposes in the acid deposition discussion section below.

Duke Power Company

Duke Power has reduced sulfur dioxide emissions by over 120,000 tons per year since 1980 through the use of low sulfur coal and the development of nuclear power. The proposed legislation would penalize Duke Power for this positive environmental contribution.

The proposed legislation would, with its current language, force Duke Power to reduce SO₂ emissions by an additional 100,000 tons per year. The additional reductions would be required because the use of actual coal fired generation capacity at Duke in the period 1985-1987 was low. Units were taken out of service for refurbishment and were planned to be brought back into service to accommodate growth in demand during the early part of the next decade. The investment in the refurbishment has already been made. Emission allowances based on the reduced coal fired capacity along with the SO₂ emissions cap would require Duke to reduce emissions to an equivalent of 0.6 pound SO₂ per million BTU when all the currently inactive coal fired generating capacity is brought back on line. That is one half the targeted emissions limit of 1.2 pounds per million BTU that would be required by the Administration bill.

To achieve the required reductions Duke would have to invest an incremental \$1.3 billion for emissions control equipment at 4,400 megawatts of capacity and switch to lower sulfur coal at the remaining units. Operating and maintenance costs would amount to \$175 million per year. These requirements translate to an increased revenue requirement of \$400 million per year.

According to EPA staff the Duke Power situation is not an isolated incident. There are other utilities faced with a similar predicament. The language in the Administration bill would permit the EPA Administrator to exclude periods during which a unit is shut down for a continuous period of four months or longer. That language may permit a resolution to problems similar to the one at Duke Power. The intent of the language is not clear.

Public Service Indiana

Public Service Indiana (PSI) calculated emission limits requirements for its Gibson, Cayuga, Wabash River and Gallagher stations. No allowance was included for the Gibson #5 unit because it was not in service in 1980. Growth requirements from 1985 to 2000 were also included in the calculations. Consequently, control strategies would require compensating for the Gibson #5 unit, growth, and complying with the 2.5 and 1.2 pound SO₂ per million BTU emission limits contained in the Administration bill.

To comply PSI would have to install one additional scrubber and upgrade the Gibson #5 scrubber by 1996. Four additional scrubbers would be required by 2001 to meet Phase II requirements. It was assumed that compliance coal prices would increase to become competitive with scrubber technology. Scrubber costs estimates were made for each unit based on the cost of construction experience at the Gibson #5 unit. Costs ranged from \$223-293 per kilowatt in 1989 dollars. Low NO_x burners would be installed to comply with the nitrogen oxides emission reduction requirement. A total capital investment of \$0.8 billion was calculated with associated total revenue requirements of \$408 million per year in 2001. The rate increase required to cover the revenue requirement was estimated to be 24.9 percent.

Discussion

Figure 1 contains a comparison of some of the significant features from the TBS, ICF and Pechan cost estimates. Costs are expressed in 1989 dollars. Only these three studies were included in the comparison because they are the most detailed and complete from a national perspective. The largest cost differences are for SO₂ emissions reductions by the year 2001 or the costs for Phase I and Phase II of the Administration bill. While the TBS report indicates a utility SO₂ emissions reduction of 9.7 million tons per year compared to 8.2 to 8.6 million tons per year for ICF, 1.3 million tons per year of the TBS total are pre 1985 reductions. The net tonnage associated with TBS costs would then be the difference of 9.7 and 1.3, or 8.4 million tons per year. That reduction is within the range calculated by ICF so it appears that both estimates were based on about the same utility SO₂ reduction from 1980 levels. The Pechan estimate of from 8.7 to 9.2 million tons per year is slightly higher than either of the other two estimates.

The major differences among the three estimates appear to be in the control strategies assumed to achieve the required reductions. TBS calculated their costs for about 65 gigawatts capacity using scrubbers and about 21 gigawatts capacity using coal switching. The Pechan scrubber capacity is of the same order of magnitude as estimated by TBS. ICF by comparison has calculated the costs for about 25 gigawatts capacity using scrubbers and about 15 percent more coal switching capacity than used by TBS. Clean coal technology implementation was nearly the same for both the TBS and ICF estimates but no cost comparisons could be made since only TBS included cost information. Coal switching under ICF assumptions may be less expensive than scrubbing to reduce SO₂ emissions. The less expensive coal switching may account for part of the difference between the two estimates. No details were included in the Pechan report regarding the extent of coal switching or clean coal technology application. Since scrubber capacity is nearly the same for the Pechan and TBS estimates the cost differences must lie in the assumptions for scrubber costs, coal costs or the amount of allowance trading that takes place. TBS apparently provided little for allowance trading in their estimate, while Pechan assumed the maximum allowance

Administration Bill Acid Rain Comparisons

Item	Organization		
	TBS	ICF	Pechan
Annual Cost Year 2001 (\$ Billion/yr)			
SO ₂	4.2-5.1	2.0-3.7	2.3-3.2
NO _x	0.2-0.3	0.3-0.3	0.3-0.3
Permit Fees	<u>0.1-0.1</u>	<u>NE</u>	<u>NE</u>
Totals	4.5-5.5	2.3-4.0	2.6-4.0
Annual Cost Year 2010 (\$ Billion/yr)	5.0-7.1	3.1-5.1	2.2-4.8
Capital Cost (\$ Billion)	13.6-22.8	NE	NE
Utility SO ₂ (MM tons/yr)	9.7 (1.3 pre 1985)	8.2-8.6	8.7-9.2
Utility NO _x (MM tons/yr)	2.0	2.0-2.1	1.8-2.0
<u>Control Mix</u>			
Coal Switching			
Gigawatts	16-27	NE	NE
MM Ton/year	90-110	109-119	NE
Cost (\$/MM BTU)	0.18-0.56	NE	NE
Scrubbers			
Gigawatts	61-74	22-28	41-73
Cost (\$/Kilowatt)	165-195 (+ retrofit)	125-156 (+ retrofit)	NE
Clean Coal Technologies			
Gigawatts	25	30	NE
Cost (\$/Kilowatt)	75-100	NE	NE
States with Greater Than a 5% Rate Increase	15	2	1

NE = No Estimate

Figure 1

trading that could be achieved. The difference in allowance trading assumptions is probably the major component of difference between the TBS and Pechan estimates.

ICF used an average capital cost for scrubbers that is about 30 percent less than that used by TBS. Since retrofit factors were not specified in either estimate, it is impossible to tell if they compensate for the difference in capital cost estimates. The difference in capital costs may account for an additional fraction of the difference between the two estimates. The Public Service Indiana data indicate the retrofit factor would have to be about 1.9 for the ICF range and 1.4 for the TBS range. The TBS retrofit factor would be close to the value of 1.3 estimated by EPA according to TBS personnel. No scrubber capital cost data were contained in the Pechan report, so no comparisons can be made with the other estimates.

The difference in NO_x emissions tons below future estimates and the cost to achieve those reductions are very similar among all three estimates. The inclusion of permit fees in the TBS estimate is small compared to the overall difference among the estimates. Neither the NO_x estimates or the permit fees are judged to contribute significantly to the difference among the estimates.

The TBS and ICF reports contained SO₂ emission reduction credits for sources other than electric utilities. The TBS report contains emissions reductions totaling 3.2 million tons per year. That total is comprised of 2.7 million tons per year from industrial sources and an estimated 0.5 million tons per year from diesel fuel desulfurization that would be required by the Administration bill. The TBS report also includes a 1.3 million tons per year reduction from electric utilities during the period from 1980 to 1985. The total estimate for SO₂ emissions reductions below 1980 level is calculated to be 12.4 million tons per year which is 2.4 million tons more than the Administration goal. TBS estimates their costs would be reduced by about 30 percent if the total reduction were scaled back to the 10 million ton per year goal. EPA staff have indicated they and NAPAP have shown that the TBS estimate for SO₂ reductions since 1980 are in error but no documentation detailing the differences was made available.

The total emissions reduction in the ICF report is about 10 million tons per year below 1980 levels. The 10 million ton total is composed of about an 8.5 million tons from electric utilities, 1 million tons from industrial sources, and 0.5 million tons from diesel fuel desulfurization. The source of the industrial emissions reduction discrepancy between the TBS and ICF reports is not clear from the references cited in the reports. The emissions reductions contained in the ICF report would be consistent with the Administration goal of a 10 million ton per year reduction from 1980 SO₂ levels. The Pechan report only contained estimates for utility SO₂ emissions reductions from 1980 levels.

Discussions with utility decision makers and utility industry management consultants have indicated that significant uncertainties exist with regard to the selection of low-sulfur coal relative to scrubbers for compliance with the proposed legislation. Some experts are of the opinion that low sulfur coal prices will rise to a point where they are just below the cost of scrubbers. On the other hand, supplies of low sulfur coal may be large enough that competition will keep the price down. In the first case, it would be a prudent decision to commit to long term contracts at today's lower coal prices. In the second case it would be prudent to purchase low sulfur coal on the spot market at competitive prices. Either option places utilities at risk with public utilities commissions with regard to recovering their costs. If a utility were to make the wrong judgement, it might not be able to pass along all the fuel costs to its customers.

A second constraint is that some utilities may not be permitted to purchase and use low sulfur coal because of language in the proposed legislation permitting governors of states to require a certain percentage of in-state coal. Utility decision makers feel the time constraints in the bill will not permit them adequate time to make informed decisions. EPA staff expressed the opinion that the time required to implement coal use restrictions in individual states would be too long to have any significant effect on control strategies.

A final constraint is the availability of low sulfur coal supplies and the necessary infrastructure to deliver the coal in time to comply with the schedules contained in the proposed legislation. Utilities may opt for scrubbers if, in their judgement, they would not

be able to obtain the required quantity and quality of coal in a timely manner. Complicating the issue of coal availability is the fact that the ICF analysis predicted approximately a halving of high sulfur coal production between now and the year 2000. High sulfur coal production in the year 2010 is predicted to be twice that in the year 2000. The flexibility of the coal industry to accommodate the ICF estimate of a 15,000 to 17,000 job shift from high sulfur production regions and back again over a 20 year period is not known but would be subject to question.

Both the ICF and TBS estimates included credits for national SO₂ reductions due to diesel fuel desulfurization requirements included in the proposed legislation. Neither included a cost estimate to accomplish that reduction. Oil industry representatives have estimated that diesel fuel desulfurization will require a \$2.8 billion capital investment resulting in about \$1 billion per year in annual costs. EPA estimated the diesel desulfurization cost to ultimately range from \$0.6 to \$1.5 billion per year in 2015. The total best estimate for the acid rain provisions, described below, does not include diesel desulfurization costs because EPA staff have indicated there will shortly be a regulation in place that would require diesel fuel desulfurization. Therefore, while a diesel desulfurization provision is included in H.R. 3030, the costs have not been included in the best estimate for the acid deposition requirements.

Best Estimate

Because of the uncertainties with supply and cost of low sulfur coal and the difference in capital cost estimates for scrubbers, the best electric utility estimate is likely to be near the upper end of the range estimated by ICF, about \$4.5 billion per year. That is also near the lower end of the TBS estimate range and at the high end of the Pechan range for the year 2010. This best estimate value recognizes that some allowance trading will take place with resulting total cost reductions. Further, the \$4.5 billion per year estimate also recognizes there are constraints that would prevent the optimum amount of allowance trading to take place.

ICF has indicated in their report that natural gas prices would be expected to rise due to increased demand caused by fuel switching strategies to comply with sulfur dioxide emissions limitations. They estimated additional costs to residential and commercial natural gas consumers could be as much as \$0.8 billion per year in the 2005-2010 time frame. These costs would be in addition to the \$4.5 billion per year SO₂ control costs and would bring the best estimate for the acid deposition provisions to \$5.3 billion per year.

Ozone Non-Attainment

Ozone, as an ambient air pollutant, is not directly emitted from specific sources. Ozone is formed in the atmosphere through a series of chemical reactions involving, primarily, volatile organic compounds (VOC), nitrogen oxides (NO_x), and sunlight. Strategies to comply with ozone air quality standards are typically based on reduction of VOC emissions and in some cases NO_x emissions. Cost estimates to control both pollutants are included in the studies described below.

The cost analyses presented in this section are primarily those prepared for the Environmental Protection Agency by E. H. Pechan and Associates. Additional studies performed by the Office of Technology Assessment (OTA), the National Association of Manufacturers (NAM), Siemon, Larsen, and Marsh (SLM), and Portney are also included. The Pechan studies include the costs to comply with specific requirements included in each of several ozone non-attainment legislation proposals. The OTA analysis does not evaluate any proposal specifically but deals with the problem of ozone non-attainment in general. The OTA report provides a basis for comparison of costs and the degree of attainment that is likely to be achieved under any circumstances. The NAM study and others listed above deal specifically with the ozone attainment approach proposed for the South Coast Air Quality Management District in southern California. The Pechan analyses is described first for the Administration bill (H. R. 3030/S. 1490), the Waxman bill (H. R. 2323), and the Group of Nine proposal (H. R. 99).

EPA Cost Analyses-Pechan

The EPA pre-1988 policy costs are important for all agency analyses because they provide a basis for incremental costs of proposed new legislation. Pre-1988 costs are those that will be implemented independent of any changes in Clean Air Act legislation or EPA policies. The pre-1988 policy costs that would be incurred by the years 1995 and 2000 are summarized in Figure 2. These new costs are estimated to be \$6.995 billion per year by the year 2000. Costs for meeting motor vehicle emission standards in 1985 or costs for

PRE-1988 EPA OZONE POLICY COSTS

SOURCE TYPE	1995 COST (\$Million)	2000 COST (\$Million)
STATIONARY		
NSPS	878	1,213
NON-CTG RACT	449	449
LAER NEW GREATER THAN 100 TON SOURCES	3,137	4,047
MOTOR VEHICLES	712	926
TOTALS	5,176	6,995

Figure 2

stationary source controls in place in 1985 are not included. Each legislative proposal cost estimate in this report would be in addition to the pre-1988 costs.

Control costs to implement various legislation requirements were estimated from a set of equations developed by Alliance Technologies. Equations for 34 point sources and 7 area sources are included in the Alliance inventory. In addition, Pechan developed cost equations from model plant data for other source types. The annual costs for some control options are negative. The reason is a credit is generated for recovered materials such as solvents. Cost effectiveness factors for a total of 97 control approaches applied to 65 source categories are contained in the Pechan report. The cost effectiveness factors range from a \$3,260/ton VOC emissions reduction credit for automotive refinishing controls to a cost of \$80,853/ton VOC emissions reduction for alternate fuels in heavy duty vehicles. Control efficiencies range from 5 percent for Waxman alternate fuel proposals to 100 percent for emulsified asphalts and petroleum refining vacuum distillation controls. No controls or costs were proposed for VOC emissions from stationary combustion sources.

The key provisions for the Administration, Group of Nine, and Waxman proposals are summarized in Figures 3, 4, and 5. The VOC control cost summary for all three proposals is shown in Figure 6. The Administration bill and the Group of Nine proposals are nearly identical when taken in aggregate. Each would require VOC emission reductions of about 8 million tons per year at an annual cost projected to be between \$9 and \$10 billion per year. In both cases attainment would be reached in all areas of the country by the year 2005. The Waxman proposal would require an additional reduction of 700-800 thousand tons of VOC per year. Costs for the Waxman proposal would be nearly \$18 billion per year or about \$8 billion per year more than either of the other two proposals.

The summary of the provision categories and differences between the bills provided includes a statement of the scope of the regulation, significant differences in the features among the proposals, and comments regarding the technical feasibility of the requirements. Some provisions have no costs estimates included. Those items are identified in the summary description.

ADMINISTRATION BILL PROVISIONS SUMMARY

Ozone Non-attainment Area Classification and Deadlines

	Ozone Design Value (ppm)	Attainment Date
Marginal	0.13	1995
Moderate	0.14 - 0.15	1995
Serious	0.16 - 0.18	2000
Severe	0.19 and greater	2010

Motor Vehicles/Fuels

- Enhanced I/M in serious and severe areas
- Stage II vehicle refueling controls in moderate, serious, and severe areas
- Improved evaporative test procedures
- Gasoline volatility controls
- New emission standards for light duty vehicles and light duty trucks
- Alternative fuels in severe areas
 - 500,000 vehicles in model year 1995
 - 750,000 vehicles in model year 1996
 - 1,000,000 vehicles in model years 1997-2004

Stationary Sources

- National control measures for TSDf, architectural coatings, commercial solvents, vessel loading, and landfill emissions
- Seven CTGs in all but marginal non-attainment areas
- Moderate, serious and severe areas must achieve 15% VOC reduction net of growth by 1995 and 3% per year thereafter till attainment

Figure 3

GROUP OF NINE BILL PROVISIONS SUMMARY

Ozone Non-attainment Area Classification and Deadlines

	Ozone Design Value (ppm)	Attainment Date
Moderate I	0.13	3 Years after enactment
Moderate II	0.14 - 0.15	1995
Serious	0.16 - 0.18	1997
Severe	0.19 and greater	2005

Motor Vehicles/Fuels

- Enhanced I/M in serious and severe areas
- Stage II vehicle refueling controls in all non-attainment areas
- On-board vapor recovery
- Improved evaporative test procedures
- Gasoline volatility controls
- New emission standards for light duty vehicles and light duty trucks
- Alternative fuels program
 - Fleets in serious and severe areas
 - 30% of new vehicles in 1994
 - 50% of new vehicles in 1995 and 1996
 - 90% of new vehicles after 1996

Stationary Sources

- National control measures for architectural coatings, commercial solvents, and traffic coatings--25% in five years, 50% in 10 years
- Eleven CTGs in all but moderate I non-attainment areas

Figure 4

WAXMAN BILL PROVISIONS SUMMARY

Ozone Non-attainment Area Classification and Deadlines

	Ozone Design Value (ppm)	Attainment Date
Moderate	0.121 – 0.144	4 Years after enactment
Serious	0.145 – 0.180	8 Years after enactment
Severe	0.181 – 0.240	12 Years after enactment
Extreme	0.241 and greater	16 Years after enactment

Motor Vehicles/Fuels

- Enhanced I/M in all but moderate areas
- Stage II vehicle refueling controls in all but moderate areas
- Improved evaporative test procedures
- Gasoline volatility controls
- On-board vapor recovery for all light duty vehicles
- New emission standards for light duty vehicles and light duty trucks
- Alternative fuels in severe and extreme areas
 - Fleets of 15 or more vehicles—alternate fuels in 1993 and thereafter
 - 30% of new registrations in severe areas to be low emissions vehicles by 1998
 - Extreme area low emission vehicle schedule—10% 1994, 30% 1996, 70% 1998, 100% 2000

Stationary Sources

- National control measures for architectural coatings, commercial solvents, pesticides, traffic coatings, and military coatings
- Twelve CTGs in all non-attainment areas
- Minimum VOC reduction targets; serious = 30%, severe = 50%, extreme = 70%
- Ozone transport region controls the same as serious areas
- Emission reduction milestones

Figure 5

COMPARATIVE OZONE LEGISLATION COSTS--2005									
PROVISION	ADMINISTRATION			GROUP OF NINE			WAXMAN		
	TONS	COST	\$/TON	TONS	COST	\$/TON	TONS	COST	\$/TON
NATIONAL STATIONARY									
TSDF	2,100	1,800	900	2,100	1,800	900	2,100	1,800	900
Municipal Landfills	130	69	550	130	69	550	130	69	550
Solvents	220	430	2,000	580	1,200	2,000	220	430	2,000
Architectural Coatings	340	0	0	290	0	0	340	0	0
Marine Vessels	25	51	2,000	25	51	2,000	25	51	2,000
MOTOR VEHICLES/FUELS									
RVP II	2,000	280	140	2,000	280	140	2,000	280	140
Evaporative/Running Losses	880	68	80	880	68	80	900	68	80
Tailpipe/Useful Life	200	500	2,600	120	510	4,300	490	8,400	17,000
Refueling									
Stage II	170	150	870	190	170	890	37	110	2,800
Onboard	-	-	-	-	-	-	470	180	380
Alternative Fuels	43	0	0	9	360	-	53	40	-
AREA SPECIFIC MEASURES									
RACT to 50 tons/yr	-	-	-	54	84	1,600	54	84	1,600
New GTG	380	420	1,100	510	630	1,200	590	730	1,200
Enhanced Inspec. & Maint.	85	87	1,000	85	87	1,000	110	380	3,500
Basic Inspec. & Maint.	32	82	2,600	32	82	2,600	-	-	-
Transport Regions							180	240	1,400
PROGRESS REQUIREMENTS									
Identifiable Controls	300	270	900	140	85	600	79	16	200
Assummed Controls	1,000	5,000	5,000	900	4,500	5,000	960	4,800	5,000
NATIONAL TOTALS	7,905	9,207		8,045	9,976		8,738	17,678	
NON-ATTAINMENT AREAS		0			0			0	

VOC CONTROLS ONLY
 TONS ARE IN THOUSANDS
 COSTS ARE IN \$MILLIONS/YEAR

Figure 6

National Stationary Measures

Sources controlled in National Stationary Sources category include Treatment, Storage and Disposal Facilities (TSDF), Municipal Landfills, Commercial and Consumer Solvents, Architectural Coatings, and Marine Vessels. Controls applied to these facilities would result in emissions reductions in attainment and non-attainment areas. The major cost difference in the three legislative proposals is the requirement for solvent emission reductions in the Group of Nine bill. That bill would require an emissions reduction of 50 percent by the year 2000. This is a technology forcing provision because controls beyond 20 percent are not currently reasonable or feasible, according to the Pechan report.

The emissions reduction for architectural coatings in the Group of Nine proposal is less than for the other two legislative proposals. EPA information apparently indicates that the Administration and Waxman estimates are more reasonable. Many architectural coatings could be reformulated to incorporate water based solvents at little or no cost, according to a draft EPA Control Techniques Guideline. Therefore, no cost was assigned for the architectural coatings category.

Motor Vehicles/Fuels Measures

The provisions evaluated include reduction of gasoline Reid Vapor Pressure (RVP) to 9.0 pounds per square inch, reductions in motor vehicle Evaporative/Running Losses, motor vehicle Tailpipe/Useful Life emissions reductions, Refueling emissions controls, and Alternative Fuels. Differences among the proposals for RVP and Evaporative/Running losses are essentially non-existent.

The most significant difference among the bills is the Waxman tailpipe emissions reduction requirements. H. R. 2323 would require a reduction to 0.25 grams per mile (gpm) VOC and 0.4 gpm NO_x for the model years 1993 through 1999. For model years 2000 and later emissions would be further reduced to 0.125 gpm VOC and 0.2 gpm NO_x. The VOC emissions reductions would be less than six percent of the total included in the Waxman

proposal and are clearly the least cost effective at \$17,000 per ton. H. R. 2323 would also require that tailpipe control devices remain effective for 10 years or 100,000 miles.

All proposals contain provisions for nitrogen oxides emissions reductions from motor vehicles. The costs to comply with those provisions in the year 2005 have been estimated to be \$0.415, \$0.508, and 1.785 billion per year, for the Administration, Group of Nine, and Waxman bills respectively. These costs must be added to the VOC cost estimates to obtain the total incremental cost estimate for each bill. No costs have been included for the proposed 0.2 gpm NO_x emission standard. The technical feasibility of such a standard is questionable.

The differences in refueling control cost estimates between the Administration and Group of Nine bills are negligible. The Waxman bill would require on board controls for all light duty vehicles. The total controlled emissions are higher than for Stage II controls alone because on board controls would reduce emission nation wide. Stage II would only be required in certain non-attainment areas.

The differences in alternative fuels programs among the bills is due to the difference in extent of application, quality of the fuel (100 percent versus 85 percent methanol), and motor vehicle costs. Neither the auto nor the oil industry agree with the Administration zero cost estimate for alternate fuel provisions. No cost effectiveness values are included in Figure 6, but a sensitivity analysis is included in the Pechan report. If the cost per 100 percent methanol fueled vehicle ranged from \$50 to \$250 and the premium for methanol fuel relative to gasoline ranged from 20 to 30 cents per gallon, as estimated by petroleum industry sources, the alternate fuel cost effectiveness would range from \$21,000 to \$34,000 per ton of VOC emissions reduction. These estimates are for the year 2005.

Area Specific Measures

The categories included under Area Specific Measures are the application of Reasonably Available Control Technology (RACT) to 50 ton per year sources, new Control

Techniques Guidelines (CTG), Basic and Enhanced Inspection and Maintenance procedures for motor vehicles, and extension of controls to VOC Transport Regions.

The Administration proposal contains no provisions for controlling VOC emissions from smaller stationary sources. The Group of Nine and Waxman provisions are identical. The three bills differ primarily in the number of CTGs required. The Administration would require seven, the Group of Nine would require eleven, and Waxman would require twelve. Recent modifications to the Administration bill have changed the number of required CTGs to 11. The costs in Figure 6 are for seven CTGs. The difference in number of CTGs account for the difference in emissions controlled and the costs. The larger Waxman cost for enhanced inspection and maintenance procedures are due to the requirement for annual inspections. The other bills would require biennial inspections. Neither the Group of Nine nor the Administration bills contain provisions for VOC controls in regions that might result in atmospheric transport to non-attainment areas. Costs are included to account for this requirement in the Waxman bill.

Progress Requirements

The two Progress requirement categories listed are Identifiable Controls and Assumed Controls. These categories are potential sources of additional controls needed to achieve the emissions reduction required to achieve AAQS in non-attainment areas. The Identifiable Control costs and emissions reductions are complimentary to the new CTG costs and emission reductions. The Administration bill has the lowest CTG requirement and consequently has the highest identifiable controls requirement. The converse is true for the Waxman bill.

Assumed controls cover the additional emissions reductions needed to achieve ozone standards. A cost effectiveness range from \$2,000 to \$10,000 per ton of VOC controlled was derived in an earlier Pechan report for EPA. It was based on a weighted average of \$6,200 per ton to obtain residual VOC reduction requirements from industrial solvent use, commercial solvent use, and additional mobile source reductions. All other source

categories were judged to be either essentially completely controlled or that the VOC reductions available were insufficient to contribute to the reduction requirement. A cost effectiveness of \$5,000 per ton was used by Pechan in the calculations.

The control techniques considered were incineration for industrial solvent users and product reformulation for commercial solvent emissions. Additional motor vehicle emissions reductions would come from transportation control measures and increased use of alternate fuels over that which would already be required in any given legislative proposal.

Cost Summary

The total cost estimate would be \$9.6 billion per year for the Administration bill, \$10.5 billion per year for the Group of Nine bill and \$19.5 billion per year for the Waxman bill. These totals are summarized in Figure 7 and include both VOC and NO_x costs. The costs for the pre-1988 EPA policy have been included in Figure 7 and added to the costs for each proposal to show the full cost that would be required to achieve ozone Ambient Air Quality Standards in all regions of the country under each proposal.

Office of Technology Assessment Analysis

The Office of Technology Assessment (OTA) has conducted a comprehensive study of the ozone non-attainment problem in the United States. They have analyzed the VOC reduction requirements for all non-attainment cities based on design values for each city. The analysis included an assessment of attainment levels based on legislation and environmental regulations currently in place. OTA then evaluated the additional VOC reductions needed to bring each city into compliance. Costs and cost effectiveness were evaluated for 11 different control categories that covered both stationary and mobile sources. The study has been active for over two years and is very comprehensive in terms of emission reduction requirements, costs, and definition of uncertainties in the calculations.

EPA OZONE LEGISLATION COST COMPARISON 2005

ITEM	LEGISLATION COST (\$ Billion/year)		
	ADMINISTRATION	GROUP OF NINE	WAXMAN
VOC CONTROLS	9.2	10.0	17.7
NO _x CONTROLS	<u>0.4</u>	<u>0.5</u>	<u>1.8</u>
LEGISLATION SUBTOTAL	9.6	10.5	19.5
PRE-1988 POLICY	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>
OZONE ATTAINMENT TOTAL	16.6	17.5	26.5

Figure 7

The major conclusions from the OTA study paint a bleak picture regarding the possibility of achieving ozone ambient air quality standards in all cities in the United States. OTA has projected that by the year 2004 all the control measures they have evaluated will cost between \$8.8 and \$13 billion per year. They also project that the VOC emissions reductions under-control for those cities with a design value of 0.16 ppm or greater will range from 1.81 to 2.14 million tons per year. Even with all controls evaluated by OTA at the costs cited above, as many as 61 cities would still not be in compliance with the ambient air quality standard in 2004. Figure 8 contains a summary of the VOC source categories evaluated by OTA and their associated costs. The Administration bill projections modified to incorporate the recent Dingell-Waxman compromise on motor vehicle emissions controls are also shown in Figure 8 for comparative purposes. Total costs for the modified Administration bill would be the \$ 17.3 billion per year shown in Figure 8 plus the \$1.8 billion for motor vehicle NO_x control shown in Figure 7. The total estimate for the modified Administration bill would be \$19.1 billion per year in the year 2005.

Discussion

The total emissions reductions achievable by the methods evaluated in the OTA report is 3,700,000 tons per year in non-attainment areas. The value shown in Figure 8 is 4,040,000 tons per year. The difference between the values in Figure 8 and the OTA estimate is contained in four source categories. First, the architectural coatings reduction of 120,000 tons per year in Figure 8 includes 70,000 tons per year from attainment areas. Second, adding both Stage II and on-board emissions reduction numbers for non-attainment areas results in double counting. Third, there is a 140,000 ton per year reduction in the OTA report that is due to existing regulations. Correcting for these differences yields a total non-attainment area reduction of 3,700,000 tons per year, the same as in the OTA report.

The OTA analysis indicates that an additional 1.8 to 2.0 million tons per year of emissions reductions would be required for all areas to achieve attainment by the year 2005. It would be useful to determine if the modified Administration bill contains sufficient

OTA – MODIFIED ADMINISTRATION COMPARISON 2005						
PROVISION	OFFICE OF TECHNOLOGY ASSESSMENT			MODIFIED ADMINISTRATION		
	TONS	COST	\$/TON	TONS	COST	\$/TON
NATIONAL STATIONARY						
TSDf	840	760	900	2,100	1,800	900
Municipal Landfills	-	-	-	130	69	550
Solvents	-	-	-	220	430	2,000
Architectural Coatings	120	58	1,200	340	0	0
Marine Vessels	-	-	-	25	51	2,000
MOTOR VEHICLES/FUELS						
RVP II	1,500	270	260	2,000	280	140
Evaporative/Running Losses	-	-	-	880	68	80
Tailpipe/Useful Life	330	2,900	2,700	490	8,400	17,000
Refueling						
Stage II	220	220	1,000	170	150	870
Onboard	260	270	1,100	470	180	380
Alternative Fuels	16	490	31,000	43	0	0
AREA SPECIFIC MEASURES						
RACT to 50 tons/yr	470	1,300	2,800	-	-	-
New GTG	110	620	5,600	380	420	1,100
Enhanced Inspec. & Maint.	170	1,040	6,100	85	87	1,000
Basic Inspec. & Maint.	-	-	-	32	82	2,600
Transport Regions	-	-	-	-	-	-
PROGRESS REQUIREMENTS						
Identifiable Controls	-	-		300	270	900
Assumed Controls	-	-		1,000	5,000	5,000
NATIONAL TOTALS	4,040	7,900		8,500	17,300	
NON-ATTAINMENT AREAS		61			0	

VOC CONTROLS ONLY
TONS ARE IN THOUSANDS
COSTS ARE IN \$MILLIONS/YEAR

Figure 8

reductions to comply with that requirement. The following paragraphs contain a comparison of the OTA emission reduction with those in the modified Administration bill.

Emissions Reduction Comparison

Total national VOC emissions reductions that would be required under the modified Administration bill are 8,500,000 tons per year. That is 4,800,000 tons per year greater than those identified in the OTA report. The reductions indicated in the Pechan report were not itemized by attainment area classification. Only a rough estimate could be made of the portion of the difference that would be in non-attainment areas.

OTA has indicated in their report that 44 percent of VOC emissions are in non-attainment areas. For the National Stationary Measures identified in the modified Administration bill, the total emissions reduction would be 2,820,000 tons per year. On the assumption that 44 percent of the emissions are from non-attainment areas, the total non-attainment reductions would be 1,240,000 tons per year. That is about 280,000 ton per year more than the amount included in the OTA report for National Stationary sources.

Pechan estimated gas station and motor vehicle Evaporative/Running Loss reductions to be 2,800,000 tons per year for the modified Administration bill. That is 1,380,000 tons per year more than the OTA emissions reduction estimate. Both estimates are apparently based on the implementation of a 9.0 pound per square inch vapor pressure limit on gasoline. OTA included Evaporative/Running Losses in their emissions reduction estimate. The Pechan report does not specify the control approach for Evaporative/Running Losses, but it is assumed to be due to RVP reduction. EPA personnel indicated their estimate of running losses differs from OTA's which might account for a portion of the discrepancy between the emission reduction estimates.

Additional motor vehicle tailpipe controls agreed to in the Waxman-Dingell compromise would result in 160,000 tons per year additional emission reduction over the OTA national estimate. Assuming that 44 percent of the increment would come from non-

attainment areas, the modified Administration bill would result in 70,000 tons per year more than the OTA estimate in non-attainment areas. EPA staff have indicated that the percentage of tailpipe emissions may be higher than 44 percent because motor vehicle travel is largely in non-attaining urban areas. If that is the case, the incremental modified Administration bill motor vehicle emissions reductions would be larger than shown in Figure 9 as would the total VOC emissions reduction increment.

The modified Administration bill would achieve 50,000 tons per year less VOC emissions reduction than the OTA estimate for refueling controls. The difference between the modified Administration bill and the OTA estimate would be the same if either on-board controls or Stage II is used as the basis for calculation. Since on-board controls would reduce VOC emissions in attainment areas, the modified Administration bill estimate was corrected to estimate non-attainment area emissions reductions. Differences in the impact of alternative fuel measures would not significantly affect the total emissions reduction between the Pechan and OTA analyses.

The categories of RACT, CTGs and Identifiable Controls were grouped to compare the two estimates for stationary source Area Specific Measures and Progress requirements. The modified Administration bill would result in an incremental 110,000 ton per year VOC emissions reduction over that contained in the OTA analysis for the three source categories. These controls are directed only to non-attainment areas.

Inspection and Maintenance techniques contained in the OTA analysis would result in 53,000 tons per year more emission reductions than would those in the modified Administration bill. There is also a category of Assumed Controls in the Administration bill that would require an additional 1,000,000 tons per year reduction. The OTA analysis contained no such provision and no specific sources or control techniques were included in the Administration bill analysis.

As shown in Figure 9, the modified Administration bill has provisions that would require emissions reductions that are nearly 2.8 million tons per year more than those

EMISSIONS REDUCTION COMPARISON				
PROVISION	OTA	ADMINISTRATION	ADMINISTRATION INCREMENTAL EMISSIONS REDUCTION	
	TONS	TONS		
NATIONAL STATIONARY				
TSDf	840	2,100	ADMINISTRATION SUBTOTAL 2,815	
Municipal Landfills	-	130	x 0.44 = 1,240	
Solvents	-	220	OTA SUBTOTAL 960	
Architectural Coatings	120	340	DIFFERENCE 280	280
Marine Vessels	-	25		
MOTOR VEHICLES/FUELS				
RVP II	1,500	2,000		500
Evaporative/Running Losses	-	880		880
Tailpipe/Useful Life	330	490	DIFFERENCE = 160	71
Refueling			x 0.44 = 71	
Stage II	220	170		-50
Onboard	260	470	470 x 0.44 = 210	-50
Alternative Fuels	16	43		27
AREA SPECIFIC MEASURES				
RACT to 50 tons/yr	470	-		-470
New GTG	110	380		270
Enhanced Inspec. & Maint.	170	85		-85
Basic Inspec. & Maint.	-	32		32
Transport Regions	-	-		
PROGRESS REQUIREMENTS				
Identifiable Controls	-	300		300
Assumed Controls	-	1,000		1,000
NATIONAL TOTALS	4,040	8,500		2,750
NON-ATTAINMENT AREAS	61	0		

VOC CONTROLS ONLY
TONS ARE IN THOUSANDS

Figure 9

included in the OTA analysis. That should be more than adequate to provide for the 1.8 to 2.1 million tons per year additional requirement OTA has indicated for all ozone non-attainment areas to achieve compliance. The major difference between the OTA and Pechan estimates for emissions reductions are associated with RVP control and the Pechan category of Assumed Controls. These two items make up nearly 90 percent of the incremental emission reductions in the Administration bill above the OTA analysis.

Cost Comparison

The difference in annual cost between the OTA and Pechan analyses is about \$9 billion per year. Since there is limited provision by provision comparability in costs evaluated, only the major differences will be discussed. The largest absolute cost difference is for Tailpipe/Useful Life provision. OTA estimated a total cost of \$2.9 billion per year while Pechan estimated \$8.4 billion per year. The difference is the OTA estimate appears to be based on VOC control costs to reach a 0.25 gpm emission level from light duty vehicles with certification testing for 50,000 miles. The Pechan estimate is apparently based on the Waxman requirement for a second level of emissions reduction to 0.125 gpm. The difference between these two estimates accounts for \$5.5 billion per year, or about 60 percent of the total difference.

The second largest difference among common emission sources is for Enhanced Inspection and Maintenance. OTA has estimated \$1.0 billion per year will be required while Pechan has calculated \$0.09 billion per year. The OTA estimate is based on an inspection program that includes all requirements of the existing California program plus annual testing for all pollutants (VOC, NO_x, CO, and particulate), improved visual inspection, and a repair cost ceiling of \$500 per year. Enhanced I/M would be required in all non-attainment areas. The OTA VOC cost was calculated from a total I/M cost of \$3.1 billion/year assuming that one-half the cost was for ozone and two-thirds of that was for VOC. No details were contained in the Pechan report for the I/M cost calculation basis.

The final major cost difference is the \$5.0 billion in the Pechan report for Assumed Controls. The basis for the range of \$2,000-10,000 per ton cost effectiveness range or for the average value of \$5,000 per ton was developed in an earlier Pechan report for EPA. The estimates are based on a mix of discretionary controls for industrial solvents, consumer solvents, and mobile sources. These sources were estimated to be 77 percent of the emissions inventory in the year 2000 and were judged to have relatively low levels of control. The control strategies included incineration for industrial solvent sources, product reformulation for consumer solvents, and transportation control measures (TCM) or alternate fuels for mobile sources. The range and most likely value for these discretionary controls mentioned above was a weighted average of the cost effectiveness for each of the categories. TCMs with a cost effectiveness greater than \$100,000 per ton VOC reduced were eliminated from consideration in the estimate.

The sum of the major Administration excess costs for motor vehicle Tailpipe/Useful Life and Assumed Controls is \$10.5 billion/year. Subtracting the major excess OTA cost of \$1.0 billion per year for Enhanced I/M yields \$9.5 billion per year which is about the difference between the two estimates.

National Association of Manufacturers

The National Association of Manufacturers (NAM) has reported an estimate of costs to implement the proposed South Coast Air Quality Management District (SCAQMD) plan for southern California. SCAQMD has proposed several techniques to further reduce VOC, particulate, NO_x, CO, and SO_x emissions in an area that has the most stringent regulations in the country but still has the worst air quality. Some of the additional restrictions proposed are listed below.

- Four day work week
- Equipment and process changes in manufacturing and building construction
- Mandated use of alternative fuels in vehicles starting in the 1990s and electric vehicles by the year 2007
- Strict regulatory controls on solvents and coatings in industrial, commercial, and residential applications
- Retrofit of Best Available control technology for all pollutants

- Trucking and goods distribution limitations to from 12 midnight till 5 am
- Technology forcing emissions controls

NAM reported cost estimates for Tier I of the three Tier program could be as high as \$15 billion per year. No estimates have been made for the second and third Tiers. A study conducted for the California Council for Environmental and Economic Balance estimated a job loss of 52,000 for the entire plan. Economic impacts were projected to be disproportionately felt by lower income households with costs being as high as 17.7 percent of income. There was no indication in the report that Tier 1 would likely permit attainment of the ozone standard. Consequently, costs could be higher than the NAM estimate. No details of the basis for the cost and impact estimates were available at the time this report was prepared.

Additional information regarding the details of the basis for the NAM report was obtained from the Congressional Research Service. Two reports were evaluated. The Siemon, Larsen, and Marsh (SLM) report contained information describing the emissions reductions targets for the SCAQMD. In Tier I the reductions in tons per year that would be required are 200,000 for NO_x, 210,000 for VOC, 100,000 for particulate, 44,000 for SO_x, and 750,000 for CO. Cost estimates for these reductions were taken from an article by Portney. There is a great deal of uncertainty in the total estimate of \$13 billion per year. The average cost per ton was calculated for the 58 provisions for which there were cost estimates. The total tons of emissions reduction in Tier I were then multiplied by the calculated average cost per ton to obtain the cost estimate for all 120 provisions in Tier I. Details of the cost breakout by pollutant were not included in the report.

Discussion

From the OTA analysis and the Pechan analysis it is clear that most of the less costly controls are already in place or are specifically included in the proposed legislation. There are few, if any, available emissions reductions remaining in the \$1,000 to \$2,000 per ton cost effectiveness range. The major cost uncertainty in the Pechan analysis is the estimate for

the category of Assumed Controls. While Pechan estimated the Assumed Controls costs will range from \$2,000 to \$10,000 per ton with an average of \$5,000 per ton, other indications are that the costs could be much higher. The three categories of VOC sources that are projected to comprise about 80 percent of the inventory in 2005 are consumer solvents, industrial solvents and motor vehicles. These categories would be the likely targets for the final increment of emissions control needed to attain ozone air quality standards in high design value areas, such as Southern California.

Incinerators for industrial solvent controls are estimated to cost \$6,000 per ton of VOC removed. The Chemical Specialty Manufacturers Association presented information showing that costs to achieve a 50 percent reduction in VOC emissions from one small category of consumer products, underarm products, could range from \$49,000 to \$98,000 per ton of VOC emissions reduction. OTA estimated methanol fuels would cost from between \$8,700 and \$51,000 per ton of reduction which is consistent with calculations based on oil industry estimates. Twenty Transportation Control Measure options were evaluated in Kansas City State Implementation Plan. Of the twenty, twelve were evaluated for cost effectiveness. Three had costs less than \$5,000 per ton of VOC and two had costs between \$5,000 and \$10,000 per ton of VOC. Four had costs between \$10,000 and \$100,000 per ton of VOC and the remaining three fell in the \$100,000 to \$500,000 per ton of VOC range. It would appear that the final increment of reductions needed to achieve compliance with AAQS could easily fall in the \$2,000 to \$50,000 per ton range.

An estimate for southern California Tier I VOC control costs was developed from the SLM and Portney data as follows. Costs for CO control were taken as \$2 billion of the \$13 billion per year that Portney estimates for Tier I controls in SCAQMD. The \$2 billion per year is more than ten times the national total estimated by EPA for S. 1894, introduced in the 100th Congress. An average cost for the remainder of the pollutants was calculated to be \$20,000 per ton by dividing the remaining \$11 billion per year cost from the Portney estimate by the remainder of the annual emissions reductions that would be required. The \$20,000 per ton value was taken as the cost for VOC and NO_x controls for Tier I.

To estimate the ozone air quality standards compliance cost for southern California, the VOC reduction requirements for all three Tiers of the SCAQMD plan were multiplied by the calculated cost effectiveness for Tier I. The total VOC emission reduction requirement for all three Tiers in the SLM report was about 375,000 tons per year. Applying the Tier I VOC cost per ton estimate to all three Tiers leads to estimate of about \$7.5 billion per year for the SCAQMD plan VOC controls. If the Tier II and Tier III VOC control costs would be higher than those in Tier I, the SCAQMD VOC cost estimate would be understated. It was assumed that about \$2 billion of the estimated \$7 billion total for NO_x controls would also be required for ozone attainment purposes. The total cost estimate for ozone attainment in the SCAQMD would then be about \$9.5 billion per year.

Best Estimate

The range for Assumed Controls could apparently extend from about \$2,000 to at least \$20,000 per ton. The total cost estimate for the provisions evaluated by Pechan other than for Assumed Controls is \$14.1 billion per year. Adding \$2 billion for the low end and \$20 billion for the high end of the Assumed Controls would result in an ozone non-attainment cost range from \$16.1 to \$34.1 billion per year.

A best estimate for the cost to comply with ambient ozone standards was calculated by adding the \$9.5 billion per year estimate for southern California to the \$19.1 billion average estimate generated by Pechan, then subtracting the Pechan estimate for California from the total to avoid double counting. The best estimate result would be \$24.4 billion per year. The uncertain nature of this estimate is clear from the basis of the calculation. The best estimate represents an attempt to quantify the cost to solve what has been generally recognized as the very difficult problem of ozone air standards compliance in a high design value area.

There is reason to believe that other cities with high ozone levels would also have to implement measures similar to those in southern California. If the thirteen cities with design values between 0.18 and 0.26 ppm cited in the OTA report implemented similar measures the estimates for the modified Administration bill cost could be significantly higher.

Air Toxics

The air toxics provisions in each of the legislative proposals contain similar features. Facilities would be categorized as major or area sources depending on their amount of emissions from a list of chemicals, metals, and metal compounds. Each proposal would require an initial reduction in emissions of the listed chemicals. The amount of reduction required would be determined by applying an unspecified "Maximum Available Control Technology" (MACT). Following the application of MACT, the EPA administrator would evaluate the residual risk and specify additional controls if, in his judgement, such controls were justified. In H.R. 3030/S. 1490 a level of acceptable residual risk is not defined. In S. 1630 specifies two simultaneously applicable residual risk standards. All facilities would be required to comply with a one in ten thousand lifetime risk to the maximum exposed individual. All facilities would also be required to strive to achieve compliance with a one in one million residual risk standard. Under S. 1630, compliance costs may not be considered in residual risk exposure level decisions. One major difference between the Administration bill and S. 1630 is that the Administration bill would only require MACT for 50 percent of the source categories. Also, compliance costs and technical feasibility could be considered in residual risk decisions under the Administration bill.

Cost estimates included in this section are those provided by the American Petroleum Institute (API), the Chemical Manufacturers Association (CMA), and the Environmental Protection Agency (EPA). The CMA report contains cost estimates for several levels of MACT and two levels of residual risk. In their reports, both API and CMA stress the uncertainty of their cost estimates. Both have considered point and fugitive sources of emissions. CMA included particulate emissions control costs while API did not. EPA estimated costs for the technology based standards for specific source categories and five generic classes of pollutants. EPA also estimated costs for implementation of the Administration at the MACT level. EPA did not include any estimates for the residual risk provisions. A summary of the analysis and results from each of the three studies are given below.

American Petroleum Institute--Delta Management Group

The API report was prepared by the Delta Management Group (DMG). API supplied the approach, cost estimates, and types of equipment that would be used to comply with more or less restrictive MACT definitions. API dealt with the uncertainty in the MACT definition by estimating costs for two separate cases. The first was based on MACT requirements being approximately equivalent to those required now in certain non-attainment areas. This level of control would be consistent with a less restrictive interpretation of MACT and would not include any additional controls for residual risk. The second case is based on additional control requirements that are currently experimental or are not otherwise in significant commercial use. The second case would correspond to a very strict interpretation of MACT or to additional controls to reduce the estimated residual risk. Cost estimates for the second case would be incremental to those for the first case.

Capital Cost Estimates

For each of the two cases API estimated capital and annual costs for each of four petroleum sectors including production, transportation, refining, and marketing. Because the proposed legislation will likely include many smaller sources than have been included in previous analyses of the petroleum industry, API chose a bottom up analysis for a cost basis. First potential sources of listed pollutants were identified. Then the number of those sources in the appropriate sector were estimated. A unit capital cost for Case I and Case II control technologies was calculated and multiplied by the number of sources in the sector to estimate total sector costs. A sample calculation for the refining sector is shown below.

Sample API Capital Cost Calculations

Case I

<u>Emissions Source</u>	<u>Number</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Safety Valves	70,140	\$200	\$14,000,000

Control Device: Rupture disk

Case II

<u>Emissions Source</u>	<u>Number</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Pumps	39,907	\$27,000	\$1,100,000,000

Control Device: Dual mechanical seals with barrier fluid

The costs for each case for each petroleum sector were summed to calculate the total capital cost estimates. The results are summarized in Figure 10.

API CAPITAL COST SUMMARY (\$ Millions)

Sector	Case I	Case II	Combined
Production	8,500	27,000	35,000
Transportation	900	3,000	4,000
Refining	1,300	14,000	15,000
Marketing	<u>4,300</u>	<u>9,200</u>	<u>14,000</u>
Totals	15,000	53,000	68,000

Figure 10

As was indicated earlier, Case II costs would be incremental to those incurred under Case I. The total for both cases is included in Figure 10. Total capital costs would range from \$15 billion to \$68 billion depending on the restrictiveness of the controls selected. API did not include any analysis that would indicate if the more restrictive controls would result in a residual risk of less than one in ten thousand or one in a million as would be required by S. 1630.

The capital cost estimates do not include controls for catastrophic releases of acutely toxic materials such as ammonia, chlorine, and hydrogen sulfide. The costs to modify the constituents in motor gasoline are also not included. In some instances, the application of Case II controls would require the removal of Case I controls. No costs are included in the API estimate for Case I control system removal nor have the impacts of forcing marginally viable industry operations out of service. No effort has been made to estimate the costs associated with diminished industry capacity or oil and product import impacts. No costs have been included for down time to install items such as fugitive controls. Some of the controls could be required under ozone non-attainment legislation requirements. No attempt has been made to estimate the amount of double counting that may have occurred.

Annual Cost Estimates

API included operating and maintenance costs as well as capital recovery in their annual cost estimates. Incremental operating and maintenance cost estimates were divided into five groups. The first group had no incremental costs because the equipment would be similar to that currently in place but with lower emissions. The second group included relatively passive equipment such as drains, piping and vents. Costs were estimated to be one half the industry average or 2.13 percent of capital investment. For equipment that is judged to be an "average" mix of equipment and machinery, group 3, overall industry operating and maintenance costs equal to 4.26 percent of capital investment were used in the calculation. Group 4 was composed of rotating, reciprocating, or highly mechanical equipment. For group 4 operating costs were judged to be higher than the industry average. A value of 6.39 percent of capital costs was used for this group. The fifth group category was Stage II controls. An earlier study indicated operating and maintenance costs would be 8.25 percent of capital investment. Sample calculations for operating and maintenance estimates are shown below.

Sample API Operating and Maintenance Cost Calculations

Case I

<u>Equipment</u>	<u>Capital Cost</u>	<u>O/M %</u>	<u>Annual O/M Cost</u>
Rupture disks	\$14,000,000	4.26	\$600,000

Case II

<u>Equipment</u>	<u>Capital Cost</u>	<u>O/M %</u>	<u>Annual O/M Cost</u>
Double mechanical pump seals	\$1,100,000,000	6.39	\$68,900,000

Operating and maintenance cost estimates were calculated for all items in both cases and the results totalled. A summary of the calculations is shown in Figure 11. Total annual operating and maintenance cost estimates are \$1.1 billion and \$1.7 billion for Cases I and II respectively. As with the capital investment estimates, the operating and maintenance estimates are additive. The total of \$2.8 billion per year represents the annual cost for a most stringent interpretation of MACT or added controls to reduce residual risk.

Capital recovery costs were determined as a function of the interest rate used and the equipment's useful life. API used a five year useful life for equipment associated with internal combustion engines and ten to twenty years for most other equipment. A ten percent interest rate was assumed for the results summarized in Figure 11. The annual cost for capital recovery would be \$2.1 billion under Case I and \$7.9 billion under Case II. The total capital recovery representing a restrictive MACT or added controls for residual risk would be \$ 10.0 billion per year.

The annual operating and maintenance costs have also been included in Figure 11. The column identified as Total Annual Costs is the sum of operating and maintenance and capital recovery costs. API concluded the total annual costs for air toxics legislation could range from a low of \$3.2 billion to a high of \$12.8 billion for the petroleum industry.

API also evaluated the possible consequences of provisions in the legislation that would require permits "for a fixed period, not to exceed five years...." API has suggested that a five year permit may have the same effect as a five year useful life for all equipment.

API Total Annualized Costs
(\$ Millions)

Case I

Sector	O&M	Capital Recovery	Total
Production	550	1,220	1,770
Marketing	300	600	900
Transportation	65	140	200
Refining	<u>175</u>	<u>180</u>	<u>350</u>
Sub Totals	1,100	2,100	3,200

Case II

Sector	O&M	Capital Recovery	Total
Production	810	4,450	5,260
Marketing	400	1,100	1,500
Transportation	120	350	470
Refining	<u>340</u>	<u>2,000</u>	<u>2,340</u>
Sub Totals	1,700	7,900	9,600
Totals	2,800	10,000	12,800

Figure 11

Revision of permit requirements every five years could result in the replacement of control equipment at the end of the permit period. API calculated the effect of a five year useful life in the capital recovery portion of the annual costs for each technology incorporated in the Case I and Case II control strategies. The results show that Case I annual costs would increase from \$3.2 billion to \$4.7 billion per year and Case II annual costs would increase from \$9.6 billion to \$14 billion per year. The total increase for the combined cases would be from \$12.8 to \$18.7 billion per year. The five year permit requirement could result in as much as a 50 percent increase in compliance costs.

Chemical Manufacturers Association--Denny Technical Services

The CMA report was prepared by Denny Technical Services (DTS). The DTS cost analysis follows the requirements proposed in S. 816 which are identical to those in S. 1630. S. 816 is the most specific bill with regard to residual risk criteria. Several different assumptions for the definition of MACT have been evaluated as well as two levels of residual risk for each MACT assumption. Cost estimates for H.R. 3030/S. 1490 have been backed out of the CMA estimates. The results are described in the air toxics discussion. Costs for risk based standards were calculated only for carcinogens. No costs were estimated for toxic threshold pollutant controls that would be required by the proposed legislation.

The EPA 1985 National Emissions Data System (NEDS) was used in conjunction with EPA's VOC/PM Speciation Data System (SDS) to determine the major sources subject to S. 816's provisions. A commercially available, simplified, version of EPA's Industrial Source Complex Long-Term (ISCLT) air dispersion model was used to estimate exposure concentrations. Publicly available unit risk estimates were used to determine cancer risk due to exposure at concentrations predicted from the ISCLT model. Cost equations for the required control technologies were generated from material in the open literature. The details for each topic listed above are described in the following sections.

Toxic Air Pollutants List

The list of toxic air pollutants was taken as that presented in S. 1894. Of the 223 pollutants in the list, 89 are in the EPA VOC/PM Speciation Data System (SDS). The 89 species are listed in Figure 12. Of the 89 species, 21 have been identified as known, probable, or possible human carcinogens. All the carcinogens shown in Figure 12 are included in the Administration bill Hazardous Air Pollutant list. They are identified in Figure 12 by the unit risk number.

Major Source Identification

Each facility record in NEDS was assumed to be a source within a contiguous area and to be under common control. For each facility record in NEDS, each source classification code (emissions point) was matched to the SDS. Where species profile for the emissions point was available, the emissions from the source were multiplied by the weight fraction of toxic pollutant in the SDS to determine the tons/year toxic pollutants emitted from that emissions point. The total facility emissions for each individual toxic pollutant and for all toxic pollutants were summed. If the total emissions for any one pollutant exceeded 10 tons per year, or, if the total of all toxic air emissions exceeded 25 tons per year, the facility was designated a major source.

Facility Risk

The risk due to exposure to carcinogens from each facility was calculated using 1985 emissions of carcinogens as a basis. The simplified ISCLT model was applied to each emissions point in each facility. Stack height data for the calculation were taken from NEDS. A default value of six feet was used when no height was specified in NEDS. One important factor in determining public exposure is the distance from the emissions point to the facility fence line. There is no data in NEDS that could be used to determine that distance for each facility. A size survey for a large number of chemical company facilities indicated the largest was over 1700 acres and the smallest was less than 5 acres. The

AIR TOXICS SPECIES AND UNIT RISKS

SPECIES	UNIT RISK	SPECIES	UNIT RISK	SPECIES	UNIT RISK
Butadiene	1.8 E-3	Isomers of Xylene		Trichloroethylene	1.3 E-6
Methyl Alcohol		Benzene	8.3 E-6	Ethylene Dibromide	2.2 E-4
Methyl Cellosolve		Toluene		Propylene Dichloride	
Ethylene Glycol		Ethylbenzene		Vinyl Chloride	4.1 E-6
Acrylic Acid		o-Xylene		Epichlorohydrin	1.2 E-6
Ethyl Acrylate		m-Xylene		Carbon Disulfide	
Methyl Methacrylate		p-Xylene		m-Xylene and p-Xylene	
Dimethyl Formamide		Styrene		Antimony	
Vinyl Acetate		Phenol		Beryllium	2.3 E-3
Formaldehyde	1.3 E-5	Dimethyl Phthalate		Arsenic	4.3 E-3
Acetaldehyde	2.2 E-6	Cresol		Cobalt	
Acrolein		Dibutyl-Phthalate		Lead	
Methyl Ethyl Ketone		Phthalic Anhydride		Mercury	
Methyl Isobutyl Ketone		Aniline	7.4 E-6	Nickel	3.6 E-4
Ethylene Oxide	1.0 E-4	Nitrobenzene		Phosphorous	
Maleic Anhydride		Toluene Diisocyanate		Selenium	
Acrylonitrile	6.8 E-5	Chlorobenzene		Thallium	
Dichloromethane	4.7 E-7	o-Dichlorobenzene		Barium	
Chloroform	2.3 E-5	m-Dichlorobenzene		Cadmium	1.8 E-3
Carbon Tetrachloride	1.5 E-5	Dichlorobenzenes		Chromium	1.2 E-2
Ethylene Dichloride		Benzyl Chloride		Copper	
Perchloroethylene	5.8 E-7	Trichlorobenzenes		Manganese	
1,1,2-Trichloroethane	1.6 E-6	Napthalene		Osmium Tetroxide	
Cyclohexane		Acetone		Aluminum	
Ethylene		Propylene Oxide		Silver	
Isopropyl Alcohol		1,1,1-Trichloroethylene		Vanadium	
N-Butyl Alcohol		Chloroprene		Zinc	
sec-Butyl Alcohol		Cumene			
Methyl Methacrylate		Biphenyl			
Butyl Acrylate		Terephthalic Acid			
Butyraldehyde		Butyl Benzyl Phthalate			

Figure 12

median size was 170 acres. The distance from the center of a 170 acre, square site would be about 1360 feet. That distance was used in the exposure estimate calculation.

The annual average exposure concentration was multiplied by the unit risk factor for each carcinogen species. The risks from all emissions points in the facility were summed to determine the total carcinogen risk for the facility. The language in S. 816 is not clear regarding the cumulative effect of exposure to multiple carcinogens. The words "stream of pollutants" could mean those from a single source or could mean the stream of pollutants from the entire facility. The assumption that the language means the entire facility was used in the DTS analysis.

Control Equipment Costs

Cost equations were developed for three VOC control technologies and three particulate control technologies. The VOC control systems include flares, carbon adsorption, and incinerators (thermal oxidizers). The particulate control systems include venturi scrubbers, electrostatic precipitators, and baghouses. The cost equations generally follow procedures contained in the literature. Virtually all the references used were authored by EPA staff or EPA contractors. The cost equations were structured so total capital investment and annual costs were a function of emissions parameters contained in NEDS. The cost factors used were those contained in the references. Total costs were indexed to spring, 1989.

The procedure followed in selecting control technologies for specific emissions streams was to replace existing technology with a new control system of the same type. The replacement system was sized to comply with the legislative requirements. Discussions with industry representatives indicated that would be the predominant approach taken to comply with the proposed regulations. The default control system for sources where no system is specified in NEDS or the NEDS specification is something other than those for which cost equations were developed, was an electrostatic precipitator for particulate sources and an

incinerator for VOC sources. The costs in this report are incremental to existing control costs.

Compliance Cost Calculations

The basis for emissions reductions in the MACT cost estimates is emissions absent controls as calculated from the 1985 NEDS database. It is CMA's understanding that this basis was the intent of Congress when the legislation was drafted. Two options for MACT were evaluated. The first option would require a 90 percent reduction in toxic species emissions from those that would be emitted absent controls. The second option was a 98 percent reduction for VOC sources and a 99 percent reduction for particulate sources from emissions absent controls. The second option set of control efficiencies are typical of Reasonably Available Control Technology (RACT) determinations cited in the BACT/-LAER Clearinghouse Report for VOC and particulate sources in the chemical industry.

Two scenarios for each MACT definition were evaluated based on a 1985 facility risk calculation. The first scenario is a de minimis case scenario. For the de minimis it was assumed that facilities which, based on 1985 NEDS emission data, would not exceed one in a million risk due to exposure from all carcinogen emissions would be exempted from further emissions reduction requirements. Also, under the de minimis case, it was assumed that facilities that could achieve a one in a million risk with less than MACT emissions reductions would do so. The de minimis cost estimates reflect the lower than full MACT emissions reduction. It was assumed the de minimis facilities would be able to convince the EPA Administrator that such actions would be compliant. Such a procedure would be permitted in the proposed legislation. Under the second scenario, all major sources would be required to comply fully with MACT emissions reduction requirements.

Maximum Available Control Technology Standards Costs

SIC 28 MACT requirements compliance costs are summarized in Figure 13. The estimates range from \$3.0 to \$6.5 billion per year for SIC 28 point sources. The costs were

calculated assuming that each point source at a facility would be fitted with a control system that would comply with the MACT requirement. At a 90 percent MACT level, most manufacturers would install controls that would exceed the emissions reduction requirement on some point sources to comply with the facility emissions reduction requirement. Other control systems would remain unchanged. The installed controls would be more expensive individually, but in aggregate the cost would likely be less than the values cited in Figure 13. That uncertainty has led CMA member company representatives to the conclusion that the DTS cost estimates for the 90 percent MACT are probably high by a factor of two. A similar argument for possibly fewer and subsequently lower cost control systems does not hold true for the 98/99 percent MACT level.

Fugitive emissions controls were also considered by CMA in estimating MACT control costs. No costs were added for the 90 percent MACT case. An estimate of \$1 billion per year was made for an enhanced inspection and maintenance program for the 98/99 percent MACT case. That would raise the total MACT cost estimates to \$7.0 billion per year under the de minimis scenario an \$7.5 billion without the de minimis provision.

**SIC 28 MACT POINT SOURCE ANNUAL COST ESTIMATES
(\$ Billion per year)**

MACT De Minimis	90% Yes	90% No	98/99% Yes	98/99% No
Pollutant				
VOC	2.4	2.8	4.5	4.9
Particulate	0.6	0.6	1.5	1.6
Totals	3.0	3.4	6.0	6.5

Figure 13

Residual Risk Technology Cost Estimates

The residual risk was calculated for those facilities that would be required to fully comply with either of the MACT definitions stated above. The emissions used to estimate residual risk were those that would occur with the MACT technology in place. The costs for replacement technologies to achieve emissions reductions that would comply with either a one in ten thousand or a one in a million residual facility risk were then calculated. The risk levels are those specified in S. 816. The result of the cost calculations are shown in Figure 14. The annualized residual risk cost estimates are incremental to those for MACT in each case.

The residual risk incremental costs would range from a low of \$1.6 billion per year for a one in ten thousand risk to a high of \$9.6 billion per year for the case where MACT would be defined as a 90 percent emissions reduction with no de minimis provision. CMA assumed no additional fugitives controls would be required for either the one in ten thousand residual risk case or for the 98/99 percent MACT case. CMA did estimate a \$1 billion per year cost for an enhanced inspection and maintenance program for the one in a million residual risk at a 90 percent MACT. The total residual risk costs for the 90 percent MACT case would then be \$10 billion per year with the de minimis assumption and \$10.6 billion per year without the de minimis assumption. As would be expected the residual risk cost estimates are higher for the 90 percent MACT control case. Fewer facilities would achieve residual risk compliance levels under this less stringent MACT option.

Total SIC 28 Air Toxics Compliance Costs

The calculated residual risk costs estimates were incremental to those for MACT. Total replacement technology costs for the air toxics provisions of the proposed legislation are summarized in Figure 15. The cost estimates range from a low of \$4.6 billion per year to a high of \$14.5 billion per year.

SIC 28 POINT SOURCE RESIDUAL RISK TECHNOLOGY COST ESTIMATES
(\$ Billion per year)

One in Ten Thousand Residual Risk

MACT De Minimis	90% Yes	90% No	98/99% Yes	98/99% No
Pollutant				
VOC	1.3	1.3	1.3	1.3
Particulate	<u>0.3</u>	<u>0.3</u>	<u>0.3</u>	<u>0.3</u>
Totals	1.6	1.6	1.6	1.6

One in One Million Residual Risk

MACT De Minimis	90% Yes	90% No	98/99% Yes	98/99% No
Pollutant				
VOC	6.5	7.0	4.0	5.2
Particulate	<u>2.5</u>	<u>2.6</u>	<u>1.5</u>	<u>1.8</u>
Totals	9.0	9.6	5.5	7.0

Figure 14

SIC 28 ANNUAL COST ESTIMATES
(\$ Billion per year)

MACT	De Minimis	One in Ten Thousand Residual Risk				One in One Million Residual Risk			
90%	Yes	90%	No	98/99%	Yes	98/99%	No	98/99%	No
MACT Costs	Point Sources	3.0	3.4	6.0	1.0	7.0	6.5	1.0	7.5
		Fugitive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	3.0	3.4	7.0	1.0	7.5	1.0	7.5
		Totals	4.6	5.0	8.6	1.6	9.1	1.6	9.1
Residual Risk Costs	Point Sources	1.6	1.6	1.6	0.0	1.6	1.6	0.0	1.6
		Fugitive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	1.6	1.6	1.6	0.0	1.6	0.0	1.6
		Totals	1.6	1.6	1.6	0.0	1.6	0.0	1.6
MACT Costs	Point Sources	3.0	3.4	6.0	1.0	7.0	6.5	1.0	7.5
		Fugitive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	3.0	3.4	7.0	1.0	7.5	1.0	7.5
		Totals	4.6	5.0	8.6	1.6	9.1	1.6	9.1
Residual Risk Costs	Point Sources	1.6	1.6	1.6	0.0	1.6	1.6	0.0	1.6
		Fugitive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	1.6	1.6	1.6	0.0	1.6	0.0	1.6
		Totals	1.6	1.6	1.6	0.0	1.6	0.0	1.6
MACT Costs	Point Sources	9.0	9.6	5.5	0.0	5.5	7.0	0.0	7.0
		Fugitive	1.0	1.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	10.0	10.6	5.5	0.0	7.0	0.0	7.0
		Totals	13.0	14.0	12.5	0.0	14.5	0.0	14.5
Residual Risk Costs	Point Sources	3.0	3.4	7.0	0.0	7.0	7.5	0.0	7.5
		Fugitive	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	3.0	3.4	7.0	0.0	7.5	0.0	7.5
		Totals	3.0	3.4	7.0	0.0	7.5	0.0	7.5
MACT Costs	Point Sources	9.0	9.6	5.5	0.0	5.5	7.0	0.0	7.0
		Fugitive	1.0	1.0	0.0	0.0	0.0	0.0	0.0
		Sub Totals	10.0	10.6	5.5	0.0	7.0	0.0	7.0
		Totals	13.0	14.0	12.5	0.0	14.5	0.0	14.5

Figure 15

The low case is for a 90 percent MACT. The assumptions for this case are that no additional controls would be required for facilities that are less than one in a million risk. Also those facilities that could reach one in a million risk with less than 90 percent emissions reduction would be permitted to do so. The residual risk requirement for facilities that install MACT would be to comply with a one in ten thousand life time risk to the maximally exposed individual.

The high case is for a 98/99 percent MACT and compliance with a one in a million residual risk requirement. All major sources would be required to install MACT and those that do so would also be required to later comply with a one in a million residual risk requirement. DTS did not include estimates for fugitives controls such as welding flanges, canned pumps, and valves with bellows seals in the CMA study as was done by API. Should such stringent measures be required to comply with a one in a million residual risk requirement, the cost estimates could increase by several billion dollars per year.

Environmental Protection Agency

Energy and Environmental Analysis (EEA), in a report prepared for EPA, evaluated the costs to comply with five different air toxics provisions in H.R. 3030, H.R. 2858, and S. 816. The provisions include technology based standards, health based standards, area source standards, mobile source standards, and accidental release requirements.

Within the technology based standards analysis (MACT), costs were determined for eight specific source categories and for five generic categories. The specific categories include utility boilers, electric arc furnaces, publicly owned treatment works, coke ovens, primary lead smelters, secondary lead smelters, and copper smelters. Specific category costs were estimated from information in existing EPA documents. Costs for the generic categories were based on aggregated emissions reported to EPA under SARA Title III Section 313 from facilities meeting the toxics major source criteria. The five generic source categories included, acids and bases, chlorinated hydrocarbons, non-chlorinated hydrocarbons, sulfides, and particulates. Residual risk costs were not evaluated.

Area source control costs were estimated by assuming the magnitude of area source emissions, estimating the probable composition of those emissions, applying costs for EPA's likely control requirements. Mobile source costs for controlling three of the four chemicals specifically mentioned in H.R. 2585 and the two chemicals mentioned in Title II of the Administration bill were estimated using data from recent publications and preliminary estimates prepared by EPA and the California Air Resources Board. Costs for the accidental release provisions of H.R. 2585 and S. 816 were based on a separate EPA sponsored analysis. Compliance costs for accidental release provisions included in the Administration bill were not estimated.

The EEA cost estimates are summarized in Figure 16. The cost estimates have been corrected to take into account the costs of other EPA regulatory programs. Consequently, the estimates in Figure 16 represent incremental costs that would be required by the proposed legislation. The annualized costs are for the year 2003 and are expressed in 1989 dollars. The cost basis assumes the specific source categories evaluated, with the exception of utility boilers, will be regulated equally under each bill. For the generic sources, the analysis differentiates the number of sources that would be controlled under each bill. The top 50 percent of facilities in each four digit SIC code accounting for about 90 percent of the SARA 313 emission would be regulated under the Administration bill. Technology transfer was generally not considered by EEA in the selection of control devices to comply with MACT. Details for each of the cost categories in Figure 16 are presented below.

Technology Based Standards

Specific Source Categories

Coal and Oil Fired Utility Boilers

Emissions and control costs were estimated using an EPA Office of Air Quality Planning and Standards (OAQPS) model that evaluates hazardous pollutant emissions and control costs. Controls are for particulate emission only. Control options included

AIR TOXICS BILLS COST COMPARISON--EPA
(\$ Billions per year)

<u>Legislation</u>	<u>Administration</u>	<u>H.R. 2585</u>	<u>S. 816</u>
<u>Category</u>			
Technology Based Standards			
Utility Boilers	0.7-2.6	0.8-2.6	0.8-2.6
Specific Source Categories	0.4-1.2	0.4-1.2	0.4-1.2
Generic Source Categories	<u>0.4-2.7</u>	<u>0.4-2.8</u>	<u>0.4-2.8</u>
Subtotals	1.5-6.5	1.6-6.6	1.6-6.6
Health Based Standards	NE	NE	NE
Area Sources	0.1-0.5	0.4-0.7	0.1-0.5
Mobile Sources	<u>3.0-3.0</u>	<u>3.1-3.1</u>	<u>3.0-3.0</u>
Totals	4.6-10.0	5.1-10.4	4.7-10.1

Accidental Releases--Cost estimates are for one time costs for the preparation of risk management plans. For H.R. 2585 the estimates range from \$1.1 billion to \$2.8 billion. For S. 816 the estimates range from \$0.9 billion to \$1.8 billion. The Administration bill requirements are similar to those of S. 816 and the costs would also be expected to be similar.

Figure 16

baghouses, upgrading electrostatic precipitators, and fuel switching. Four scenarios were evaluated and the cost estimates are representative of the range for the different scenarios.

Cost Range: **Oil Fired \$0.150-\$0.660 billion per year**
 Coal Fired \$0.600-\$1.925 billion per year

Electric Arc Furnaces

Ninety percent of the toxic emissions were estimated to be from electric arc furnaces in the steel industry. Fugitive emissions controls and baghouse collectors were projected to achieve about an 85 percent reduction in particulate emissions from the 600 affected facilities.

Cost Range: **\$0.059-\$0.117 Billion per year**

Publicly Owned Treatment Works

About 800 POTWs in ozone attainment areas would be required to install controls to comply with the air toxics legislation. The control approach evaluated was to apply controls to the facilities discharging to the POTW, eliminating the POTW as a source. The discharge categories evaluated were miscellaneous solvents used by equipment manufacturers, manufacturers of organic chemicals, pharmaceuticals, and pesticides and miscellaneous industries such as paper, plastics and laundries.

Cost Range: **\$0.019 billion per year**

Coke Ovens

Best Available Control Technology systems include optimized stage charging, a door leak control program, temperature resistant door seals, topside leak seals, and offtake modification or replacement. Technologies would vary from site to site. Lowest Achievable Emission Rate technology would require rebuilding almost all coke ovens. New doors with an appropriate maintenance system could also be required. Costs have been corrected to avoid double counting the cost for the EPA NESHAP for coke ovens. EPA has recognized that most coke ovens would be forced to close if a one in ten thousand residual risk were

to be required. All would be forced to close if a one in one million residual risk level were to be required.

Cost Range: \$0.029-0.782 billion per year

Secondary Lead Smelters

Controls would include installation of venturi scrubbers downstream of the baghouse on process stack sources, enclosure of the smelter building with ventilation to a new baghouse, water systems for dust suppression, and replacement of blast furnaces with electrolytic processes.

Cost Range: \$0.186 billion per year

Primary Lead Smelters

Technologies for primary lead smelter control would include increased baghouse maintenance, improved scrubber efficiency, enclosure of buildings containing process fugitive emissions, ventilation of enclosed buildings to baghouses, and control of area source fugitive emissions.

Cost Range: \$0.081 billion per year

Copper Smelters

Copper smelters would be required to install fugitive emission controls such as building ventilation to a baghouse to control particulate arsenic and other metals.

Cost Range: \$0.060 billion per year

Generic Source Categories

Chlorinated Hydrocarbons

Fifty percent of the chlorinated hydrocarbons were assumed not to be VOCs that would be regulated under ozone non-attainment requirements. Facilities emitting

chlorinated hydrocarbons were assumed to add freeboards and covers to open tanks, switch to other non-listed compounds when able to do so, use good operating practices to reduce emissions, or to add control devices such as carbon adsorption, incinerators, or condensers to reduce emissions. Costs were assumed to be range from \$500 to \$7,500 per ton and to provide an overall emissions reduction efficiency of 75 percent.

Cost Range: \$0.091-\$1.361 billion per year

Non-Chlorinated Hydrocarbons

Controls applied to facilities were assumed to be identical to those at sources of chlorinated hydrocarbons. The controls cost were assumed to range from \$500 to \$4,000 per ton and to provide an overall control efficiency of 75 percent. Calculated costs were reduced by a factor of two to avoid double counting costs for those facilities in ozone non-attainment areas.

Cost Range: \$0.137-\$1.096 billion per year

Acids and Bases

Approximately 850 facilities would be required to install low pressure drop scrubbers and neutralizing capability to reduce acidic and basic emissions under the specifications contained in H.R. 2585. For the Administration bill requirements the number of facilities and cost would be slightly less.

Cost Range: \$0.035-\$0.175 billion per year

Sulfides

EEA cost estimates were based on flaring emissions of carbon disulfide and carbonyl sulfide at 40 facilities. No emissions data for hydrogen sulfide was available from the SARA 313 data base or elsewhere. No costs are included for hydrogen sulfide. The number of facilities and cost differences between H.R. 2585 and the Administration bill are insignificant.

Cost Range: \$0.115 billion per year

Particulates

EEA assumed that half the facilities emitting over 10 tons per year toxics would be able to add or upgrade a control device at a cost of \$25,000 per ton of particulate removed. The high incremental rate is because most sources of toxic particulates are already well controlled. Emissions were assumed to be reduced by 75 percent.

Cost Range: \$0.028-0.031 billion per year

Health Based Standards

No estimate was calculated in the EEA analysis.

Area Sources

Area source control costs were calculated by assuming the magnitude of area source emissions and estimating a control cost range from \$500 to \$2000 per ton. The extremes in the range reflect differences between the Administration bill and H.R. 2585 in the degree of control required with H.R. 2585 being more restrictive.

Cost Range: \$0.1-0.7 billion per year

Mobile Sources

EEA provided mobile source emissions reduction cost estimates for benzene, butadiene, formaldehyde, and diesel particulate. The estimates are nearly the same for all three bills analyzed. Nearly all the costs for each bill are to remove benzene from gasoline and would be the same for all three bills.

Cost Range: \$3.0-3.1 billion per year

Accidental Releases

One time costs for facilities to prepare risk management plans were estimated for H.R. 2585 and S. 816. The estimate for H.R. 2585 is based on an average cost of from \$100,000 to \$250,000 per facility. The S. 816 estimate is based on an average cost of from \$20,000 to \$40,000 per chemical for an average of four chemicals per facility. The Administration bill provisions are similar in scope to those in S. 816 and the costs are also expected to be similar.

Cost Range: \$0.9-2.8 billion

Discussion

The petroleum and chemical industries would face significant incremental operating costs if the proposed air toxics Clean Air Act modifications were implemented. The material presented below describes the methods used to extrapolate the API and CMA estimates to national cost basis. EEA estimates for the Administration bill were taken as the lowest air toxics cost estimate. The estimated residual risk costs would be incremental to the EPA estimate.

The API study included only VOC toxics while the CMA study included both VOC and particulates. From a previous analysis of the 1984 NEDS data base, it was determined that petroleum production and petroleum refining account for about 24.4 percent of the VOC emissions in SIC codes 10-39. Chemical manufacturing, SIC 28, accounts for about 18.3 percent of VOC emissions in SIC codes 10-39. Under the assumption that toxics VOC control costs will be proportional to VOC emissions, costs for all the SIC codes 10-39 can be extrapolated. The factors used to estimate national costs for the VOC toxics provisions are summarized in Figure 17.

Both the CMA and API estimates were extrapolated to SIC codes 10-39. To do so, both industry segment cost estimates had to be corrected. API costs were for VOC controls only. Approximately 65 percent of the API annual low cost estimate and 75 percent of the

NATIONAL VOC AIR TOXICS COST ESTIMATE DATA

	API	CMA
% SIC 10-39 VOC Emissions	24.4	18.3
Low VOC Estimate (\$ Billions/year)	3.2	3.0
% Costs in SIC 10-39	65.0	100.0
Efficiency Correction	-	50.0
% Costs for VOC Control	100.0	100.0
Corrected Low VOC Cost (\$ Billion/year)	2.1	1.5
High Estimate (\$ Billions/year)	12.8	15.8
% Costs for VOC Control	100.0	80.0
% Costs in SIC 10-39	75.0	100.0
Corrected High VOC Cost (\$ Billion/year)	9.6	12.6

Figure 17

annual high cost estimate were for the production and refining sectors. The total low and high cost estimates were multiplied by 0.65 and 0.75 respectively to account for only the API costs included in SICs 10-39. The low and high API estimates of \$3.2 and \$12.8 estimates were corrected to \$2.1 and \$9.6 billion per year respectively. The API costs were extrapolated from 24.4 percent of VOC emissions in the refining and production sectors to 100 percent of the VOC emissions in SIC codes 10-39. The national estimate range generated was from \$8.6 to \$39.3 billion per year.

The CMA low estimate of \$5.2 billion per year included \$3.0 billion per year for MACT VOC control. The \$3.0 billion per year value was corrected to \$1.5 billion per year to allow for efficient application of control systems to meet the 90 percent MACT requirement. The upper value of \$14.8 billion per year was corrected to \$12.4 billion per year because only 80 percent of the CMA high estimate was for VOC control. Again the CMA cost range was extrapolated 18.3 percent of VOC emissions in SIC 28 to 100 percent VOC emissions in SIC codes 10-39. The national estimate range was from \$8.2 to \$67.8 billion per year. A third estimate for national incremental air toxics costs was generated by DTS. DTS calculated the costs for all VOC major sources in EPA's NEDS point source data base using the CMA methodology. The incremental VOC air toxics cost estimates ranged from \$6.4 billion to \$60.6 billion per year.

The low and high for the three national VOC toxics cost estimates, described above, were averaged. The low end national average calculated cost was \$7.7 billion per year and the high national estimate was \$55.9 billion per year. These incremental costs are for VOC toxics only. The \$7.7-\$55.9 billion per year range represents national costs for full implementation of S. 816. The low end of the range would be for a 90 percent MACT with a de minimis assumption and a residual risk requirement of one in ten thousand. The upper end of the range would be for a 98 percent MACT with no de minimis assumption and a residual risk requirement of one in a million. No means was readily available to estimate national particulate toxics control costs from the API and CMA study results. The national estimate was compared to the EPA estimate for air toxics costs. The comparison is described below.

The Administration bill would require that only 50 percent of the toxics source categories be regulated by standards with decisions on the remaining categories to be made by the EPA Administrator. Controls for 50 percent of the major source categories is the basis for the EPA cost estimates. The EPA cost estimates for chlorinated and non-chlorinated hydrocarbons toxics ranged from \$0.2 to \$2.5 billion per year. The national VOC toxics cost estimate of \$7.7 billion per year generated from the API and CMA estimates is for 100 percent of the source categories. Also, no correction has been made in the API/CMA national extrapolation to account for the fact that some facilities in ozone non-attainment areas may be required to reach MACT control levels to comply with ozone attainment provisions in the Administration bill. Correcting for these two differences would yield a low API/CMA national estimate of \$1.9 billion per year on the same basis as the EPA calculation for VOC toxics. The API/CMA extrapolation is consistent with the EPA VOC estimate at the low end of the cost range. EPA did not estimate residual risk provision costs so no comparison for the high end of the national estimate range can be made.

A best estimate for VOC air toxics would be near \$1.9 billion per year if the EPA assumptions are those implemented by the EPA Administrator, i. e., only 50 percent of toxics categories are regulated and residual risk compliance cost estimates are taken to be zero. The VOC toxics best estimate would be near the API/CMA residual risk cost of \$55.9 billion per year if all major source categories were required to comply with MACT regulations and a one in a million residual risk requirement. Control costs rise rapidly with risk increased reduction or increased emissions reduction at control efficiencies above 90 percent. For residual risk level standard of one in one hundred thousand, SIC 28 incremental costs would be about 10 times the incremental costs at the minimum requirement. Those costs extrapolated to SIC codes 10-39 would be \$19.0 billion per year for a residual risk requirement of one in one hundred thousand.

The average EPA air toxics compliance cost estimates for the Administration bill are shown in Figure 18. The API/CMA extrapolated residual risk VOC toxics costs are also included in Figure 18 for three different residual risk levels. Source categories for which

AIR TOXICS RESIDUAL RISK INCREMENTAL COST
(\$ Billions per year)

<u>Legislation</u>	<u>Administration</u>	<u>Incremental Residual Risk Costs</u>		
<u>Residual Risk Level</u>		10 ⁻⁴	10 ⁻⁵	10 ⁻⁶
<u>Category</u>				
Technology Based Standards				
Utility Boilers	1.67	NE	NE	NE
Specific Source Categories				
Electric Arc Furnaces	0.09	NE	NE	NE
POTWs	0.02	NE	NE	NE
Coke Ovens	0.41	NE	NE	NE
Secondary Lead Smelters	0.19	NE	NE	NE
Primary Lead Smelters	0.08	NE	NE	NE
Copper Smelters	0.06	NE	NE	NE
Generic Source Categories				
Chlorinated and non-Chlorinated VOC Sources	1.07	6.6	17.9	54.8
Acids and Bases	0.11	NE	NE	NE
Sulfides	0.11	NE	NE	NE
Particulates	0.03	NE	NE	NE
Health Based Standards	NE	NE	NE	NE
Area Sources	0.40	NE	NE	NE
Mobile Sources	<u>3.0</u>	<u>NE</u>	<u>NE</u>	<u>NE</u>
Totals	7.1	6.6	17.9	54.8
Administration Bill plus Residual Risk Increment	7.1	13.7	25.0	61.9
NE = No Estimate				

Figure 18

no residual risks costs have been evaluated are indicated by a NE. As can be seen from Figure 18, the average Administration bill estimate would be \$7.1 billion per year. At one in ten thousand, one in one hundred thousand, and one in a million residual risk compliance levels, the incremental cost above the EPA average estimate would be \$6.6, \$17.9, and \$54.8 billion per year respectively for VOC air toxics. Total costs would be the sum of the incremental residual risk costs and the EPA average for VOC toxics. These totals are \$7.1 billion per year for the Administration bill, \$13.7 billion per year for a one in ten thousand residual risk, \$25.0 billion per year for a one in one hundred thousand residual risk, and \$61.9 billion per year for a one in a million residual risk. The totals are shown at the bottom of Figure 18.

Incremental residual risk costs would approximately triple for each factor of 10 decrease in residual risk. The total costs would approximately double with each factor of 10 decrease in incremental residual risk. Total incremental costs for each residual risk level could clearly be higher because costs for most of source categories were not evaluated.

Best Estimate

Assuming a compromise residual risk requirement of one in one hundred thousand would be required, the best estimate for the air toxics provision would be \$25 billion per year.

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APPENDIX A

BRT BEST ESTIMATE
STATE-BY-STATE
COST DISTRIBUTION

BRT BEST ESTIMATE
STATE-BY-STATE
COST DISTRIBUTION

The state-by-state cost distributions for ozone, acid deposition, and air toxics costs are shown in the attached spread sheet printout. Each distribution was generated by multiplying the BRT best estimate by the state fraction of cost for the particular provision given in other distribution estimates.

The Acid Deposition distribution follows that generated by Temple, Barker, and Sloane (TBS) for the Edison Electric Institute. For example, the state of Alabama was projected to absorb \$0.221 billion per year of the total TBS national low estimate of \$4.97 billion per year. The Acid Deposition portion of the BRT \$5.3 billion per year best estimate for the state of Alabama would then be:

$$\begin{aligned}\text{Alabama Acid Deposition Costs} &= (0.221/4.97) \times 5.3 \\ &= \$0.24 \text{ billion per year}\end{aligned}$$

Similar procedures were followed for the ozone and air toxics cost distributions. The basis for the ozone cost distribution is an estimate developed by Pechan and Associates for EPA. The basis for the air toxics cost distribution is an estimate of VOC emissions by state and by industry category prepared for BRT by Alliance Technologies in an earlier analysis of S. 1894 introduced in the 100th Congress. The lone exception to the procedures described above is the adjustment to California ozone non-attainment costs as described in the text of this report.

BRT BEST ESTIMATE
CLEAN AIR ACT COSTS
STATE BY STATE
(\$ Billions per year)

STATE	TOXIC	ACID RAIN	OZONE	TOTAL	STATE	TOXIC	ACID RAIN	OZONE	TOTAL
→ Alabama	0.92	0.24	0.20	<u>1.35</u>	→ Missouri	1.22	0.42	0.24	<u>1.88</u>
Alaska	0.00	0.00	0.01	0.01	Montana	0.11	0.01	0.01	0.13
Arizona	0.01	0.01	0.21	0.23	Nebraska	0.00	0.00	0.02	0.02
Arkansas	0.30	0.01	0.05	0.36	Nevada	0.00	0.00	0.02	0.02
California	1.50	0.00	9.50	<u>11.00</u>	New Hampshire	0.03	0.03	0.04	0.10
Colorado	0.02	0.00	0.06	0.08	New Jersey	0.28	0.06	1.11	1.45
Connecticut	0.04	0.01	0.36	0.42	New Mexico	0.02	0.01	0.02	0.05
Delaware	0.03	0.02	0.10	0.15	New York	0.04	0.10	2.00	2.14
District of Columbia	0.00	0.00	0.02	0.02	→ North Carolina	0.77	0.15	0.20	<u>1.12</u>
→ Florida	0.14	0.17	0.17	<u>0.49</u>	North Dakota	0.01	0.04	0.01	0.06
→ Georgia	0.45	0.29	0.22	<u>0.96</u>	Ohio	0.60	0.73	0.29	1.62
Hawaii	0.04	0.00	0.01	0.05	Oklahoma	0.35	0.00	0.08	0.43
Idaho	0.01	0.00	0.01	0.02	Oregon	0.14	0.00	0.11	0.26
Illinois	0.99	0.33	1.35	2.67	Pennsylvania	0.77	0.50	0.64	1.91
Indiana	0.28	0.54	0.49	1.32	Rhode Island	0.01	0.00	0.06	0.07
Iowa	0.10	0.04	0.02	0.17	South Carolina	0.09	0.10	0.06	0.25
Kansas	0.93	0.01	0.06	1.00	South Dakota	0.01	0.02	0.01	0.04
→ Kentucky	0.24	0.21	0.12	<u>0.57</u>	→ Tennessee	1.47	0.29	0.28	<u>2.04</u>
→ Louisiana	2.51	0.00	0.23	<u>2.74</u>	→ Texas	6.88	0.06	3.51	<u>10.46</u>
Maine	0.03	0.00	0.04	0.07	Utah	0.12	0.00	0.06	0.18
Maryland	0.21	0.10	0.18	0.48	Vermont	0.00	0.00	0.02	0.02
Massachusetts	0.15	0.02	0.82	0.99	→ Virginia	0.66	0.06	0.33	<u>1.06</u>
Michigan	0.31	0.11	0.30	0.72	Washington	0.47	0.06	0.12	0.66
Minnesota	0.23	0.03	0.16	0.42	→ West Virginia	0.47	0.37	0.13	<u>0.98</u>
Mississippi	0.19	0.04	0.05	0.28	Wisconsin	0.60	0.07	0.29	0.96
					Wyoming	0.25	0.02	0.01	0.28
					TOTALS	25.00	5.31	24.46	54.77

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Air Toxics Rule In Senate Clean Air Bill Could Triple Compliance Costs

The Senate's clean air rewrite, S. 1630, could impose enormous new costs on coal-burning electric utilities through toxic air pollution controls, says the Southern Company, the largest utility in the United States ranked by net income. The Atlanta-based electric utility holding company says that the Senate air toxics provisions could require it to put the equivalent of a flue gas scrubber on every coal-fired plant in its system.

Allen Franklin, president and chief executive officer of Southern Company Services, says that the major problem for utility plants is trace elements of heavy metals contained in coal. "But there is no known health hazard associated with these trace elements," Franklin told *The Energy Daily* on Wednesday. "The [Environmental Protection Agency] has looked at them, one-by-one, and found no hazards."

However, the Senate bill lists some 190 substances that will be regulated under the new law. A plant that emits more than 10 tons per year of any of the listed chemicals or 25 tons of any combination would be required to install the "best available control technology."

"Because we burn so much coal," said Charles Goodman, vice president for research and environmental affairs for Southern Company Services, "even small quantities can add up. A 1,000-megawatt plant, with a 60 percent capacity factor, will use 2.25 million tons of coal in a year."

The House bill, H.R. 3030, and the Bush administration's Senate version, S. 1490, put utility toxic emissions in a separate category, calling for a study to determine if they are harmful. But the Environment Committee's bill gives utilities a break only on chlorine and chloride emissions. The Senate bill says that EPA will not regulate chlorine or chlorides for three years.

"Chlorides have always been a concern," Goodman said. "But the

BY KENNEDY MAIZE

concern is far broader than that. We want EPA to look at all of them, not just chlorine."

The Senate air toxics provisions will triple the cost of compliance with the new Clean Air Act, compared to the Bush plan, Franklin said. The acid rain provisions will raise rates 8 to 8.5 percent, Goodman said, while the toxics provisions will jump rates by another 25 percent. "It would increase our capital investment by over \$12.5 billion," said Goodman. Cumulative costs through 2013 would increase by \$33 billion.

In many cases, Goodman said, the technology to clean up the air toxics from utility boilers has not been demonstrated. "There is some bench scale work," he said. "Our process engineers say that whatever the control technology is, it will have to be something that washes the flue gas. That means it should

have a capital structure that looks similar to scrubbers."

Additionally, Goodman said, the costs that could be associated with disposing of the wastes from toxic pollution control devices have not been factored into Southern Company's cost figures.

Southern, says Goodman, is not opposed to spending money to protect the environment and public health. But when it comes to utility toxic air emission, "EPA analyses have not demonstrated significant risk. But costs can be substantial. If we want to improve health, I'm not sure this is the wisest place to spend the money."

"This is just a huge burden to place on consumers," said Franklin. "We are struggling to keep our industries competitive internationally and this is a very serious hurdle." Franklin said that his company will try to spread that message "to every forum available" as the Senate begins floor action on S. 1630. The first opportunity will come next week, when the Senate Energy Committee considers the energy implications of the clean air bill.

"This has been somewhat of an arcane issue," Franklin said. "We are not sure the right people are focusing on how expensive it is. We have had years and years of discussion of the appropriate provisions for controlling sulfur dioxide. Now, all of a sudden, we are facing something that could cost twice as much, with very little discussion and no scientific evidence to support it."

Windmills Killing Eagles

Windfarms at California's Altamont Pass and Tehachapi Pass are killing birds at an average rate of about 25 per year, says a study carried out over four years by the California Energy Commission. The 1984-1988 study covered seven different species of birds of prey. The most frequent victims discovered were golden eagles and red-tailed hawks. The study looked at 108 separate incidents. In 90 percent of cases, birds were killed—either by being electrocuted or from collision with spinning blades. The study was carried out by the CEC's Energy Facility Siting and Environmental Protection Division.

REPUBLICAN CONCERNS ABOUT THE CLEAN AIR BILL

Republicans support the idea that we need to update our clean air laws and, in fact, promote improvements in air quality when necessary. In the effort to do more to improve the environment, however, we cannot lose sight of the economic costs and potentially irreversible harm of stricter clean air laws. The business community -- one of the Party's most faithful constituencies -- is up-in-arms about the clean air proposal that the Democratically-controlled Senate Environment and Public Works Committee has passed and is about to send to the Senate Floor.

Across the board, small business and industry leaders are saying that if the Congress enacts the Committee bill -- authored by northeastern Democrats -- the impact on the economy will be staggering, more than \$54,000,000,000 a year.!

If the President in his State of the Union address embraces the Senate bill or urges that a bill like it be enacted into law, Republican supporters across the country will lose confidence in the Party's judgment and that will cost us dearly both financially and politically. The President should support his original proposal and ask Congress to pass it rather than the proposal put together by the Democrats in the Senate.

EDITORIALS

SUNDAY, JAN. 7, 1990

Horror, Anguish, Clean Air

Right there in the middle of what promises to be a "raucous occasion" full of "anguish and horror," Alabama's U.S. Sens. Howell Heflin and Richard Shelby are pushing common sense.

Good for them.

That colorful prophecy was offered by Minority Whip Alan Simpson for what's going to happen in the Senate later this month when an irresistible force of powerful Senate leaders runs head-on into an immovable object of well-financed lobbyists over the subject of clean air.

Clean air ranks right in there with mom, apple pie and high taxes on toxic dumps. But there has to be a more logical way to ensure it than the route being followed in the Senate to overhaul the federal Clean Air Act. That way lies madness.

Nov. 16, Senate leaders pushed a massive, anti-pollution package through the Environment and Public Works Committee in a single day. The bill lumps previously separate legislation on subjects as complicated as acid rain, toxic air pollutants and urban and rural smog into a single, humongous mass of penalties, regulations and permits.

The committee considered 40 amendments in that one day. Sen. Max Baucus, D-Mont., unveiled a major proposal for acid rain control and saw it passed within hours. "Keep going, keep going," Baucus urged his colleagues as they grew weary of the rapid-fire pace, "we have got to get finished."

And they did.

Staffers couldn't retrieve all the pages of the overbloated bill in time to piece it together for a vote, so committee members passed it with key pages missing.

The bill greased through the cogs of the law-making process because Senate Majority Leader George Mitchell, a longtime advocate of stronger air quality controls, is pushing as hard as he can to make sure it is the first order of business for the new Congress.

It was helped along the way by postponing the discussion of some of the most serious bones of contention in the clean air debate, and (coinciden-

tally enough, surely) by giving exemptions to four senators on the committee whose Western states could face severe compliance costs.

The end result is a bill without a price tag, one which many industries claim will cost a small fortune for minimal results and with many portions mandating things that may or may not be technologically feasible.

It is a bill which in many ways goes far beyond a tough clean air proposal put forth by the Bush administration in the House.

We do need to revamp our clean air law. But we can't do that from fantasyland. We have to strike a balance between stronger rules to protect our environment and the economic impact they will have on our industries and our lifestyles.

The Senate panel's bottle-rocket rush to judgment doesn't even make a stab at that. How do panel members think their slipshod effort will stand up against an industrial lobby which between 1981 and 1988 gave \$23 million to members of Congress, much of it to key members who might control clean air legislation?

Heflin and Shelby have joined a group of senators trying to bring sanity to the

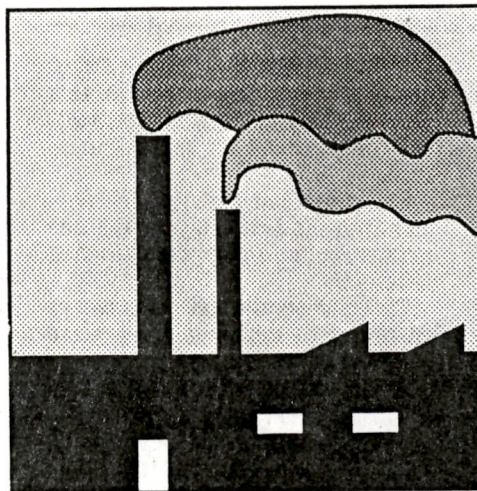
process. They have asked the Congressional Budget Office, the Congressional Research Service and the Office of Technology Assessment to do some much needed studies on the Senate panel's proposal.

They want to know, industry by industry, region by region, at least some rough estimate of the bill's cost. How much more will the tab be than the \$32 billion the Department of Commerce estimates our current clean air bill costs the U.S.?

The pity is that this thing got so far along the lawmaking trail before a study like this was requested.

Neither Heflin, Shelby nor any other responsible senator should vote for this measure until some hard dollars-and-cents estimates are made on what it will cost Americans and American businesses and industries.

You can't pass good clean air legislation in a cloud of dust.



Acid rain overblown

Trends in lake acidity, 1850-1988

Mean pH values. Less than 5.5 = acidic

	1850	1988	Change
37 acidic Adirondacks lakes	4.95	4.78	0.17
Nine acidic Florida lakes	5.11	4.81	0.30
All measured acidic lakes to date under 5.0 pH	4.78	4.63	0.15
Percent of presently acidic lakes that were also acidic in 1850:			
Adirondacks (25 of 37)	67.6		
Florida (six of nine)	66.7		
Other New England (17 of 19)	89.5		
Total	73.8		

Sources: EPA, Illinois State Water Survey Department of Energy Report, April 1989

President Bush delayed his State of the Union address several days, but it's no secret what's atop his legislative agenda. He told the Republican National Committee last week that his main priorities will be cutting the capital gains tax and passing anti-crime and clean-air legislation.

There will be plenty of support in Congress for the crime package, always a popular issue in an election year; and probably for the tax cut, which almost passed last year. His clean-air proposals, however, will generate much controversy.

One part of his plan for updating the 1970 Clean Air Act wisely calls for market incentives to reduce levels of acid rain, ozone, carbon monoxide and the like. This is in keeping with an emerging consensus among mainstream environmentalists that market forces can help improve the environment.

But another part of the Bush plan plays into the hands of environmental extremists. It calls for stringent and costly regulations appropriate, perhaps, for high-smog areas like Los Angeles, but not for much of the rest of the country.

Estimates are that it would cost public utilities and car owners between \$14 billion and \$18 billion annually.

Very little, if any, cost-benefit analysis has gone into this part

of the president's proposal. He just seems to be running with popular sentiment — eager not to be outflanked by Democrats on the popular environmental issue going into the '92 election.

Yet there is always room for common sense in American politics. The acid rain scare, for one, appears to be overblown.

Why impose extensive new controls before the release later this year of the final report of the National Acid Precipitation Assessment Program, a 10-year study commissioned by Congress in 1980?

An interim NAPAP report in 1987 upset the conventional wisdom on the extent of damage to lakes and streams caused by coal-burning plants. It also upset the professional environmental lobby and its eager army of regulation advocates.

Air pollution was on the decline, NAPAP said, and "a significant increase in the number of acidic lakes is unlikely to occur over the next few decades." (See table below.)

It also couldn't find any serious acid rain threat to fish life, forests, crops or human health.

Perhaps the final report will be different, but until it is received the president ought at least hold off on any legislation. Environmental reforms should be rooted in sound scientific data, not public hysteria.

Hermetically Sealed Law

"Keep going, keep going." That's what Senator Max Baucus was urging last month as the Senate environment committee marked up its clean air bill. The result is a testament to the modern legislative process.

In one day, the committee considered at least 40 amendments. Senator Baucus unveiled his acid rain provision and had it passed unanimously within hours. Smog, ozone, acid rain, permits and enforcement, greenhouse, toxics—the committee rammed it all through, almost without debate. Amid the chaos, something got lost—parts of the bill itself.

Different parts of the scrawled bill were spread out on the desks of different staffers. The staff couldn't retrieve all the pages in time for the final vote, so the committee ended up passing a major bill with key pages missing.

Business groups were frantic, wondering if their firms were getting gored. They still can't get a look at the bill. The committee staff hasn't finished writing it.

The contentious acid rain issue will no doubt be settled in some back room with Senator Byrd running interference for West Virginia's coal miners. But how did it get out of the committee so easily? There are no Senators from the big midwestern states on the panel. There are six Senators from Western states that could face severe compliance costs. The answer: Four of those Senators—Burdick, Baucus, Durenberger and Simpson—got special exemptions for their states, leaving most of the country to fend for it-

self with the burden. Senator Symms of Idaho was the only member of the panel who fought the rush to passage; his state got no special treatment.

The gale force wind behind this effort is Senate Majority Leader George Mitchell. For 12 years he has been pushing for a clean air bill. It looks as if he's figured out a way to get it: blow over everything in his path, including serious hearings, science, economic analysis, even regional politics. Senator Mitchell promises that it will be the first bill the Senate votes on when it reconvenes in January. At least 31 Senators have asked the three congressional research arms to evaluate 100 specific effects of the bill, but the researchers will be able to produce only cursory results by the time Mr. Mitchell wants to put it up for full vote.

Of course some interests will be well served by Senator Mitchell's work. The EPA bureaucrats are especially interested in the permits and enforcement section of the bill. Mr. Mitchell's bill layers an entire new permit-issuing bureaucracy on top of the one that already exists. Not only would businesses have to get an EPA approval for new construction, a permit would be required simply to operate. As the bill stands, every gas station, dry cleaner, body shop or any other chemical-emitting business would have to hold public hearings and get a permit to stay in business.

The EPA, which has represented its own interests more than those of the White House recently, loves the

permitting section. EPA's bureaucracy would swell, paid for by emissions taxes. EPA permit officers would have the power to shut down small businesses; they could revoke permits at any time. The EPA would even have the power to overrule state environmental offices, a blunt repudiation of federalism. And the penalties for businessmen would be tough: up to \$250,000 per individual and 15 years in jail if their company releases a hazardous air pollutant that places people in imminent danger. The distinction between malicious pollution and unintentional pollution also is eroded.

The U.S. already spends \$33 billion a year on clean air, more per capita than any of our trading partners. The President's bill would add at least \$25 billion to that. The Senate package is off the meter, and could double the costs of the existing act.

At the risk of intruding crude reality into the Senate's sealed world, there are real firms out there in America, with real employees, trying to compete. If Senator Mitchell is going to throttle entire industries, maybe it would be nice to have a bill that has withstood the scrutiny of an interested public, rather than being railroaded through a Senate whose members will barely understand the law on which they are voting.

Editorials

The Acid Rain Boondoggle

We invite your attention to excerpts of some congressional testimony reprinted on the opposite page. We stumbled across the testimony in the course of reporting on President George Bush's proposal to reduce sulfur dioxide emissions from coal-burning power plants by 10 million tons a year, a 45-percent reduction on top of the 31-percent reduction already accomplished since 1973.

The testimony makes for some entertaining reading, conducted as it was by the witty Democrat, Sen. Daniel Patrick Moynihan of New York, and the acerbic Republican, Sen. John Chafee of Rhode Island. But it should also make disturbing reading for American electricity consumers, who would have to fund the Bush proposal to the tune of \$4-6 billion a year, or as much as \$120 billion over the next two decades. Most of the cost would be borne by electricity consumers in the Midwest and Southeast, with costs ranging between \$98 and \$180 a year in Michigan, but up to \$900 per home in Ohio.

The bottom line on the expert testimony: This vast expenditure will achieve almost nothing. It might — *might* — help clean up about 75 of America's tens of thousands of lakes, but at a cost of billions — *billions* — per lake.

President Bush made this decision even though his economic advisers warned him there was no solid scientific or economic cost-benefit basis for such a reduction. The target of 10 million tons of sulfur dioxide was plucked out of thin air as a compromise between an industry proposal for a six million ton reduction and the environmental extremists' position of 14 million tons.

President Bush was advised to wait for the final 1990 report of the National Acid Precipitation Assessment Project (NAPAP), created by Congress in 1980 to study this problem. It will be the most authoritative, extensive study of acid rain ever conducted. Despite an interim report last year indicating that acid rain might not be the serious problem it is cracked up to be, Mr. Bush's



Rep. John Dingell

Environmental Protection Agency Administrator William Reilly successfully argued in favor of immediate action.

On Oct. 5, members of the Senate Subcommittee on Environmental Protection found out why Mr. Reilly was so eager to rush ahead. NAPAP Director James Mahoney admitted that the Bush program would do very little, even in 50 years, to change lake acidity in the Northeast. Even if nothing were done, he testified, there "would be no significant change" in the number of acidic lakes.

The senators also learned that NAPAP could find no evidence that acid rain was measurably hurting either crops or forests, and that it was only one of a number of factors affecting lake acidity. Or as Sen. Moynihan concluded: "It suggests to me that the sky is not falling."

Indeed it isn't. Sen. Moynihan was particularly shocked to learn that in 20 years only 25 lakes would actually be "de-acidified" by spending \$80-120 billion, or \$4-6 billion a year on the Bush program. That's \$5 billion per lake.

The fact is NAPAP's study completely vindicates the Reagan administration's refusal to spend vast amounts of the consumers' money on sulfur dioxide reduction programs and completely destroys the scientific or economic premise for the Bush program.

The scandal is not only that the administration went ahead despite this, but that so far not a single House committee working on that program has invited NAPAP or Dr. Mahoney to present their findings.

House Energy and Commerce Committee Chairman John Dingell, D-Mich., has expressed concern about the impact of a big acid rain cleanup on Michigan and other Midwestern states. He might want to ask his subcommittee chairman on Energy and Power, Phil Sharp, how he could hold four days of hearings on acid rain in the last three weeks and never include NAPAP, by now the country's foremost expert on acid rain.

Does Rep. Sharp know that Tennesseans face up to \$464 more per year in electric bills under the Bush program? Or is his mind made up in advance of the facts?

The exchanges in the Senate subcommittee are so devastating that we decided to print extended excerpts, so the consumers can judge firsthand whether the new regulations are worth it. We think you will be as shocked and outraged at this boondoggle as we are. This country is rich, but it's not rich enough to throw away money like that.

**WARREN
BROOKES**

Billions into the air-toxics breeze

A top career executive in the Environmental Protection Agency was asked how he would spend his budget to achieve the maximum reduction in premature cancer deaths.

"I would give it all to the American Cancer Society," he is reported to have said without hesitation.

The story which has been circulated widely might well be apocryphal, but it has a serious point, well-illustrated by the Air Toxics section (Title III) of the Clean Air Amendments (S 1630) now before the U.S. Senate.

Industry groups now estimate the likely cost of this section alone to the U.S. economy is between \$20 billion and \$30 billion. That's 10 to 15 times the \$1.8 billion we now spend on the National Cancer Institute for a disease killing 470,000 per year.

Yet, the EPA estimates that even using the most-extreme-risk models only 1,700-2,700 cancer cases a year are caused by air toxics. Since 900-1,600 of those are blamed on motor-vehicle emissions (covered by other controls) the total range for all industrial air toxics is only 700 to 1,100.

And, because the bill only targets those plants emitting 10 tons or more of any one pollutant, its maximum potential remediation is said to be between 350 and 500, even assuming the Senate bill's insistence on cutting effective risk to one in 1 million.

That represents a cost per cancer avoided of between \$40 million and \$86 million each. If these numbers shock you, read the careful analysis of the air-toxics madness in the winter issue of Regulation Magazine, out next week from Cato Institute.

In it, two engineers, Frederick Rueter and Wilbur Steger, admittedly consultants to industry, nevertheless use the EPA's own data to show the costs and benefits of dealing with just two of the key air toxics, coke-oven emissions, and benzene.

The EPA itself estimates air toxics from coke ovens are responsible for 6.9 cancer cases a year nationwide,

and benzene emissions for about 3.9 cases. (See Table)

Last year the EPA issued a proposed NESHAP (National Emissions Standards for Hazardous Air Pollutants) rule on coke emissions. It said that using "best-available technology" (BAT) coke emissions could be reduced enough to cut cancer incidence from 6.9 per year to 4.0, a net saving of 2.9 cases, at a cost of \$19.3 million per year, (an implied capital cost of \$200 million). That's \$6.8 million per case.

On benzene, EPA's NESHAP ruling last September called for cutting the total cancers presumed from that emission source from 3.9 to .5 per year, a saving of 3.4 cancers per year, at a cost of \$200 million a year

(an implied capital cost of \$2 billion.)

Messrs. Steger and Rueter say, "This amounts to more than \$58 million per life prolonged. It should not be difficult to find other applications for \$200 million per year that would achieve much larger reductions in cancer risk. . . ."

That's especially true since "the EPA's cancer risk estimates are extreme overestimates of the actual risks" for air toxics. Why? Virtually all those are extrapolated for the general population from epidemiological studies of workers actually employed on the emitting source sites, or from high-dosage rodent tests.

But as Messrs. Rueter and Steger point out, that assumes a straight-line risk relationship between very high exposure and very low exposure. Not only is there no such connection with low-exposure workers (whose cancer rates are uniformly below EPA risk-model expectations) but none exists on the general population.

For example, they looked at the largest concentration of industrial coke ovens in the nation, Allegheny County, Pa. They calculated the age-adjusted cancer rates for the 30 geographic areas in that county for the period from 1969-1971, well before substantial emissions reductions took place, in order to get the maximum possible health effect.

Even so, they found no pattern of raised rates. Indeed around two of the three coke plants, cancer rates were from 20 to 40 percent lower than the county as a whole. They

concluded "the risk levels are so low they cannot even be detected in epidemiological studies of population exposures to outdoor concentrations of coke-oven emissions that were (1969-1971) substantially higher than those prevalent currently."

The EPA admits its technique of extrapolating risk from high to low exposure has "no solid scientific basis." Worse, the EPA risk model assumes the average individual is exposed to the maximum possible ambient level of the pollutant for 24 hours a day through his entire 70-year life span. Since most of our life is spent inside our homes, and since we move on average every six years, such an assumption is a ludicrous exaggeration.

For coke, the two engineers conclude: "EPA assumptions result in the overestimate of those cancer risks by at least a multiple of 100." So, the likely national risk for all coke emissions currently is 0.07 cancers per year. The likely reduction from investing \$200 million in capital is .03 cancers per year, or about 1 every 30 years or so.

For investing \$20 billion to \$30 billion on all air toxics, the likely reduction in cancers is not 350 to 500 a year, but something on the order of 3 to 5, or \$4 billion to \$9 billion per life prolonged.

As the EPA executive suggested, there must be myriad better ways to spend our money on health improvement than this.

EPA'S AIR TOXICS PROGRAM COST/BENEFITS (Cancers per year — nationwide)

Coke-oven emissions	EPA Risk Model	Realistic Risk
■ Current baseline	6.86	0.009
■ Using Best-Available Control Technology (BAT)	4.03	0.041
■ Net Reduction	2.83	0.028
■ Annual Cost Total	\$ 19.3 million	\$ 19.3 million
■ Cost/cancer avoided	\$ 6.8 million	\$ 682.0 million
Benzene		
■ Current Baseline	3.91	0.039
■ Using BAT	0.51	0.005
■ Net Reduction	3.40	0.034
■ Annual Cost	\$200 million	\$200 million
■ Cost/cancer avoided	\$ 58.8 million	\$ 5,880 million

Sources: All Data in First Column From EPA's NESHAP Data in Second Column from realistic risk assessment in "Air Toxics and Public Health: Exaggerating Risks and Misdirecting Policy," Regulation Magazine, Winter 1990.

Washington Times
Jan 17, 1990

grams, the four areas hold their majorities at the \$100-per-taxpayer level. But when people are asked to pay as much as \$200 per year out of their own pocket to boost spending, only public education (54%), and efforts to fight drugs (52%) find majority support.

Less Willingness To Sacrifice To Fight Pollution Although "reducing air pollution" and "research on AIDS" each captured an identical 59% support for increased spending, support for reducing air pollution eroded sharply as personal stakes were raised. Only about half as many Americans would personally contribute \$200 per year to clean up the air (29%) as feel in general that the area deserves more government funding. On the other hand, those who favor more spending to fight AIDS are more willing to stick to their guns on the issue when the \$200 price tag is attached. Thirty-eight percent would pay the additional taxes.

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The Gallup Poll. Oct. 5-8, 1989. N=1,234 adults nationwide:

"Do you think the Bush administration will or will not be able to avoid raising taxes?"

	Oct. %	Jan. %
Will	18	29
Will not	71	64
Don't know	11	7

"Do you approve or disapprove of raising income taxes as a way of reducing the federal budget deficit?"

	%
Approve	25
Disapprove	69
Don't know	6

"If you had a say in making up the federal budget this year, for which of the following programs should spending be increased, decreased or kept the same?"

	Increased %	Kept Same %	De- creased %	Don't Know %
Improving public education	76	19	3	2
Combating drug problem	75	16	7	2
Help homeless	71	20	6	3
Health care programs	67	24	5	4
Reducing air pollution	59	30	9	2
Research on AIDS	59	29	9	3
Job training, placement programs	56	33	9	2
Assist low-income families	56	31	10	3
Aid to farmers	48	32	16	4
Health insurance	48	34	12	6
Financial aid for college students	44	39	15	2
Provide child care services	41	42	13	4
Assist first-time home buyers	37	42	16	5
Space exploration	21	39	38	2
Defense spending	14	41	42	3

For each budget item above, those who favored a spending increase were asked one of the three following questions. The total sample was divided into the three subsamples with similar numbers of interviews so responses to the three different questions could be compared.

Asked of subsample A: "Would you be willing to pay higher taxes to increase federal spending for [see below]?"

Asked of subsample B: "Would you be willing to pay \$100 more in taxes each year to increase federal spending for [see below]?"

Asked of subsample C: "Would you be willing to pay \$200 more in taxes each year to increase federal spending for [see below]?"

	Favor Spending Increase %	Willing To pay More Taxes %	Willing To pay \$100 %	Willing To pay \$200 %
Improving public education	76	63	59	54
Combating drug problem	75	57	56	52
Help homeless	71	58	59	46
Health care programs	67	57	52	48
Reducing air pollution	59	36	34	29
Research on AIDS	59	45	42	38
Job training, placement programs	56	40	30	29
Assist low-income families	56	43	38	35
Aid to farmers	48	38	35	29
Health insurance	48	38	31	32
Financial aid for college students	44	32	27	25
Provide child care services	41	29	28	23
Assist first-time home buyers	37	25	21	18
Space exploration	21	13	13	14
Defense spending	14	10	11	11

Yankelovich Clancy Shulman for Time and CNN. Oct. 9-10, 1989. N=1,000 adults nationwide:

"In general, do you favor or oppose raising taxes to deal with some of the problems the country faces today?"

	%
Favor	34
Oppose	59
Not sure	7

"Would you be willing to pay higher taxes if the money was used for..."

	Yes %	No %	Not Sure %
Feeding and providing medical care for very poor children	86	12	2
Fighting the war on drugs	79	19	2
Increasing benefits for retired people	75	21	4
Improving public schools in communities like yours	72	25	3
Reducing the federal budget deficit	57	38	5
Ensuring that the armed forces have the most modern weapons and equipment	50	45	5

INDUSTRY SPECIFIC IMPACT

SMALL BUSINESSES

DRY CLEANERS

- Fifty percent of all dry cleaners have no more than \$100,000 in receipts per year. Increased costs associated with permitting and necessary equipment additions may cause many mid-to-small sized cleaners to go out of business.
- The average dry cleaner may be required to install "state of the art" pollution control equipment which is not an "add on" to existing equipment but rather, is totally new equipment. Cost varies by size and output of shop but the average cost would be approximately \$40,000-50,000 per shop.
- Dry cleaners may be required to apply and pay for an operating permit which would monitor compliance with emissions standards.

PRINT SHOPS

- Printers will likely be categorized as a "major source" emitting 25 tons or more per year for a combination of pollutants. Regardless of size or output, all print shops would have to buy new printers and encase them in order to capture emissions. The approximate cost for the average print shop would be between \$160,000-\$300,000 for the equipment, encasing would be additional.
- Printing is the largest manufacturing industry in the U.S. with 36,000 shops. Severe legislation would impact many of the small shops because of the enormous costs involved with reducing their emissions. These costs are often estimated to exceed half of a small shop's annual income.

SERVICE STATIONS/GASOLINE MARKETING

- "Stage II" vapor recovery equipment would be required to be installed on all pumps at a cost between \$40,000 - \$60,000. While oil companies may cover initial installation costs, yearly maintenance could run over \$4,000 for each owner.
- Underground storage tanks necessary to house alternative fuels will cost twice as much as gasoline tanks because they are double lined. That cost alone could put many service stations out of business.

AUTO BODY REPAIR SHOPS

- Body shops would be required to purchase new equipment for applying paint (i.e. spray guns). The range of paint colors may become limited because manufacturers must reformulate all paints to reach compliance with new standards.
- Certain substances will likely be restricted under new clean air laws. The average auto body repair shop will likely have to install emission control equipment costing up to \$100,000.
- Additionally, garages will face restrictions on the use of degreasers, solvents, engine detergents, windshield wiper fluids, paints and lacquers.

BAKERIES

- When yeast reacts with the oven's heat during baking, it produces hydrocarbons which are a major contributor to smog. Bakeries would be required to install emissions control equipment in the form of afterburners which would burn-off the hydrocarbons before they leave the exhaust stack. The cost of this technology varies according to the size of the bakery.

FURNITURE REFINISHERS

Furniture refinishing operations have three basic options.

1. Reformulation to water-based finishes (has not been performed successfully on an industry scale).
2. Add-on controls such as incinerators and carton absorption systems (there are technical and economic problems). In the case of incinerators, companies would have to add a \$250,000 incinerator for each spray booth it operates. For example, one plant with 185 employees which produces \$11 million in furniture annually, estimates the cost of incinerators at its plant alone to be \$3 million. This is economically unfeasible for most manufacturers.
3. Application technology (the most economically and technically viable at this point).

MATERIALS TRANSPORTATION

- Alternative fuels mandates pose problems because these fuels are more expensive and potentially more unsafe. Clean diesel (low sulfur) fuel will cost roughly 3-5¢ a gallon more.
- The lack of availability of these fuels will limit the range of trucking.
- Higher transportation costs in the form of more costlier fuels and vehicles will mean higher costs to consumers for materials transported by truck.
- Truckers will have to add expensive pollution control devices to their vehicles.
- Urban transit restrictions (i.e., rush hour restrictions, truck bans from certain roads, etc.) will impede trade

FOOD PROCESSING

- Restaurants with charcoal grills will have to install containment units to meet air toxics goals.

CONSUMER PRODUCTS

- Some 750,000 products will be regulated and reformulated. These include: shaving cream, mouthwash, deodorant, perfumes, window cleaners, furniture polishes, kitchen cleaners, brake cleaners, antifreeze, windshield deicers, disinfectants, sterilizers, medicines, and others.
- Reformulation of products might reduce their efficacy, thus forcing consumers to use more of the product, resulting in a negative impact on the environment. Example: reformulated paints may mean that consumers need more than one coat; they would eventually be using more paint to do the same job.
- The federal government has already mandated the industry to change from CFC propellants to hydrocarbon propellants, at a cost of \$1 billion. Now the government is contemplating mandating another change, only this time there is no readily available alternative. Small to mid-sized companies will be forced to close.

LARGE INDUSTRY

CHEMICAL MANUFACTURING

- Manufacturers would be required to install additional controls and/or change work practices in order to reach a level of "negligible risk"
- Manufacturers would also be required to pay unreasonably high fees for operating permits.

IRON AND STEEL MANUFACTURING

-
- The iron and steel industries face much higher utility costs which are a major cost in manufacturing their products.

PETROLEUM REFINING

- The legislation provides the EPA with broad discretion on determining which refiners receive emissions permits and which do not. The emissions standard is not specific, so, individual companies are unable to determine the appropriate technology to use for reducing emissions. This may lead to higher compliance costs on technology which is inappropriate.
- Industries also face much higher utility costs, an important part of the cost of doing business.

AEROSPACE

- Industries face much higher utility costs, an important part of the cost of doing business.

ELECTRIC POWER PLANTS

- The legislation will cost electricity ratepayers up to \$7.1 billion each year for 20 years. 85% of these increased costs will be carried by 15 states including: Florida, Illinois, Missouri, Pennsylvania, Ohio, Michigan.
- Electric utility companies would be forced to invest in emissions control technology which is outdated (scrubbers) and will cost billions of dollars. These technologies are not as effective as newer, clean coal technologies which will be available in the next few years.

PLASTIC PRODUCT MANUFACTURING

- Industries face much higher utility costs, an important part of the cost of doing business.

PAINT MANUFACTURING

- Manufacturers of paint would be required to reformulate the solvents and components which make-up the chemistry of paint. They would also be required to add equipment to their plants which would further limit emissions.
- Applicators of paint (i.e. auto body shops) would be required to buy new spray guns for applying paints. Plus, the colors available for use would be limited by the manufacturers ability to reformulate each of the 10,000 colors currently being marketed.
- Individual paint applicators would also be required to install emissions control equipment.

#

SECTION 112

CLEAN AIR WORKING GROUP

S. 1630 : SMALL BUSINESS REALITIES

The regulatory scheme proposed in S. 1630 will result in unnecessary burdens on small businesses. The proposed program requirements often will be redundant or duplicative. Moreover, the requirements far exceed the technical and financial capabilities of most small businesses. Discretionary EPA regulatory authority for dealing with small sources are likely to prove illusory due to sweeping mandated provisions.

Small business concerns with S. 1630 include:

- Consideration must be given to the control requirements of other Clean Air Act provisions and other federal statutes. The EPA Administrator should be directed to ensure that additional control requirements are not redundant or unnecessarily costly.
- Credit should be provided for **all** prior emissions reductions, both voluntary and mandatory.
- Smaller sources --*emitting as little as 10 tons per year*-- may be designated as "major sources" subject to maximum achievable control technology standards instead of relying on cost effective and generally available control technologies for small emission sources.
- Implementation of an urban air toxics control strategy for the smallest of emission sources within only nine years of enactment **will virtually guarantee** a poorly designed program that may provide **no health benefit to the public at an enormous cost** (*including job losses*) to small businesses.
- There is no assurance that protection of the hypothetical most exposed individual from an infinitesimal risk of cancer is technologically feasible.
- Plant closures --*from near zero emission standards for some chemicals*-- are likely.
- Small companies tend not to have professional staff capable of understanding complex emission control standards and permit requirements. *Even with a Small Business Technology Assistance Program*, they will be forced to vie for expensive outside consultants for permit application development and monitoring reports.
- In requiring facility emission permits for small sources, unnecessary delays in plant expansions and modifications will result due to the lack of permit authority resources.

**An alternative to S. 1630, Title III of S. 1490,
the President's proposal, is based upon a more rational
approach to regulating hazardous air pollutants.**

SECTION 112

CLEAN AIR WORKING GROUP

PERMITS: SMALL BUSINESS CONCERNS

Even in attainment areas, thousands of small businesses will be regulated for the first time under pending clean air legislation. Most companies will have to obtain a permit to continue to do business while doing their part to control air pollution. Detailed emission analyses, compliance schedules, compliance certification and permit violations must be submitted to local, state, or federal environmental protection agencies.

Small business concerns follow:

- A permit system must be streamlined to keep paperwork to a minimum and not hinder business.
- Any permitting system should be *cost-effective*.
- Existing permits should **not** be thrown out "en mass" before a new program is in place.
- Group permits or permits by rulemaking would limit expense and manpower for some industries.
- Permit fees should be reasonable, *based on administrative costs*, and **not** used as a deficit reduction mechanism.
- Fines, penalties, and criminal prosecution should have a **direct correlation** to the seriousness of the violation. Paperwork violations such as late submissions of forms or delayed payment of routine administrative fees, *which cause no public harm*, should not be treated the same as willful or negligent emissions violations.
- More than 80% of the new jobs in the past decade were created by small business. Capital costs and human resource allocation are critical for their success. Continuous emissions monitoring which requires specialized equipment --*typically costing between \$50,000 to \$250,000--* and a computer dedicated to managing and analyzing the data are just too much and could cause many small businesses to fail.
- Contents of a permit application and compliance plan should be treated as *privileged information* and protected for "trade secrets." Disclosure should be **limited** to that which is vital to protect the health of workers and the general public.

SECTION 112

CLEAN AIR WORKING GROUP

S. 1630 : ACCIDENTAL RELEASES

Section 129 of S. 1630 requires facilities using certain substances to develop detailed hazard assessments to anticipate the consequences of a range of accidental releases of these substances, including worst-case events. The bill also provides for the creation of a Chemical Safety and Hazard Investigation Board with broad and intrusive powers to investigate accidental releases. S. 1630 specifies an initial list of 28 substances subject to its accidental release provisions, and requires that an additional 22 be added.

Effects on small business would be:

- Monitoring, recordkeeping, training, and reporting requirements would impose tremendous administrative and paperwork burdens.
- Hazard assessments requiring sophisticated, and expensive modeling efforts are beyond the reach of most small businesses. Updates would be required every other year.
- Several substances included in the initial list are not listed under SARA Section 302 --*thus should not be considered "extremely hazardous."*
- Responsibility for developing a list of substances and substance and hazard assessment elements has been assigned to the Chemical Safety Board. However, some initial determinations have already been proposed in Section 129. Such decisions should be made only after a *thorough* evaluation by the appropriate body.
- Worst-case estimates of the potential for accidental releases --*regardless of their probability*-- must be prepared by facilities. These publicly available estimates would further heighten public hysteria and mistrust of industry and government.
- Many Section 129 provisions duplicate existing SARA, RCRA, HMTA, and OSHA regulations.

THE LESSONS FROM NAPAP

The National Acid Precipitation Assessment Program (NAPAP) was created by Congress in Title VII of the Energy Security Act (Public Law 96-294) which was signed into law in June 1980. NAPAP authorized and directed a comprehensive ten-year, federal inter-agency investigation of the causes and effects of acidic deposition and required that a report be submitted to the Congress to assist in policy decision-making.

During the past ten years, thousands of competent scientists in this country and abroad have been involved in NAPAP, and \$500 million has been expended on the program. Hence, the good brains, the resources and the time specified by Congress have been provided. The research results, to be published in final form by September 1990, essentially are already known: The allegations of adverse effects of acid rain, so glibly asserted by proponents of emission-control legislation, simply have not withstood the test of scientific scrutiny. Nonetheless, Congress appears to be set on a course of ignoring the scientific results of NAPAP by rushing to adopt legislation before the facts are published, in which case the politics, once again, will have outpaced the scientific conclusions and recommendations.

On October 5, 1989, Dr. James R. Mahoney, Director of the National Acid Precipitation Assessment Program and an internationally respected scientist, testified before the Subcommittee on Environmental Protection of the Senate Committee on Environment and Public Works.

In the first paragraph after his introductory remarks, Dr. Mahoney stated: "In my view, emission reductions in this range (10 million short tons of sulfur dioxide below 1980 emission levels) would benefit aquatic resources and would mitigate other environmental effects caused by acidic deposition and its precursors..." (p. 2)¹

However, nowhere in his testimony, which "summarizes the current scientific information about acidic deposition effects, and describes key findings from some recently completed projections of future surface water chemistry at different deposition levels" (p. 1), can one find any substantiation for this political policy statement. To the contrary, Dr. Mahoney's entire scientific testimony stands in strong refutation of this single sentence.

¹ Page references are to "Testimony of James R. Mahoney, Director, National Acid Precipitation Assessment Program, before the Subcommittee on Environmental Protection, Committee on Environment and Public Works, United States Senate, October 5, 1989."

Sources, Atmospheric Processes and Deposition

Dr. Mahoney stated that sulfur dioxide, nitrogen oxides, and volatile organic compounds are the chemical precursors involved in producing acidic deposition. (p. 3)

- "Between 1973, the peak year of sulfur dioxide emissions, and 1988, sulfur dioxide emissions in the United States decreased by 23% from approximately 31 to 24 million short tons, despite a 45% increase in coal use." (p. 4)
- "Emissions of nitrogen oxides peaked in 1978 at 23 million short tons and have since declined. Preliminary estimates of 1988 emissions are 20 million short tons, which is a 14% decrease from 1978." (p. 4)
- "Emissions of volatile organic compounds have also decreased during the last ten years; preliminary estimates for 1988 are 21 million short tons, which is a 28% decrease since 1978." (p. 4)

Clearly, then, emissions of precursors to acidic deposition have been significantly reduced under provisions of the current Clean Air Act; but such emission reductions have not been proportionately reflected in acidic deposition results, according to NAPAP:

- "From 1979 to 1986, the majority of the wet deposition monitoring stations in the eastern United States showed an average reduction of the wet deposition of sulfate of 14 percent, although the trend was not statistically significant." (p. 21)
- "Although the annual wet deposition of sulfate has decreased as the emissions of SO₂ have decreased since the 1970s, no apparent trend in the acidity of rainfall has been detected." (p. 22)

Nor can one determine from NAPAP's extensive research that emission reductions in one region will alleviate deposition in another specific area:

- "Percentage reductions in emissions may not result in similar percentage reductions in deposition at a particular location." (p. 22)

- "...[E]missions changes in the Ohio River Valley and Eastern United States may result in less than proportional reductions in wet deposition in the downwind region." (p. 22)

Effects of Acidic Deposition on Aquatic Ecosystems

Potential acidification of aquatic systems resulting from acidic deposition has been the principal driving influence in research and control activities, and Dr. Mahoney's testimony contains five tables summarizing "quantitative information about current chemical status and future projections for lakes and streams in sensitive regions, based on NAPAP-sponsored research." (p. 5)

"Acidic waters are defined as those having acid neutralizing capacity (ANC) less than zero. Sensitive waters are defined as those having ANC above zero but less than 50 (microequivalents per liter)." (p. 6)

NAPAP estimates that 162 (5%) of the 3,227 lakes in the Northeast currently are acidified and 880 (27%)² are sensitive. If deposition remains at current levels for 20 years, it is projected that 161 lakes (a reduction of one)³ will be acidified and 648 (a reduction of 232) will be sensitive. After 50 years of such constant deposition, projections are that 186 lakes (an increase of 24) will be acidic and 648 (a reduction of 232) will be sensitive. (p. 12)

When questioned about these projections Dr. Mahoney said: "If . . . we look at the time 20 years from now and then 50 years from now, we see that if deposition is unchanged, we don't expect to see any significant change. The projection is 162 changing to 161 twenty years later at the present deposition levels. What that really means is no change at all. That's so small, given all the uncertainties, we would say that's the same thing. Going out 50

² Table 1 of the testimony lists 19% of the Northeast lakes as sensitive, but Table 4 says 27% are sensitive. No explanation is provided for the discrepancy.

³ Further explanation for the lay reader: (1) NAPAP has found that 162 of the 3,227 lakes in the Northeast are acidic today; (2) if SO₂ emissions and acidic deposition remain constant over the next 20 years, NAPAP's best estimate is that 161 lakes (one less than today) will be acidic in 2009; but (3) NAPAP is not at all confident that its estimate is correct, or even close (± 245): there may be no acidic lakes ($161-245=-84$) or there may be 406 acidic lakes ($161+245=406$) in 2009. Other findings by NAPAP indicate that the latter projection of 406 is so highly unlikely that it should be disregarded.

years, the projection is 186 lakes in the northeast. Now that also is such a small change that the proper scientific statement would be no significant difference."

Senator Daniel Moynihan then observed: "So, if we do nothing, nothing is changed. And we live with the fact that 5 percent -- about 1 large lake in 20 -- is going to be acidic, and that's where we are for the next 50 years." (Hearing transcript, pp. 42-43)

At the hearing, Dr. Mahoney explained "that we cannot expect to see, through natural conditions, a repopulation of fish in the affected lakes anytime in the next 20 years or beyond through emission reduction, alone. So insofar as there is an interest in having restored fish viability in the 10 or more percent of the lakes in the Adirondacks, for example, where it no longer exists, in addition to emission reductions, or whether there were such reductions or not, other intervention would be required such as liming and stocking of such watersheds and lakes as you would want to see restored to recreational use where they are not now in such use."

Explaining further, he stated: "In fact, the situation for the northeast is that it is, in fact, not very sensitive to the deposition level. We have a percentage of acidic lakes, and no matter what we do over the next century except for restoring them one at a time through liming, little is going to change that quickly." (Hearing transcript, p.p. 19 and 21)

Dr. George Hidy of the Electric Power Research Institute also discussed the merits of lake liming: "[I]f low alkalinity lakes . . . are the focus of concern, we believe that liming treatment offers one important, cost effective, environmentally-benign alternative that will predictably improve the lake's acidity status. This is in contrast to emission controls that are projected." (Hearing transcript p.p. 61-62) Senator John Chafee added: "I had the privilege of going to Stockholm and seeing what they're doing, and the Swedes, overall, were very, very impressive . . . They're deeply into the liming business." (Hearing transcript pp. 77-78)

"In the Southern Blue Ridge Region there are presently no acidic lakes. At current levels of deposition, projected changes could occur after the sulfate absorption capacity of watersheds is exhausted within 20 to 50 years. The projected number of systems becoming acidic under constant deposition is 10%." In a footnote, it is explained that the "95% confidence interval on this estimate is $\pm 15\%$. Thus our best estimate is that 10% of the systems acidify. The number may be as large as 25%. Alternatively, models project that 5% of the systems increase in ANC." (p. 15, emphasis added)

NAPAP also projected that, after 20 years of constant deposition, no streams would become acidic and 187 (± 310) may become sensitive; after 50 years, 129 (± 295) might be acidified and 203 (± 333) may be sensitive. Under the unlikely event of an increased deposition scenario, whereby deposition would be held constant for 10 years and then increased linearly for 15 years to a level 20% above the current level, no streams would acidify after 20 years, but 187 (± 314) might become sensitive; in 50 years, projections are that 159 (± 291) streams may acidify and 340 (± 359) may become sensitive.⁴

What is one to conclude from projections with such incredibly wide bands of uncertainty? How can one have confidence, based on such dubious estimates, that a multi-billion-dollar-per-year emission control effort will produce tangible and worthwhile benefits in improved water quality?

In his testimony, Dr. Mahoney acknowledged the "scientific and statistical uncertainties" in determining the percentage of acidic waters "due wholly, or in part, to acidic deposition," and he added this profound understatement: "Although trends are evident in these projections, the effects of increased, constant, and decreased deposition are not always statistically significant." (p.p. 11 and 14)

At the hearing, when queried about the confidence factor, Dr. Mahoney replied: "I think I'd simply note the current confidence limits are larger than the projections of change, themselves . . . [I]t is a devilishly difficult job to know just what benefit we will get from this." (Hearing transcript pp. 26-27)

⁴ As stated above, there is no indication that deposition will increase significantly, certainly not by anything as drastic as 20%; to the contrary, as NAPAP notes, emissions are declining, and to the extent that reduced emissions are reflected in deposition, acidic deposition also will decline -- not increase. Therefore, it would appear that there was specious reasoning behind the effort to conduct an increased-deposition scenario projection. This suspicion is reinforced by the fact that the Environmental Protection Agency issued a press release citing only the estimates of projected acidic and sensitive streams (without stating the broad uncertainties in the estimates) to "support President Bush's call for reductions in sulfur dioxide emissions that cause acid rain." The press release misinformed the public regarding the dangers of acid rain, and it was widely reported in news media as Congress was considering the President's Clean Air Act amendments (see, e.g., "Acid is Killing Streams in Southern Blue Ridge Mountains, EPA Says, " The Atlanta Journal, August 29, 1989).

Effects on Forests

These are the relevant conclusions in Dr. Mahoney's testimony regarding effects of acidic deposition on forests: acidic deposition "appears to intensify the effects of natural stresses" upon one species of tree (red spruce) at eastern high elevation locations; "other than for red spruce, extensive surveys of forest condition have indicated no evidence of widespread forest decline in North America related to acidic deposition". (p. 17)

Effects on Agricultural Crops

Dr. Mahoney stated categorically "that there is no measurable and consistent adverse crop yield response from the direct effect of acidic rain at ambient levels in North America. Thus, the acidic deposition impact on regional crop production in the United States is considered to be negligible." (pp. 18 and 20)

He points out, to the contrary, "an evaluation of the nutritional enrichment of some agricultural soils through the input of sulfur and nitrogen from acidic deposition indicates indirect benefits associated with decreased fertilizer requirements." (p. 20)

Effects on Materials

As stated in the testimony, "there are serious limitations in developing representative data and interpretative methods to isolate and inventory acidic deposition effects on exposed materials. Therefore, no generally accepted regional or national estimates of materials effects resulting from acidic deposition are currently available." Also, it is pointed out that reductions in urban air pollution levels -- not long-range transport of acidic compounds -- likely will create the largest material benefits. (pp. 20-21)

Economic Value of Benefits

"Economic valuation methods have not been sufficiently tested for the full range of effects categories to support a comprehensive cost-benefit evaluation of acidic deposition control approaches." (p. 21)

Senator Moynihan asked: "So when you say . . . that an emission reduction would benefit and mitigate, let's put a number on benefit . . . For what cost do we get what benefit?" When Dr. Mahoney avoided a direct answer, he was asked: "Is that because your findings suggest not much benefit?" Again, Dr. Mahoney was evasive, and he was asked, "Well, what are the costs?" Mr. William Rosenberg, Assistant Administrator of the Environmental Protection Agency, said, "We estimate about \$4 billion a year, Senator." At this point Senator Moynihan engaged in this soliloquy: "Okay. So

we have to ask ourselves whether it is best if we -- is that the best way to spend \$4 billion a year? Let's see. In New York State we have one million abandoned women and children -- some people are on welfare. That \$4 billion would come to \$4,000 times one million, right? So if we gave every family -- the typical family is a little under three, but say 3,000. We could, with that money, give -- obviously, this is very hypothetical -- give every welfare family \$12,000 to vacation in the Adirondacks on some of the 95 percent of the lakes that are not acidic . . . So we could give every welfare family in New York State a three months summer vacation in the Adirondacks with the same amount of money. I'm just saying there are trade offs. That's all I'm saying." (Hearing transcript pp. 45-47)

Discussion

From the above testimony, it appears that NAPAP has concluded that acidic deposition is causing no adverse effects on agricultural crops; to the contrary, sulfur and nitrogen deposition may be beneficially enriching agricultural soils. Acidic deposition's effects on forests are, at least, uncertain; at best, adverse impacts are minimal or non-existent. Similarly, there is almost no definitive information on adverse effects of acidic deposition on materials, and no adequate methods are available for making cost-benefit analyses of control proposals.

Of the categories of possible effects discussed by Dr. Mahoney, that leaves aquatic ecosystems. Admittedly, there are acidic lakes and streams in the United States, but the population nationally and in any region is relatively small. While acidic deposition may be responsible (which by no means has been positively established) for all or some portion of the acidified surface waters in certain regions, the contribution in other regions, such as Florida and the Upper Midwest, is small.

Conclusion

In view of the above findings by NAPAP, it is difficult to understand Dr. Mahoney's unsupported statement that a ten-million-ton reduction in SO₂ emissions below 1980 levels "would benefit aquatic resources and would mitigate other environmental effects caused by acidic deposition and its precursors." While it is almost axiomatic that reduced emissions will not cause -- and probably will alleviate -- environmental harm, it is quite another thing to predict that such reductions will produce positive benefits commensurate with the costs. It is noteworthy that Dr. Mahoney did not attempt to quantify the benefits in comparison to the costs of acid rain control bills currently pending before the Congress.

Projections of future acidification of aquatic bodies under current, decreased, or increased deposition levels are extremely

speculative, with such broad ranges of uncertainty as to render them nearly meaningless for policy decision-making purposes.

NAPAP has been a valuable research effort, and the Congress deserves commendation for its foresight in encouraging study before legislative action. Scientific knowledge of acidic deposition has been dramatically advanced, and allegations of adverse effects have been shown to be exaggerated, speculative, or wrong. The facts show there is no acid rain crisis, or as one senator said as the hearing was drawing to a close, "the sky is not falling." Those findings alone justify the past investment of half a billion taxpayer dollars and the ten-year wait for scientific research results.

Acidification of some aquatic bodies, an acknowledged fact, can be mitigated quickly, inexpensively, and effectively by the proven procedure of liming. Consequently, Congress should heed the lessons of NAPAP and adopt a cost-effective program of lake and stream liming. Conversely, attempting to alleviate acidification through massive emission reductions, an expensive control system that may or may not work over a period of several decades, is an experiment the nation can ill-afford.

SOUTHERN OBJECTIONS TO ACID RAIN LEGISLATION

I. General Objections

The South shares in the general objections that have been voiced nationally in opposition to enactment of additional acid rain legislation at this time. These objections may be grouped into four basic categories:

1. Additional acid rain legislation should not be considered until NAPAP releases its Final Report. In 1980, Congress established the National Acid Precipitation Assessment Program ("NAPAP") to conduct a comprehensive 10-year research program to determine whether additional emission controls are necessary to address acid rain. NAPAP's Final Report is due in 1990. It is clear that were Congress to act now -- literally months before the Final Report is released -- it would be wasting the millions of dollars and years of research that have gone into NAPAP. And why? No new information or scientific conclusions have suddenly emerged to dictate such a radical change in Congress' 1980 game plan, and no abrupt deterioration of our environment has occurred in this "eleventh hour." Clearly, common sense should tell us that now is not the time to enact additional acid rain legislation.

2. Additional acid rain legislation is not supported by current scientific knowledge. The Interim Assessment of NAPAP concluded that, 1) contrary to once popular belief, there is no impending acid rain crisis, and 2) the current Clean Air Act is successfully controlling acid rain-causing emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x). Indeed, the Interim Assessment concludes that there are very few instances of damage to the environment from acid rain and that at present emission rates (and of course these rates will be reduced in the future by the current Clean Air Act) acid rain will have little or no effect on our environment. Proponents of additional acid rain legislation, therefore, must look to some other justification as the basis for their proposals, for current scientific knowledge lends them no support.

3. The cost of implementing additional acid rain legislation is economically unjustifiable at this time. The current acid rain proposals will yield only a short-term acceleration of the SO_2 emission decreases already mandated by the current Clean Air Act. Each of these proposals, however, entails several billions of dollars in yearly compliance costs. Even more, they will have staggering, negative impacts on utility rates, the Consumer Price Index (CPI), inflation, the budget deficit, employment, and U.S. industrial competitiveness -- impacts that have not even been quantified -- and will cause a diversion of funds from clean coal technology research and development. There can be no doubt that the known compliance costs and unquantified macroeconomic impacts of additional acid rain legislation bear no reasonable relationship whatsoever to the meager benefits of a mere acceleration of the rate of emission decreases and that the current proposals are

economically unwise, especially at a time when our economy is once again teetering on the verge of recession.

4. Science cannot yet provide a clear risk/benefit analysis on which to support additional acid rain legislation. In recent testimony before the Senate Environmental Protection Subcommittee, the Administrator of the EPA could not quantify what the benefits of H.R. 3030 would be nor could he predict when they might arrive. Still more recently, a U.S. Justice Department brief filed in the United States Court of Appeals for the District of Columbia stated as follows: "... important scientific questions remain unresolved concerning acid deposition effects on forests, lakes, crops and building materials. Indeed, science cannot now accurately predict the effects that would result from source-specific emissions reductions of sulfur dioxide and nitrogen oxides on affected areas." These instances indicate exactly how unsettled science is at this time concerning the risks, if any, of proceeding under the current Clean Air Act versus the benefits of enacting additional, costly emission control measures. In light of the absence of any clear risk/benefit analysis, Congress should not be looking to purchase such a colossally expensive insurance policy or, at a minimum, should adopt an approach of flexibility and reasonableness rather than the current one of "command and control."

II. Regional Objections

Aside from the host of reasons demonstrating that additional acid rain legislation is not in our national interest, the current proposals are of particular concern to the South for several reasons:

1. The South is not, and is not likely to be, subject to the serious environmental problems to which these proposals are addressed:

- * NAPAP's Interim Assessment establishes that the South is not experiencing significant environmental problems due to acid precipitation, much less an environmental crisis.

- * NAPAP reports that the acidity of Southern rainfall is less than that of other areas of the country.

- * NAPAP concludes that no significant deterioration of Southern forests, lakes, or crops is likely to occur at present emission levels--levels that will, of course, continue to decrease under the Clean Air Act.

- * NAPAP reports that the acidification of surface waters is significantly more limited than first reported and that almost all of the affected lakes are in the Northeast. This problem has been found to be strongly

influenced by lake bed geology rather than rainfall acidity.

* Several other regional scientific studies confirm NAPAP's findings concerning the South.

2. Implementation of additional emission controls in the Southern states will not affect the acid precipitation situation in the Northeast:

* EPA has concluded that sources of sulfur dioxide and nitrogen oxide emissions can have little, if any, effect on acidic deposition in areas greater than 600 miles away.

* Other scientific studies have placed the range of significant dispersion at even less than 600 miles.

* Most Southern states do not meaningfully contribute to acid precipitation levels in other areas of the country, including sensitive areas of concern such as the Adirondack Mountains of New York.

* Problem areas inventoried by NAPAP seem to be concentrated close to large urban centers in the North, reinforcing the concept that significant emission contributions are from local sources rather than from long-range transport from the South.

3. Current acid rain proposals unfairly burden the South.

* The individual livelihood of Southerners would be unfairly threatened by acid rain legislation, while other regions with already-higher standards of living will enjoy lower compliance requirements and costs. Keep in mind these per capita income figures when considering acid rain legislation:

Mississippi - \$9,187;
Alabama - \$10,673;
Pennsylvania - \$14,437;
Texas - \$13,483;
New York - \$16,050;
Massachusetts - \$16,380.

* The idea of an emissions cap would have a devastatingly chilling effect on economic growth in the South, possibly reversing the positive business climate we have worked so hard to create. The emissions cap would pressure utilities to use yet undeveloped "pristine" technologies, eliminating fossil-fired generation as an expansion option, expansion necessary to serve the region's growing demand. While "pristine" technologies such as wind and solar power seem prudent

in concept, advanced generation alternatives prove to be unattractive when one considers their high installed cost and their technical risk due to lack of development. When Southern utilities chose the coal option in the past, they did not choose to pollute as some have stated; rather, they chose to provide reliable, affordable electricity. That is why electric rates in the South today consistently rank in the lower half of nationwide utility prices. Moreover, Southern coal units are not major acid rain contributors to the areas of concern.

* HR. 3030 requires Southern states to make larger emission reductions, at higher costs, than a number of other more pollution-prone states. For example, according to a recent Edison Electric Institute study by Temple, Barker and Sloane, five of the fifteen states having 84% of the costs are in the South, three of the Southern states are in the ten states responsible for 90% of the reductions. Yet, if emissions were to be measured for efficiency in terms of SO₂ emitted per customer or SO₂ emitted per kilowatt-hour of delivered electricity, Southern states move way down the list of emission contributors, far enough down to be out of the top 1/4 contributors.

* Proposed amendments that require SO₂ scrubbers violate the President's directive of June 12² that directs this legislation be driven by market forces and economic choices. A mandatory scrubbing is meant to preserve high sulfur coal miners jobs when in fact, freedom of choice decisions almost always include some application of scrubbing as the favored alternative at certain plants. Low sulfur coal is not as plentiful nor as proximate for it to be the single answer to compliance.

* The trading or selling of emission allowances optimistically predicted by the EPA is an empty hope since most compliance over-performers will choose to keep their own allowances rather than sell them. For regions expecting to grow and thus needing new generation, this is simply self-preservation through allowance self-banking to accommodate their own projected emission growth. Most Public Service Commissions nationwide support this attitude since they are charged with insuring the economic well-being of their state or region. EPA has even implied that the EPA should own and disburse excess credits to ensure trading traffic. Since these credits would be made possible through increases in individual ratepayers' billings, such a solution is inequitable and would penalize those who over control to free up allowances for trading.

SUMMARY

The imposition of additional, nationwide emission controls at this time, especially in light of NAPAP's Interim Assessment and its upcoming Final Report in 1990, is environmentally unnecessary. The recent testimony of EPA's Administrator and the Justice Department's legal arguments only confirm this conclusion. But the current proposals are something much worse than scientifically unjustified, they are economically irresponsible, particularly when our global economic position is deteriorating. Additional emission controls will result in a host of potentially debilitating drains on the South's booming economy, negatives that will not be limited to electric rates. As utility rates rise, so will the price of goods and services of industries and businesses that rely on electricity; industries as divergent as metal shops and grocery stores. As these prices rise, the American consumers' standard of living will absorb the double blow of increased electric bills and increased costs of goods and services. In an effort to reduce expenses there is also a significant probability that thousands of jobs will be lost. Also, the South's momentum in areas of international competitiveness, such as textiles, will begin to falter under the weight of increased costs and decreased productivity. Clearly, these are costs the South cannot afford.

Requiring the South to incur these costs in the name of benefits that the EPA Administrator cannot quantify nor forecast will not significantly benefit our country, or any part of it, and the South should not be asked to make such a disproportionate, meaningless sacrifice.

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