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OF AIR POLLUTION STANDARDS

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HEARING
BEFORE THE
SUBCOMMITTEE ON
AIR AND WATER POLLUTION
OF THE
COMMITTEE ON PUBLIC WORKS
UNITED STATES SENATE
NINETY-THIRD CONGRESS
FIRST SESSION

SEPTEMBER 18, 1973

SERIAL NO. 93-H19

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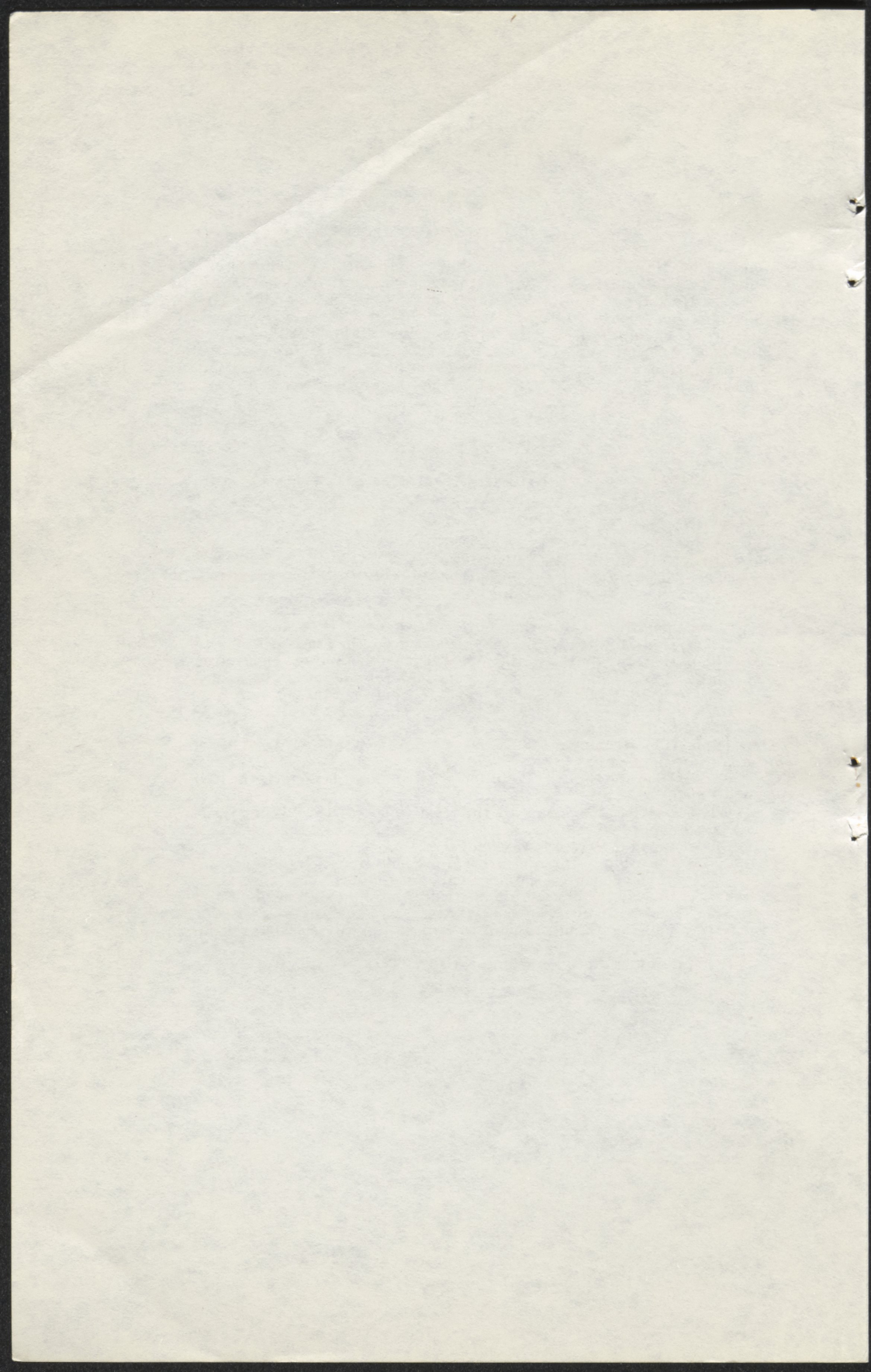
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THE ADMINISTRATION'S PROPOSAL FOR RELAXATION OF AIR POLLUTION STANDARDS

TUESDAY, SEPTEMBER 18, 1973

UNITED STATES SENATE,
COMMITTEE ON PUBLIC WORKS,
SUBCOMMITTEE ON AIR AND WATER POLLUTION,
Washington, D.C.

The subcommittee met at 11 a.m., pursuant to call, in room 4200, Dirksen Senate Office Building, Hon. Edmund S. Muskie (chairman of the subcommittee) presiding.

Present: Senators Randolph (chairman of the full committee), Muskie, Biden, Baker, Buckley, Stafford, McClure, and Domenici.

OPENING STATEMENT OF HON. JENNINGS RANDOLPH, U.S. SENATOR FROM THE STATE OF WEST VIRGINIA

Senator RANDOLPH (presiding). Good morning, ladies and gentlemen. The able chairman of our Subcommittee on Air and Water Pollution, Senator Muskie of Maine, is understandably detained because of certain votes that apparently are being taken at this time in the Foreign Relations Committee on reporting the nomination of Mr. Kissinger to the Senate.

We will begin and hope—and I have been assured—that he will be with us in perhaps 10 or 15 minutes.

We have the privilege today of sharing our counsel—on both sides of the table, not in any sense as a confrontation, but certainly as a statement of viewpoints—with you, the Director of the Energy Policy Office, John Love, of Colorado.

I am going to make just brief remarks at the outset of this meeting. I think that constantly people talk about the problems of the environment and about the problems of energy. They seem to think that they cannot come together in commonalty in an understanding way, that there must be a continued polarization of these two concerns.

The Congress, of course, faces these issues, but I hope not in just that way. I think there is a realistic need within our country for the structuring and implementation of environmental policies.

Some of the prevailing policies may be—I say may be—unduly restrictive. They are, however, the law and must be taken seriously and must be observed, and they must be enforced until they are either rescinded or amended.

We have not done well in finding a suitable or perhaps an equitable balance between energy and the environment. I believe there is blame on many sides.

The cause and the long term success of Federal environmental policies, I think, is threatened. Then, equally, our vital energy base, perhaps our whole economy and maybe our security—our national security—these may be endangered in degree.

Then we ask ourselves the question, why does this exist? I think because the respective spokesmen for environmental and economic interests have made insufficient efforts to reason together.

I suggest to you, Governor Love, they have perhaps been acting in the role too often—as let's use the term "pressure groups"—to make the Congress and the interests that they effect something that is unreal.

The Congress is not an arbitration board, as such. In the necessary spirit of a compromise there must be developed a consensus on immediate and long term environmental objectives that mesh, not clash, with the policies that may be established for energy.

The hearing today will serve a good purpose. It concerns itself with the specific interrelationship between available environmentally acceptable energy supplies and air pollution controls that stem from the Clean Air Act.

In the 1970 amendments to that act we thought that we were taking, and I believe today we were, an important step toward a national policy for simultaneous achievement of both environmental objectives and recognition of energy needs.

I recall on April 4, of this year, in an address on this subject in the Government Affairs Seminar of the Air Pollution Control Association, I stated that I believe both national policies can be achieved.

I believe that both the national policies for well-reasoned energy programs, and the policies for well-reasoned environmental programs can be achieved.

I will ask that a copy of the April 4 speech be included in the record.
[The speech referred to follows:]

ADDRESS BY SENATOR JENNINGS RANDOLPH, CHAIRMAN, COMMITTEE ON PUBLIC WORKS, UNITED STATES SENATE BEFORE THE FIRST A.P.C.A. GOVERNMENT AFFAIRS SEMINAR

WEDNESDAY, APRIL 4, 1973

It is gratifying to be invited to address the First Government Affairs Seminar of the Air Pollution Control Association.

On many occasions over the last ten-years an event such as this could have helped to stimulate dialogue and understanding among government and industry and the environmentalist, alike. I say "ten-years" because it has been that long since the Senate Public Works established its Subcommittee on Air and Water Pollution. Together, we have journeyed over a long and arduous course. We still have a difficult journey ahead.

This Seminar has been concentrating, appropriately, on the policy issues arising out of the implementation of the 1970 Federal Clean Air Amendments and the resultant State implementation plans. And, this is a timely discussion, as are the public policy debates as to whether or not the auto industry can achieve the 1975 auto emission standards prescribed by the Congress. During the next two years, the Congress and the American people must evaluate the status of our national quests for clean air and the adequacy of the commitment by government, industry, and the public, toward achievement of our country's environmental goals.

I am reminded of the word of President Nixon in his February 1970 Environmental Message to the Congress:

The task of cleaning up our environment calls for a total mobilization by all of us. It involves government at every level; it requires the help of every citizen. It cannot be a matter of sitting back and blaming someone else.

This statement was made by the President in response to a new awareness in America that environmental degradation threatens the public health and the quality of our lives. Later, that same year, the Environmental Protection Agency was established by law to insure our country's quest for environmental quality.

Today, however, these goals are jeopardized. There has been too much talk and too little action by government and industry, alike. Government actions, short on perspective, have actually threatened the long-term success of Federal environmental policies. I speak principally of energy supply problems arising out of implementation of the Clean Air Act Amendments of 1970 by EPA and the states of the Union. The choice, ultimately, may be clean air or energy.

But many current difficulties also are of industry origin. Unfortunately, and all too often, industry has not cooperated sufficiently with Federal environmental policies, hoping for eventual variances or even repeal. And, unfortunately, all parties, and particularly, the Federal Environmental Protection Agency, have not undertaken the statutorily mandated programs necessary for the timely development of air pollution control technologies.

REALISM IS NEEDED

Without question, there is a need for realism in our country's implementation of environmental policies. Doubtless, there are those among you who believe that the prevailing policies enunciated in statute and regulations are unduly restrictive. But, they are the law of the land and are to be taken seriously. We surely can see our recent failures to make reasonable attempts to implement soundly the Federal and State environmental policies. We have not done well in finding a suitable, or equitable, balance between energy and the environment, and I emphasize, "energy AND environment." Rather, it seems that we have adopted a national posture of environment versus energy, to the very substantial disadvantage of domestic energy supplies. The consequence has been an exacerbation of an already difficult energy supply problem.

The answers are to be found, in some degree in the administration of the oil import program. But, the answers, in large part, are to be found in the form of the Environmental Protection Agency's Clean Air guidelines and regulations, and the resultant State emission standards and their time schedules. For there is ample evidence that EPA did not consider, at the time of their approval, the aggregate effect on domestic energy supplies of State implementation plans.

As a result, present State regulations will render 155 million tons of current coal production unusable, putting 26,000 miners out of jobs. This amounts to roughly one-third of the non-coking coal used in the United States.

And, ample alternative and acceptable energy supplies are NOT available. By 1975, an additional 125 million tons of coal, or its equivalent in other fuels, will be needed to satisfy rising energy demands.

From newspaper reports, I was encouraged to believe that the President's February 1973 Environmental Message would recognize in some degree—hopefully, a substantial degree—the cumulative impact caused by implementation of several Federal environmental policies, including those of the National Environmental Policy Act and other statutes. For these policies have carried numerous of our country's energy problems to the rim overlooking the valley of chaos.

What appears to have happened is that the cumulative effect of laws, regulations thereunder, the enforcement thereof, and actions by the courts moved us beyond the ability of known technology to keep pace. I was discouraged, when the President's Environmental Message provided little recognition of this reality.

I have long endorsed the statutory policy that protection of public health should not be subordinated to economic feasibility. This was the underlying premise of the Air Quality Act of 1967. And, I would not want in any way to jeopardize the long-term success of overall Federal environmental policies. But it is obvious to me that short-term environmental concerns have dominated EPA's implementation of the Clean Air Amendments of 1970 so dramatically that our country's energy requirements cannot be met until unrealistic environmental constraints, predicated upon protection of public welfare, are slowed down to "reasonable" time schedules. Only that for which there is technology available can be accomplished.

MUST RETURN TO STATUTORY POLICIES

After long deliberation in 1967, and again in 1970, the Congress enacted a Federal air pollution control policy that distinguishes between concerns for

public health *and* concerns for welfare. Twice the Congress rejected the concept of national emission standards. Yet, as so frequently has occurred in recent years, the Administration ignored flexibility contained in the 1970 Clean Air Amendments and encouraged the States to adopt, in effect, national emission standards which bear no relationship to ambient air quality standards.

Nevertheless, don't look to the Congress for "wholesale" variance from existing regulations. Judicial remedies were provided, in 1970, for this purpose. A realistic distinction is needed between potential and actual problem areas. Then let's talk. For the issue is not repeal, but whether there has been a "good-faith" attempt to incorporate environmental and social concerns into management decisions by government and industry, alike.

For example, it is unrealistic to look for an environmental scapegoat for our emerging energy crisis. What has occurred is that hastily adopted environmental policies have expanded the problem and made it even more complex.

TECHNOLOGY OFFERS THE KEY

For many years, I have been in the vanguard of the too few Members of the Congress, urging more emphasis on the development of technologies to make the use of coal environmentally acceptable. This can be accomplished through better control of sulphur oxides and more rapid development of coal gasification and coal liquefaction and advanced power cycles for the generation of electricity.

When both the 1967, and 1970 Clean Air Act Amendments were under consideration in the Senate Public Works Committee, and in the Senate, I warned that the current situation might develop. I predicted potentially damaging consequences, not only for energy, but, also, for the success of environmental policies. Repeatedly, I offered amendments to increase both authorizations and appropriations for research and development. Most of my amendments were accepted, and are now in the law, but the Executive Branch consistently has done too little toward the financing of research on energy-related environmental control technologies.

Even when increased funds were fought through the Administration's budget councils and the Congress, EPA often declined to obligate them. Admittedly, the Office of Management of Budget, as usual, resisted budget increases; however, in this case, appropriated funds were not even committed to the effort. This was due to the failure of EPA's program managers to focus adequately on this problem and the statutory program to deal with it. The consequence is a badly out-of-balance condition of such proportions that our domestic coal industry—and the people involved in and depending on it—are in a tenuous position.

What is most disturbing, however, is that EPA regulators admit that all aspects of State implementation, in their aggregate, cannot be achieved by 1975, despite the best efforts of government and the private sector. Yet, in February 1973, when Administrator Ruckelshaus announced EPA's fiscal 1974 budget, it showed a decrease in funds for air pollution control programs and research.

The disturbing proposal, however, is termination of EPA's \$5 million program to develop sulfur oxide control technologies to control air pollution emissions—for example, from the combustion of high-sulfur coals. The agency's justification for this is that EPA, to date, has devoted more than \$86 million to development and demonstration of first-generation technology for reducing and controlling air emissions from stationary and mobile sources. EPA now plans to move into a second phase where the private sector is expected to further refine and improve this technology.

EPA's position on these budget cuts reflects a policy that the development of sulfur oxide control technology is the responsibility of the private sector, *not* government; yet, this position does not reflect the Congressionally enunciated policy contained in the Clean Air Act (Section 104). Is EPA under the law or does it consider itself above the law?

This budget cut is even inconsistent with recent recommendations of the Interagency Sulfur Oxide Control Technology Assessment Panel (SOCTAP), which states:

In particular, Federal R & D efforts should be expanded to accelerate the development of improved scrub or solid waste management processes. It also is strongly recommended that the Federal government continue support of ongoing government sponsored program (SIC) to develop SO_x processes.

At this point, I wish to emphasize excerpts from an October 13, 1972, letter from EPA Deputy Administrator Fri to the Office of Management and Budget—four months before the budget was submitted to the Congress:

(The proposed reductions for stationary source air pollution control technology) will . . . eliminate the funding of the sixth (sulfur oxide) flue gas control technology demonstration and prevent EPA funding of the completion of the fifth. *This abandons the Presidential commitment to find six of these demonstrations.* (Emphasis added) Eliminating these demonstrations does increase the risk that we will ultimately not be able to sustain the large scale steam generation SO_x new source standard, but we think this risk is not unacceptable in view of the current legal situation and the progress that has been made in the first four demonstrations, in the private sector since the standard was set, and in foreign countries.

These cuts also affect the nitrogen oxide control technology program, which has direct public health implications. Yet, according to Administrator Fri, the proposed 1974 EPA budget represents—

A risky course as the control technology for NO_x is very primitive. If NO_x does prove to be a major problem our reduction in this program will delay the setting of meaningful source standards and the achievement of the ambient standards.

To me, these statements represent a total lack of commitment by the current Administration to a Congressionally mandated joint government-industry program. This effort was to be geared at implementing Federal environmental policies in a realistic manner through available control technologies. Instead, while the Federal government reverses its position on its commitment to statutory policies, industry is expected, nevertheless, to meet enforcement deadlines.

The irony of this situation is characterized in Administrator Fri's own words:

(EPA is) capable of achieving the most pollution abatement in those areas where we have the best legislative mandate. The Clean Air Act is our best legislative mandate. It also has congressional mandate which would be very embarrassing to do a poor job on.

Yet, while proposing budget cuts for research, EPA proposes to increase the FY 1974 budget by \$5.2 million for enforcement of air standards and State implementation plans, and enforcement in auto certification and regulation. I cannot help but ask, "Where is the realism?"

I was encouraged, however, by the recent action by the Illinois Commerce Commission toward the achievement of workable solutions to environmental-energy problems. At the request of Commonwealth Edison Company, the Commission approved a fuel adjustment clause for the utility which, among other things, allows for the recouping of the costs attributable to cleaning up fuels, through such methods as sulfur oxide devices and pre-combustion techniques. This represents a significant step forward during a period of constant debate over whether the technology is even available.

AUTOMOBILE

We are familiar with reports of the decreased automobile performance associated with the particular air pollution control methods being developed by the auto manufacturers. This is true and the automobile industry has, in part, found a scapegoat for its own failures. That industry seems to lay its problems on environmental law and seems to impute perfection to its own engineering. This is a sanctimonious approach not supported by the National Academy of Science.

There is no secret about the fact that lighter and smaller cars emit less pollution and consume less fuel than their heavier, high-powered counterparts. It is also a matter of record that diesel engines are more efficient than gasoline engines of the same size.

However, the development of automobiles in this country has not followed the pattern of either small size or diesel power. The reason is clear—an unwillingness to abandon the internal combustion engine—perhaps motivated too much by profit considerations, rather than consideration for environmental or energy policies. The profit aspect is not un-American—but it can be overdone.

From 1960 to 1968, before the current air pollution standards came into being—by industry engineering design—the efficiency of operation of automobiles decreased almost 3 percent. This was due to such factors as increased weight, allegedly poor aerodynamic designs, more factory-installed air conditioning, and V-8 engines. So, the trend already existed before auto emission controls—to keep the current situation in perspective.

As I have said on previous occasions, I find it difficult to understand how our major automobile companies—General Motors, Ford, and Chrysler—keep complaining about the impossibility of the 1975 Federal automobile emission standards, while the Mercedes diesel and two small Japanese companies—Honda and Mazda—reportedly already have met the 1975 standards. This was accomplished with long-known, but non-traditional, engine technologies.

In addition, the National Academy of Sciences, in response to a study mandated by the Congress, concluded, in February of this year, that four types of systems are available to meet the 1975 standards. However, the auto manufacturers seem to keep right on disagreeing—with all except themselves.

In 1970, the Congress recognized that the 1975 standards might not be achievable, and a possible one-year extension was provided. And, this extension is now under review by EPA with an announcement expected next week.

Meanwhile, before all appeal mechanisms have been exercised, a major public relations effort has been launched by the auto and oil industries to discredit the Clean Air Amendments of 1970. At issue, however, is not the statute, as this public relations effort suggests, but whether a "good-faith" effort has been made by government and industry to assure the success of Federal Clean Air policies.

What must be questioned are the corporate policies that insist on using the traditional internal combustion engine. These policies according to the NAS, have lead to the installation of the less effective—but more expensive—exhaust control systems. The obvious question is, "Has there really been adequate investigation on the other alternatives?" Our country's quest for environmental quality is a joint, societal venture, which must not be allowed to be exploited for short-term economic gains.

However, the government's efforts to develop and demonstrate alternatives to the internal combustion engine, mandated by the Clean Air Act, must also be questioned. In its report of May, 1972, the GAO stated, with respect to EPA's advanced automotive power systems program (AAPS), that—

The commitment of resources, both money and manpower, to the search for a clean engine was not commensurate with the need, nor did it reflect the urgency of the need to resolve the air pollution problem.

In response to this GAO criticism EPA (or, perhaps OMB) has cut its budget still further! In the words of EPA Deputy Administrator Fri:

This increases the risk we will not be able to demonstrate an advanced power system capable of meeting the 1976 standards. We view the demonstration of such a system as essential as a hedge against the possibility that the auto industry will be unable to clean up the conventional internal combustion engine enough to meet the 1975-76 standards. *We see plenty of evidence that this oligopolistic industry will not conduct enough of its own research into unconventional power systems without EPA stimulus.* (Emphasis added.)

EPILOGUES

As I have emphasized on frequent occasions, a prime difficulty appears to be too many advocates of vested interests, whether environmental or economic. Too little effort is being made to sit down to discuss and develop, in a spirit of compromise, a consensus on what are the immediate environmental objectives and what are our country's long-term societal policies, of which environmental concerns are only one element.

It is generally recognized that our long-term environmental policies are but a small part of the much broader issue of providing an adequate lifestyle for the American people, with all the attendant ramifications.

The challenge is there—the question is one of acceptance and a solid commitment to meet our national environmental policies while, at the same time, meeting other societal responsibilities. Both can be achieved if the approachment to solutions is reasonable and not fanatical. You, and the interests you represent, both environmental and economic, must counsel with the Congress *as well as* the Executive Branch, for both bodies are coordinate branches of the United States government.

As provided in our Constitution, the Congress is responsible—and accountable—for the formulation of our country's priorities and programs. The Executive Branch, in turn, must implement and administer statutory policies or recommend their modification.

Senator RANDOLPH. The President, in his April 18 message to the Congress on energy resources, proposed, and I quote: "To carry out the provisions of the Clean Air Act in a judicious manner"—that is the word he used—"carefully meeting the primary health related standards but not moving in a precipitous way toward meeting the secondary standards."

In order to accomplish this objective, the President proposed, and I quote: "Delay of the secondary air quality standards that is non-health related by the States beyond 1975 in order to allow fuller utilization of our coal resources until the new technologies have been demonstrated."

I have never been sure, Governor Love, how this extension of deadline by the States is to be accomplished. The 1970 Clean Air Amendments did not provide Federal authority applicable to implementation of these extensions which have been suggested.

On May 1, 1972, during hearings in the Senate's national fuels and energy policy study, I recall I asked Secretary Rogers C. B. Morton on how the administration intended to accomplish this extension of deadline by the States.

In response, Secretary Morton said: "The only way, of course, that we could do it under the present authority is to work with the States themselves through cooperative negotiations with the States. If this fails, we will have to come back to the Congress and obviously seek amending legislation of the Clean Air Act to provide ways and means of doing it."

What is unclear to me, and perhaps to some members of our subcommittee, is whether this extension by the States is being undertaken with Federal guidance or by Federal coercion that may be involved.

Clearly, I say to you it should not be done indirectly under the guise of an energy shortage. We must be very careful to see that that is not done.

We are now being called on to exercise stewardship over both our natural energy and environmental resources in unprecedented ways. I am reminded of the words of the philosopher George Santayana, who once wrote that, "Those who do not understand history are doomed to repeat it." As a country, we have learned to our sorrow that there is wisdom in that viewpoint, particularly with respect to some of the irrevocable degradation that has been inflicted on our environment.

So, as a nation, yes, as a people, we have a choice between repeated past mistakes predicated on policies that favor just one, either energy or the environment.

The Congress, in executing its constitutional duties, must formulate a true national environmental and energy policy. In turn, the executive branch must assume its constitutional function to implement and administer statutory policies or recommend their modification.

I think the challenge is implicit. The question is the acceptance and commitment of both the Congress and the executive branch to meet our energy requirements consistent with—and I repeat—with environmental policies.

Since Senator Muskie was unavoidably detained, his opening remarks will be inserted at this point in the record.

OPENING STATEMENT OF HON. EDMUND S. MUSKIE, U.S. SENATOR
FROM THE STATE OF MAINE

Today's hearing was called as a result of President Nixon's announcement to seek relaxation of clean air rules to avert a winter energy shortage. On September 8 the President directed energy policy adviser Governor John Love to seek State action to relax emission standards for sulfur oxides.

Reportedly, relaxation of sulfur oxide emission standards would help avert a home heating-electricity crisis. I am advised that these emission standards have, in almost every case, been adopted as Federal standards. Thus, any revision or relaxation of those standards would require the approval of the Administrator of the Environmental Protection Agency.

It is generally asserted that there will be a fuel shortage this winter in many parts of the Nation, but there are few statistics to support these assertions.

Little, if any, information has been made available which indicates what or where the supply and demand will be. Less information is available on what impact a relaxation of emission standards would have on the overall availability of fuel. And no information is available on how low sulfur fuels, purportedly in limited supply, would be distributed to areas where air quality problems are most severe.

My impression is that the President proposes to use a meat ax to solve a problem which requires a scalpel. If temporary relief from emission requirements will assure availability of home heating fuels and electricity supply then relief should be granted, but only as a result of careful examination of the specific results to be achieved.

But what other policies has his administration considered to stretch limited supplies? Have fuel conservation alternatives been evaluated? Why haven't mandatory allocations of limited resources been proposed?

I cannot believe that a policy of wholesale exception to clean air requirements will relieve the crisis of supply. Even if specific clean air exceptions can be justified, I doubt that this is the best or the only option. We need a fuels policy which recognizes both the cause of the shortage as well as the cause of the increase in demand.

We need an enforceable fuels distribution mechanism which assures maximum environmental protection and minimum economic dislocation. The recent proposal by the administration does not approach this objective. The crisis continues. This winter appears to be a beginning rather than the end. I look forward to Governor Love's discussion of these issues.

Senator RANDOLPH. Governor Love, before asking you to give your statement, and hoping that Senator Muskie will come very soon, I turn to Senator Buckley, from New York, for any comment that he would wish to make at the outset of the hearing.

Senator Buckley?

OPENING STATEMENT OF HON. JAMES L. BUCKLEY, U.S. SENATOR
FROM THE STATE OF NEW YORK

Senator BUCKLEY. Thank you, Mr. Chairman.

Governor Love, I also would like to welcome you to these hearings and to associate myself with the remarks of the chairman. Undoubtedly, you have got one of the most important and undeniably difficult jobs in the Government today.

The purpose of the hearing is to seek clarification as to what was really intended in the President's recent statements urging the Governors in the Northeast and the Middle West to seek a relaxation of air quality standards for sulfur oxides in order to meet predicted fuel shortages this winter.

Rightly or wrongly, the President's statement has given rise to fears that the administration intends an across-the-board rollback of environmental safeguards. I note that an item in today's New York Times seems to sustain that fear.

This article is headlined "U.S. analysis links big oil import gains to eased air rules." I will read only the first two paragraphs.

The Nixon Administration, putting new pressure on States and cities to relax clean air standards for the winter heating season, said today that such action could increase imports of heating oil by up to 400,000 barrels a day.

That figure compares with what the Interior Department described as a basic prospective shortage of 105,000 barrels a day.

In other words, this item suggests that we could be relaxing standards by approximately four times that needed to meet predicted shortages.

If, indeed, it is the intention of the administration to relax standards across-the-board or if this impression gets out, I think it could be enormously counterproductive. In the first instance, it will alarm those who care about the environment and understand its importance, and result in actions that would unnecessarily impede the flexibility which the EPA demonstrated last winter when adjustments in local crises were handled on the basis of all of the available facts.

This was done rather invisibly and effectively.

Another counterproductive result of a misunderstanding of the administration's intentions could be to cause a relaxation on the part of the municipalities and industry in finding new techniques for coping with sulfur content in fuels.

We recognize the seriousness of the situation that faces us, all of us on this committee. We recognize that we must always be open-minded and see how to find a reconciliation between the opposing objectives and the competing needs.

But we need the facts. This is what I hope you will be in a position to give us today. We need, for example, to know the data on which the coming shortages were estimated, where they are located. We need the data on which you have been able to estimate the amount of fuel that would be saved as a result of adjustments recommended.

We need to know the environmental costs of these relaxations and we need to know what other options might be available to you.

As I say, we are totally sympathetic to the problem and we know the need for speedy action and I, for one, am looking forward to the information you can give us because we need to have your perspective while jealously guarding the achievements that have resulted from the air quality legislation we have enacted.

I might just say in passing—this is, of course, dating back before your tenure—that had the administration in effect followed a NEPA procedure beginning a year ago when we first understood we were facing this kind of crisis, we might already have in our possession documentation of the tradeoffs, of the costs and options that we must now consider.

Thank you.

Senator RANDOLPH. Thank you very much, Senator Buckley.

Senator BIDEN?

Senator BIDEN. I have no statement.

Senator RANDOLPH. Senator Domenici?

OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator DOMENICI. I just want to indicate to the Governor that I share the concerns expressed by Senator Buckley. I would summarize them this way.

I think there is a lot of rhetoric being bantied around about altering and adjusting the Clean Air Act. I hope you don't intend, nor does the administration intend, to leave the impression that if we relax that, the fuel crisis and energy shortage in this country will all of a sudden disappear.

I don't think that is what you mean, but I think some people are saying that is what you mean and that might be what the President means in calling for relaxation. I think we have to be fair about the situation.

It isn't the Clean Air Act that causes the shortage. It might be that we need to make some adjustments in order to alleviate what is a critical situation for this country and will continue to be critical.

I would be interested in your observations and the facts with reference to that. Also the nondegradation policy of this country with reference to the Clean Air Act. I think, is of enormous significance to development of vast resources and what your views on it are and the views of other experts would be of extreme importance to me.

Another area that I think is critical today is whether or not the private sector is going to be able to invest huge amounts of money or even borrow it for gasification experimentations. For instance, I know that a minor experiment in gasification is going to cost one-half a billion dollars. We want the private sector to do this.

What are they going to be faced with by way of rules, regulations and the like? Is this going to prohibit the private sector from being adequately involved in moving ahead in this area? This is of great concern, perhaps not short term, but most certainly long term.

I want to compliment you on the job you have done to this point. Thank you for coming here today. We will certainly have plenty of questions.

Thank you, Mr. Chairman.

Senator RANDOLPH. Senator Stafford?

**OPENING STATEMENT OF HON. ROBERT T. STAFFORD, U.S. SENATOR
FROM THE STATE OF VERMONT**

Senator STAFFORD. Thank you, Mr. Chairman.

Governor Love, I am sure you are aware of the concern in the Northeastern States about the No. 2 home heating oil which is the principal source of heat for the houses of our entire region.

So that is a matter of principal interest to me and the people that I represent here. I won't take further time from your time. I would like to hear what your comments will be on that and the other problems.

Senator RANDOLPH. Thank you, Senator.

Senator McClure?

**OPENING STATEMENT OF HON. JAMES A. McCLURE, U.S. SENATOR
FROM THE STATE OF IDAHO**

Senator McCLURE. Thank you, Mr. Chairman. I will be very brief because I am sure we came here to hear the Governor and not to hear all of us expound our views. But I am absolutely convinced that the facts indicate the necessity for the action you have already announced and that you are here to testify about.

I am certain there will be a number of searching questions asked on all sides of this issue before we are through, but again, I think we must stress the necessity of the action that was taken, the urgency of the situation, and the fact that any relaxation of air quality standards are temporary in nature and that they are directed toward the relaxation of secondary standards and not primary standards.

I think these distinctions must be brought out in the testimony and questioning today.

Senator RANDOLPH. Senator Baker?

**OPENING STATEMENT OF HON. HOWARD H. BAKER, JR., U.S.
SENATOR FROM THE STATE OF TENNESSEE**

Senator BAKER. Mr. Chairman, thank you very much.

This is a meeting of the subcommittee and I am grateful for the opportunity to sit in with it, on the occasion of the Governor's first appearance before us on the subject of clean air and energy.

There has been a lot of talk lately, and I am delighted for it, about a spirit of cooperation between the White House and the Congress. I think this is a prime example of an opportunity for a candid, frank, and honest conversation on the exigencies of the fuel economy and its impact on the clean air requirements of this Nation.

I think you are uniquely suited to this task. I have a high admiration for you and your political career, your ability and perception. So I would like to say that I am glad you are here.

I have great confidence in your ability to state the issues, to hear and understand the countervailing issues as they develop, and to take account of the respective viewpoints of the executive department and the legislative department in this respect.

I see this as more than just a hearing on clean air standards. I see it as an exercise in cooperation between the two branches of the Government.

I won't prolong these preliminary remarks by elaborating and embellishing upon the very excellent statements by my colleagues, especially those of the chairman and the ranking minority representative on the subcommittee, Senator Buckley.

I would have, however, a simple caution that I am sure is implicit in the statements of each member. I am sure it is uppermost and paramount in your mind, Governor, and that is: "Let's not throw out the baby with the bath water," let's find out what we have to do in order to stay warm and to stay clean. Let's find out what we can do without reversing the tide of progress in the environmental field. Let's talk about the whole range of options. Let's synthesize the very best program we can in concert, constructively and cooperatively.

I rather believe that is why you are here. I commend you and thank you for appearing before the committee at this very busy time in your early tenure.

So I conclude by saying that I will hear your statement with great anticipation. To the extent that I can, I intend to participate fully in these deliberations and others. I hope that we can accommodate the requirements of the country through solutions which are in fact the synthesis of—must be a synthesis of—your ideas and ours.

I think it is a good point in time to carefully examine the clean air standards, but I would like to warn ahead of time that, as we proceed into this business, I intend to touch briefly on the general energy policy of the country, not only as it deals directly with the ambient air standards, but on such other things as the fuels policy of the United States, the continuation of oil exploration for fossil fuels, strip mining, and a number of other things.

Those aren't really in the jurisdiction of this committee. But after almost 7 years in the Senate, I have grown to have increasing regard for the need to consider such issues broadly and I thought I might tell you that I wanted to discuss those things briefly.

OPENING STATEMENT OF HON. JOSEPH R. BIDEN, JR., U.S. SENATOR FROM THE STATE OF DELAWARE

Senator BIDEN. Mr. Chairman, although I don't have a prepared statement, I would like to ask a general question which I was reminded of when Senator Domenici said that he hopes you will clear up the misimpression some may have that the Clean Air Act is in fact the cause of our environmental problems.

Some of us and some of the people I have spoken to—when I say some of us, I don't think anyone else in this committee probably shares this concern—but I would like you to clear it up from another side.

Some of us think that maybe the Clean Air Act is the cause of the energy shortage, not for the reasons stated, but were it not for the Clean Air Act, the companies would not have come up with an announcement all of a sudden with the serious energy crisis we are faced with, that sort of fell upon us at least in the press 8 months ago, and some have raised the question that maybe it was the Clean Air Act that brought on the energy shortage and it is in order to eliminate the Clean Air Act and similar acts or at least to do violence to the progress that has been made in the air, in the environmental field.

I am not saying I am sure of that. I must add I have an open mind to that possibility. I would like you to address the reverse side of that question, if you could. Thank you very much.

Senator RANDOLPH. Thank you, Senator Biden.

Senator Baker, I think you strike a sound note when you indicate that there are broader matters that naturally fall even within, I guess, the scope of this committee.

You have indicated that perhaps you are outside of our jurisdiction if we go into those matters, but I would remind my colleagues that we are now operating in the Senate, in the Interior Committee, the Commerce Committee, the Joint Committee on Atomic Energy, and the Public Works Committee, a study of a national fuels and energy policy embracing all these matters.

This has been going forward now for a period of over 2 years, under a resolution that I originally sponsored.

We have already prepared and sent to the Senate two substantial pieces of legislation which have passed our body. There are others. We are hoping that the research and development program with large sums of money over a 10-year period will be reported today.

There has been this active participation and very properly so in these matters. I would not attempt to draw any polarization again, but I will remind you, Governor Love, how much better it would have been had we worked these matters through, at least started on them, years ago. I remember when I presented the resolution years ago to have the legislative and the executive branches join together in the development of a national energy policy.

I have the documentation that the executive branch said, "No, we are not interested." You see, these are the yesterdays, but I think sometimes we must recognize them, that there has been a lack of cooperation—that word has been used by many of our members here—between not, let's say one administration, but the administration and the Congress.

Now Senator Biden says it breaks on us rather suddenly. But it has been there for a long, long time. Make no mistake about it.

Director Love, if you would give us your statement at this time.

STATEMENT OF JOHN LOVE, DIRECTOR, ENERGY POLICY OFFICE

Mr. LOVE. Thank you, Mr. Chairman and distinguished members of the committee for the statements and questions presented certainly have mapped out—

Senator RANDOLPH. Governor, I have asked exactly how many of our members here are a member of that study group from this committee. Senator Baker, Senator Buckley, Senator McClure, Senator Domenici and your chairman are all actively members of that ad hoc structure that is moving forward and really accomplishing something. I am certain of that.

Senator BAKER. I am on it as a member of the Joint Committee on Atomic Energy.

Mr. LOVE. Mr. Chairman and members, as the questions and statements you have made indicated and certainly have a broad range and probably serve a broad range of interests, before I get into my statement, which is fairly specifically designed to respond to the heating

oil situation this winter and the proposal in regard to sulfur standards, I would like to just at least comment and respond briefly to some of the statements that have been made.

I certainly agree with you, Mr. Chairman, that this cannot be allowed to be simply a confrontation. I have said many times, although it is not too helpful in providing policy, that there would be no solution if we have all of the energy in the world and air we couldn't breathe.

On the other hand, certainly with the most pure and clean air with no energy, it is not a solution either. We must find a way in which these two imperatives can be met.

I further would like to state that I personally also understand that to assign the energy problem or crisis simply to the environmental movement is erroneous in my opinion. Undoubtedly any of us can point to some places in which it has had some effect, but to simply assign it as full responsibility to the environmental movement is incorrect and erroneous.

Similarly, Senator, in my opinion, I would say that although I hold no particular brief for the oil companies and have no particular knowledge or evidence one way or the other, I am firmly convinced that the energy problem is much deeper than anything that could be assigned simply to a plot on the part of the oil companies.

I remember some years ago as Governor of Colorado in attempting to promote the development of oil shale in Colorado the graphs that we used at that time would indicate the growing demand for energy in the United States and the line that indicated the supply, domestic supply growing at a lower rate and talking in terms about what would indeed go to make up that growing gap.

Insofar as you can assign a blame for the energy problem, I believe it is simply related to a remarkably increasing and burgeoning demand, not only in the United States, but worldwide.

We have been increasing our demand at an increasing rate recently. I have used the statement in mortal words of polo; we have met the enemy and he is us. It is our use, demand for energy which is closely related to our economy, our development and our society and so on as much as anything else.

There is plenty of room for blame. I believe that we in Government can take our fair share, certainly the companies perhaps have not foreseen and so on. But I do think that to assign it to any simple reason will be a disservice to the people of the United States, because I think before we can work toward the proper solutions there must be an understanding that this is real, that it is not going away soon, that it is not something that there is a simple panacea for.

As a matter of fact, I believe it is going to get worse within the next several years for really mechanical reasons that lead time on any of the solutions is so long that I don't see any substantial increase in supply for at least the next 3 years, perhaps 5.

With that, I am sure we can expand on anything that interests you in questions, but I will direct myself to this current and specific situation that I am here to discuss today.

I will attempt to explain how we are trying to work within the Clean Air Act rather than how it might be modified. I discussed possible modifications of the Act yesterday in a hearing before a House committee.

In my presentation, I will first discuss why we have the problems we do, and then I will discuss the outlook for this winter, and finally I will discuss the specific actions we are asking the States to undertake.

There are many reasons for our current energy problems, and environmental restrictions are only one of the reasons. The primary reason for our immediate problems this winter is lack of refining capacity.

For various reasons, including the disincentives under the old mandatory oil import program, problems in obtaining sites and commitments for crude oil, and lack of ports able to handle very large crude carriers, not enough refineries have been built.

The problems in obtaining crude oil were reduced by the elimination of import quotas which the President announced in April. Since then there have been a number of announcements of new refinery projects, representing both expansions and new construction.

However, constructing these will take time. In addition, since the United States lacks deep water ports such as those possessed by most other countries, the President has requested Congress to pass a bill to license deep water ports.

In addition, there are problems in obtaining crude for some of the refineries we have now. Domestic crude is typically low sulfur, while Middle Eastern and Venezuelan crudes are high sulfur. Most of our own refineries were designed to use domestic low sulfur oils and cannot physically handle corrosive high sulfur crudes. Some refineries, especially at inland locations have been running at less than full capacity because of lack of low sulfur crude.

Due to low prices and environmental restrictions, the potential demand for natural gas has risen rapidly. However, with prices held at artificially low levels due to regulation, the supply has fallen far below this demand. The result has been that many users have been forced to shift to oil, putting further pressure on our already short supplies of oil.

The President has called for deregulation at the wellhead of new supplies of natural gas as a way of limiting demand and increasing supply.

There are other factors which have contributed to our current problems including failure to build the Alaskan pipeline, low water flow in the Northwest—which is an interesting coincidence not associated really with the petroleum situation—delays in offshore leasing, delays in building nuclear plants, and Cost of Living Council actions.

The President has repeatedly called for construction of the Alaskan Pipeline, and has made plans to increase our rate of offshore leasing as soon as the environmental studies can be made.

Let me now turn to how we see this winter. Let me caution you that studies are still under way, and that the numbers we use later may be slightly different than those I am giving you today. The reason for that is there are many variables in trying to forecast the situation this winter, the weather being one of course, our situation in Libya, and others I will mention later, whether we can continue to keep our refinery capacity at the high level it presently is.

Distillate fuels, which I will discuss, include both home heating oils and diesel fuel for our trucks and buses.

Considering natural gas curtailments and increased utility use, plus normal increases in demand, our forecasts for 1973 and 1974 translate into an estimated demand for the 1973-74 winter heating season 10 to 12 percent above last winter.

Last winter's heating season experienced unusually cold weather before the turn of the year and unusually warm weather in the first 3 months of 1973. Taken together, the two winter quarters were 3.3 percent warmer than normal.

Adjustment for a colder winter, normal sector growth rates, and increased use of distillate, which I have described, account for the large projected increase.

Our crude production peaked in 1970 domestically and has declined gradually since then. In 1972 production averaged just under 9.5 million barrels a day and it is expected to continue to decline to about 9.2 million in 1973, and to 9.0 in 1974.

To meet expanding demand, import of crude oils has been growing rapidly. Imports of refined products are also growing rapidly since the United States has an essentially fixed refinery capacity that is now operating at or near maximum possible levels. Thus, we cannot refine much more crude oil even though we want to.

As you know our foreign sources of crude supply are principally Canada, Venezuela, North Africa, and the Middle East. As imports from the Western Hemisphere are currently near maximum levels and declining, most of our additional crude oil imports will be high sulfur crudes from the Middle East. That crude oil, even if it continues to be available, poses problems.

Our estimates of domestic production must be based on current refinery capacity, allowing for minor expansions known as debottlenecking. In addition to capacity, however, another key factor for this winter will be the rate at which we utilize our refineries.

For most of 1971, rates hovered around 85 percent. During 1972 they increased dramatically, and this year they reached record levels, remaining at 94 percent during the third quarter. Under fortuitous circumstances the refinery utilization rate might continue at about 93 to 94 percent, though it will be 1 to 2 percent lower than that. We cannot plan on output continuing at such levels indefinitely, because:

Maintenance was deferred, which cannot be done forever.

There were no unexpected (or emergency) capacity losses from fires or floods or failures.

Equipment failures will probably increase in frequency because the high operating rates were maintained for long periods, and

Increased dependence on sour imported crudes will result in the underutilization of refineries not designed to handle them.

Natural gas curtailments may force refiners to burn some of the fuels that they would have otherwise sold.

If refinery capacity is used as expected and inventories by the end of March 1974 are to be maintained at a minimum level (about 101 million barrels), to assure there are minimal shortages due to insufficient inventories imports of distillate must average about 600,000 to 650,000 barrels per day during the winter season.

Inventories as of August 29, 1973, were 173.4 million barrels. This is up over last year's level. What should also be noted, is that last year's stock levels were below average. This year's inventory is nearly at the 1971 level, which was about normal for that year.

Our previous high rate of imports was the average of 530,000 barrels per day for one quarter last winter. Thus, considering the best estimates of the availability of foreign petroleum products, we are hopeful that we can import enough distillates to meet demand. However, the winter in Europe last year was mild, thus permitting significant U.S. purchases of European distillates. European refinery capacity has increased, but some experts still doubt that we will be able to import more distillate than last year. If we cannot, we may have a shortage.

These projections do vary widely, depending on the assumptions. For example, if refinery output can rise 2 percent above the base case projections I have been discussing, the need for imported distillates would be reduced by 200,000 barrels per day. This is because both crude runs and yields of distillate are increased due to sufficient gasoline already being produced. A number of experts feel that this will, indeed, be the case.

On the other hand if capacity use drops by 2 percent, distillate import needs will rise to 740,000 barrels per day. Gasoline imports would also need to increase by 65,000 barrels a day to 215,000 barrels a day during the first three quarters of 1974 because current gasoline production could not be sustained at the lower refinery operating rates.

To consider another possibility, if the weather is abnormally warm (5-year average) and refinery throughput can be kept at the higher rate, import needs would be 360,000 barrels during the winter, or 10-percent less than last winter.

On the other hand, a cold winter and low refinery use rates could together increase import needs to 860,000 barrels a day during the winter. Clearly, under even the most fortuitous circumstances, imports must approximate last year's level and under less favorable conditions, greatly increased imports are necessary.

I would like now to turn to the matter of principal interest to you, why we have felt compelled to ask the States to relax their sulfur emission limitations.

First, let me make very clear the distinction between the ambient air quality standards set in the Clean Air Act, and the emissions limits set by the States.

Under the pressure of time, many States determined what set of emission regulations were required to achieve the ambient air standards in their dirtiest city. These regulations were then applied to the whole State or to the whole of the air quality region in which the city was located.

The result was that over most of the State the restrictions were far more strict than was required to achieve the ambient air standards.

We are now faced with the need to import more high sulfur oil, both residual and distillate. We are trying our best to insure that this oil is burned where and when it will do the least harm.

EPA has been aware of this coming problem since before I joined the Government and has been attempting to determine how to utilize the oil to do the least damage. I can assure you we will be giving high

weight to their advice on this matter. As explained earlier, most States have large areas where the emission restrictions are far stricter than are required to achieve the ambient air standards.

For instance, Maryland applies the same emission limitations to the rural areas of the Eastern shore as they do to downtown Baltimore. Thus, considerable relaxation of emission limitations is possible without threatening to exceed the ambient air standards set to protect public health. Doing so requires that we think not in terms of State-wide regulations applicable to all areas, at all meteorological conditions, but rather in terms of what is needed here and now.

In addition to asking the States to relax certain emission limitations now, we are also preparing contingency plans in case the weather is colder than usual, or the situation deteriorates for some other reason. Because compliance with the procedures specified in the Clean Air Act is time consuming, we are asking the States to modify their implementation plans now so that further variances can be granted quickly if needed.

I have already explained why we must accept a large volume of high sulfur distillates from abroad. Because of lack of desulfurization capacity, and use of Middle Eastern crudes, her distillate supply averages about 0.6 percent sulfur.

Some of our air pollution regulations require sulfur of much lower levels. New York City requires 0.2 percent sulfur distillate. The intention is to extend this to the rest of the air quality region for next winter, thus including such areas as Suffolk County.

Philadelphia required 0.3 percent last year, and intends to go to 0.2 percent this winter. However, many of our areas apply the same set of sulfur regulations to distillates as they do to residual fuel oils in spite of the difference in typical stack heights of facilities using the two fuels.

When this is done, the rules on distillate sulfur content prove non-restrictive. EPA has estimated that 20.5 percent of this coming winter's distillate demand will require distillates of under 0.2 percent sulfur content, and 48.3 percent must be below 0.5 percent.

It is obviously impossible to bring in additional distillate in sufficient quantities without relaxing the State emission limitations. One of the problems we are faced with is whether we get less total imports if importers in certain areas such as New York and Long Island cannot use higher sulfur distillates.

There are several reasons why relaxation of sulfur standards for residual fuel oil is necessary. One is simply that enough foreign residual fuel oil of the required sulfur content is not available due to lack of desulfurization capacity and the high sulfur content of most foreign crudes.

Another problem has to do with the emissions from refineries themselves. Certain refineries that can physically handle corrosive high sulfur crudes, must run low sulfur crudes to keep refinery emissions within limits.

Additional pressure to run sweet crudes when sour could be used results from the need to produce low sulfur products. In some cases, legal inability to utilize sour crudes combined with unavailability of sweet crudes has resulted in operation at less than full capacity.

In other cases the refinery has been able to get the sweet crude, but the very fact they got it made it harder for other firms to obtain it.

Some inland refiners are operating at less than capacity because of difficulty in obtaining the sweet crude their refineries were designed for. One reason for this is that the integrated refiners are being forced to utilize their own sweet crude rather than selling it.

Our emission regulations have led to an increase in the use of distillate fuels where residual fuels could be used. In some cases regulations were such that only distillate fuels could qualify. In other cases, the price advantage of distillate fuels over low sulfur residual is now small.

The greater ease of handling No. 2 oil then led many users to shift from residual fuel oil. For instance, the amount of distillates used by powerplants under boilers has risen to 5.9 million barrels for the last quarter of 1972.

For many refineries the lowest sulfur residual fuel oil can be obtained only by blending in substantial quantities of distillates. A relaxation in sulfur specifications will free up some of these distillates for sale as a home heating fuel.

Some of the high sulfur residuals are now used for cooking. This converts part of the fuel to lighter fractions which bring higher prices, and part to coke. The total heat contents of the liquid products coming from the coker is substantially less than the heat content of the material that went in. By using the high sulfur material as a blending stock in residual fuel oil, our total volume of fuel oil could be increased.

Finally, there is still some excess capacity in European refineries. If they increase their utilization of this capacity, they will also produce large quantities of high sulfur residual oils. We may have to take this residual oil if we want to get the heating oil.

I would like now to move on and discuss another problem that requires more attention—the use of high sulfur residual fuel oils. It is important to understand that when a refinery installs a desulfurization unit, all of the crude is not desulfurized. The refiner is left with some high sulfur residual and some low sulfur residual.

They can be blended with the desulfurization material to give a single product that can be used everywhere, giving similar emissions in various parts of the country.

An alternative strategy would be to direct the lowest sulfur fuel to our polluted cities, and to use the higher sulfur materials elsewhere. A third possible strategy involves burning some of both at certain powerplants.

Instead of following the current procedure of mixing the two, and burning a fuel of the average sulfur content at all times, one might wish to keep the two fuels separate, and burn them at different times, depending on meteorological conditions. This should make it possible to turn significant quantities of high sulfur fuels without violating primary standards. Since excessive emission restrictions in one area may actually make it difficult to achieve clean air in another area, these alternative strategies may provide other ways to work toward both energy and environmental goals.

I have just given the reasons why a relaxation of State emission limitation is necessary to increase our total fuel supply. Let me emphasize again that this does not necessarily mean that we will be violating the Federal ambient air standards. Outside of the major cities there is much overkill in the State emission limitations.

Even within the major cities, much high sulfur fuel can be burned during conditions of good dispersion if we shift to lower sulfur fuels at the times of bad dispersion. Currently we are meeting the annual sulfur standards in all cities of over a million population, and only in three of those cities, for a few days per year in each, is the 24-hour standard not being met.

You may ask why we are planning now for emission limitation relaxation when summer is scarcely past. I am certain you realize that the Clean Air has definite procedures to use in amending State implementation plans which involve public hearings. These take time.

Second, you must understand that we are talking about importing substantial volumes of high sulfur fuels, not just an occasional shipload. Last year we were able to wait until the last moment and then give variances for individual shiploads acting on an emergency basis.

Such actions create problems. If you wait until a ship is offshore and you are nearly out of oil, you have little choice as to whether you take it or where you take it. One can easily end up burning the highest sulfur oil in the heart of our largest cities at the worst possible meteorological times simply because that was where the crisis occurred first.

By planning ahead we hope to be able to comply with all the procedures in the Clean Air Act, and to use the high sulfur fuels at the places and at the times where they are least likely to cause a violation of the ambient air standards.

This year we are talking about importing substantial quantities of imported fuel. After the State regulations have been amended, it is necessary for the oil companies to commit for the fuel and bring it in. This takes time.

Consider an oil company that is going to import more Middle Eastern oil to run in a domestic refinery if it can do so without violating emission limitations.

It must first buy the oil or get it out from under a contract for sales to another nation. The oil must then be shipped 12,000 miles to the United States. Here it must be refined, and the products distributed to their markets. And we hope to still have time enough to have the oil go to the place where it will do the least harm, and perhaps to hold off burning it if the meteorological conditions are adverse. We do not want to have to rush it to the first person to run out.

It should be realized that our risk of causing violations of the Federal ambient air standards is greater if the State emission limitations are relaxed later rather than now.

The reason is that in a typical northern city the highest levels of emissions occur during the winter when heating plants are operating at full capacity. It is then that the highest sulfur oxide levels are likely to be observed. During the warm season, powerplants and industries could often burn higher sulfur fuels without causing the Federal standards to be exceeded.

A logical means of restoring balance to our energy supply and demand situation is to moderate the trends toward the use of distillates rather than residual oil in powerplants and industrial boilers, and toward the use of oil rather than coal in those plants capable of burning either fuel.

On August 29, 1973, I issued a proposed regulation establishing priorities of use and allocation of supply for low sulfur petroleum

products to help alleviate the supply problems that were becoming evident in parts of the country.

This regulation would temporarily prohibit utilities and industrial and commercial firms from (a) switching from coal to petroleum products (b) switching from residual fuels to home heating fuels, or (c) increasing the quantity of distillates blended into residual fuel oil, except where such actions were absolutely necessary to meet health related air quality standards.

The reason I did not want to conserve more oil by requiring conversion back to coal was to avoid doing anything that might be interpreted as possibly resulting in a degradation in our air quality.

In closing, I would like to emphasize that I will do what I can to assure that the imported high sulfur fuels are burned where and when they will do the least harm.

Thank you.

[The following is a supplement to Governor Love's statement:]

ENERGY POLICY OFFICE, JOHN A. LOVE, DIRECTOR

September 17, 1973

The Energy Policy Office, today released a study by the Interior Department on the winter fuel oil situation.

Governor John A. Love requested the Interior Department to undertake the study on August 9, 1973. Data and analysis were provided by the Office of Energy Data and Analysis, the Office of Oil and Gas, the Bureau of Mines and the Office of Economic Analysis within the Department of the Interior. Assistance was also provided by other government agencies including the Department of Commerce, Department of Treasury, Environmental Protection Agency, and the Federal Power Commission.

The study concluded:

U.S. requirements for distillate fuel oil in the coming winter will increase greatly over last year. A projected 10.4 percent increase over last winter reflects last year's warmer-than-normal winter, historic growth trends and additional requirements for oil in lieu of natural gas. As gas production has ceased to increase, supplies are frequently unavailable to new customers and its deliveries to established industrial and utility users are being curtailed.

Rising distillate fuel needs cannot be met from U.S. refineries which are constrained by both limited refinery capacity and limited quantities of acceptable quality crude oil. Increasing gasoline requirements compete with distillate fuel for a portion of this limited refinery output.

If both gasoline and distillate fuel needs are to be met, domestic distillate fuel supplies will need to be supplemented by a very high level of imports. With normal winter temperatures, distillate imports of 650 thousand barrels a day will be needed—assuming refineries will operate at 91.7 percent of capacity and distillate yields will be 22.4 percent. Warmer weather, higher than anticipated refinery operating rates or a decision to maximize distillate yields at the expense of other products could reduce these requirements to 450 thousand barrels a day or less. Colder weather or an inability of refineries to operate as anticipated could increase imports to over 800 thousand barrels a day. If a concerted national effort at energy conservation is implemented and successful, import needs can be reduced by upwards of 100 thousand barrels a day.

It may not be possible to increase imports to needed levels. Last year, imports had averaged only 400 thousand barrels a day during the winter. A maximum of about 550 thousand barrels a day may be available to the United States from world markets. This is slightly more than the record volume imported in the first quarter last year. This availability of distillate fuel for import will depend upon normal winter temperatures worldwide, no crude oil or distillate curtailments by exporting nations, sulphur variances similar to last year, and U.S. price control regulations which allow cost passthroughs.

**THE DISTILLATE FUEL OIL SITUATION
WINTER 1973 - 74**

***By Department of the Interior
September 15, 1973***

FOREWORD

On August 9, 1973, John A. Love, Director of the Energy Policy Office, requested the Department of the Interior to prepare an assessment of the heating oil situation for the coming winter.

Data and analysis were provided by the Office of Energy Data and Analysis, the Office of Oil and Gas, the Bureau of Mines and the Office of Economic Analysis within the Department of the Interior. The report would not have been possible without previous studies and the direct assistance provided by the Department of Commerce, Department of Treasury, Environmental Protection Agency, and Federal Power Commission.

Summary

U.S. requirements for distillate fuel oil in the coming winter will increase greatly over last year. A projected 10.4 percent increase over last winter reflects last year's warmer-than-normal weather, historic growth trends and additional requirements for oil in lieu of natural gas. As gas production has ceased to increase, supplies are frequently unavailable to new customers and its deliveries to established industrial and utility users are being curtailed.

Rising distillate fuel needs cannot be met from U.S. refineries which are constrained by both limited refinery capacity and limited quantities of acceptable quality crude oil. Increasing gasoline requirements compete with distillate fuel for a portion of this limited refinery output.

If both gasoline and distillate fuel needs are to be met, domestic distillate fuel supplies will need to be supplemented by a very high level of imports. With normal winter temperatures, distillate imports of 650 thousand barrels a day will be needed -- assuming refineries will operate at 91.7 percent of capacity and distillate yields will be 22.4 percent. Warmer weather, higher than anticipated refinery operating rates or a decision to maximize distillate yields at the expense of other products could reduce these requirements to 450 thousand barrels a day or less. Colder weather or an inability of refineries to operate as anticipated could increase imports to over 800 thousand barrels a day. If a concerted national effort at energy conservation is implemented and successful, import needs can be reduced by upwards of 100 thousand barrels a day.

It may not be possible to increase imports to needed levels. Last year, imports had averaged only 400 thousand barrels a day during the winter. A maximum of about 550 thousand barrels a day may be available to the United States from world markets. This is slightly more than the record volume imported in the first quarter last year. This availability of distillate fuel for import will depend upon normal winter temperatures worldwide, no crude oil or distillate curtailments by exporting nations, sulphur variances similar to last year, and U.S. price control regulations which allow cost passthroughs.

OVERVIEW OF THE ANALYSIS

This study focuses on the supply/demand picture during the coming winter for distillate fuel oil. Distillate fuel oil is the general classification for products known as No. 1 and No. 2 heating oils, normally used in heating homes, and light diesel fuels. No. 4 fuel oil is also included in this category, although it is a blend of distillate fuel oil with heavier residual fuel oil.

For the purpose of this study the winter heating season extends from October 1, 1973 through March 31, 1974. The present study focuses principally on the winter heating season, although the gasoline situation next summer must be taken into account in developing the forecast.

To forecast the winter situation for distillate oils is a complex task. By definition, supply and demand will ultimately be in balance, even if there is a "shortage." In fact, if projected supplies and consumption are not in balance, this means that adjustments, sometimes severe and often localized, will occur. The result will be a curtailed demand in spite of what the consumer might originally desire.

To estimate the potential problem with distillate fuel oil requires a careful assessment of not only domestic distillate production and expected demand, but also imported distillate, which makes up a significant percentage of our total supply. And of course, our ability to obtain foreign produced distillate is dependent on foreign supply capacity and foreign demand. Finally, inventories of distillate are also crucial to reducing possible shortages. Because distillate demand is seasonal (high in the winter and low in the summer), inventories are built up in the off season and then drawn down during the peaks in demand. As a consequence, the measure of a shortage is not whether production can meet demand, because during the peak times production is always exceeded by demand, but rather when inventories are reduced to a level which is insufficient to cover the gap between current production and market requirements. As inventories are drawn down below the required level, shortages do not develop simultaneously everywhere, but rather are usually seen in local areas, often those which are farthest from the source of supply.

The analysis which follows will first look at the composition of domestic distillate demand and its probable level this winter. Secondly, domestic capability to produce distillates will be estimated, considering available crude supplies, refinery capacity, probable operating rates and yields. Actual distillate production will also be balanced against minimum production of other petroleum products, such as gasoline, to assure a tenable gasoline situation this coming summer. Given the domestic demands and lesser domestic supplies, import requirements will be derived to assure that demand is met and inventories do not drop to a dangerously low level. Finally, the feasibility of reaching the projected import levels will be assessed in light of the world supply/demand picture.

DEMAND FOR DISTILLATE FUEL OIL

Distillate fuel oil is used primarily for space heating in homes and commercial buildings and for the production of process heat in industrial facilities. It is also heavily used by diesel trucks and buses. More recently there has been an increasing use of distillate in electric utilities.

Historical Demands and Growth

Historic trends in the major uses of distillate fuel and rates of growth by sector are compared in Table 1 and 2. While the use of all petroleum products grew 3.5 percent a year between 1960 and 1970, demand for distillate increased at a 3 percent annual rate. Competition from natural gas and electricity for heating purposes has been the dominant influence in restraining the historic growth of distillate heating oil demand.

The most persistent growth has been recorded by the highway use of diesel fuel, where it is used principally by large tractor trailers. About 5 years ago, significant amounts of distillate fuel began to be used at electric power plants. While small volumes of distillate have always been used as "start-up" fuels and in internal combustion generators, the surge in power plant use of distillate is now attributable principally to its use in turbine generators. However, distillate is also being used to some degree as a substitute for residual fuel oil in order to meet current more rigid sulphur specifications, as required by air quality laws and regulations.

While distillate demand for all uses increased about 3 percent a year during the 1960's, 1972 use increased 9.6 percent over the 1971 level. Two major factors, cold weather and a growing scarcity of natural gas, caused this large increase. Weather in the first and fourth quarters of 1972 averaged 5.8 percent colder than normal and 7.5 percent colder than the same period in 1971.

Projected Demand Growth

As indicated in Tables 1 and 2, distillate demand in calendar 1973 is projected to rise 3.4 percent above 1972. A further 8.8 percent demand growth is projected for 1974.

The 1973 demand increase is not as large as might be expected, due to heating below that in calendar 1972. This is explained by 1972's abnormally cold weather, a warm January through March of 1973 and assumed normal weather during this coming winter.

Though highway diesel fuel requirements will continue their strong upward trend, the largest percentage demand gains in both 1973 and 1974 are expected to occur in the industrial and electric utility sectors, due not only to normal growth but also as these customers seek low sulphur oil in lieu of curtailed natural gas.

Natural gas production has not increased significantly in the last 2 years and significant gains are not expected through 1974. As a result, there have been increasing curtailments of gas supplies to historic consumers and very little gas available for new customers. During the 1972-73 winter, gas deficiencies against firm requirements amounted to 422 billion cubic feet. The Federal Power Commission's Bureau of Natural Gas estimates 629 billion cubic feet of inter- and intrastate curtailments of firm customer sources will occur with normally cold weather during the 1973-74 heating season. These curtailments will be almost exclusively in the industrial and utility sectors. See Table 3.

While it is difficult to translate these curtailments into distillate oil requirements, FPC estimates indicate that during the coming winter over 130,000 barrels a day of distillate oil demand may be due to curtailments of firm gas sales. Additional quantities of distillate may be required to replace greater than usual quantities of interruptible gas as gas availability diminishes.

These annual forecasts for 1973 and 1974 can be translated into the 1973-1974 winter heating season. Table 4 compares this coming winter with last year. The distribution between the quarters in 1973 and 1974 is derived from the seasonal distributions during the last several years. Ideally these distributions should be done separately by sector. Unfortunately demand data by quarter is not available. As indicated in the table the winter's demand is estimated to be 10.4 percent above last winter. Last winter's heating season experienced unusually cold weather before the turn of the year and unusually warm weather in the first three months of 1973. Taken together, the two winter quarters were 3.3 percent warmer than normal. This adjustment from a colder winter, normal sector growth rates and increased use of distillate to replace natural gas account for the large projected increase.

Effects of the Weather

For a variety of reasons, it is difficult to translate data on winter severity into changes in demand for distillate fuel, especially when variations are as wide as they have been recently. Weather conditions other than temperatures principally humidity and wind velocity also affect heating requirements.

Regional weather variations are also important. For example, if is very cold during a particular winter in New York, the impact on heating oil is much greater than from a similarly cold season in Tennessee. Not only do each of these areas have different populations, and hence different demand for heating oil, but may rely on very different fuels to meet their needs.

Despite these limitations, it is possible to estimate the effect of abnormally cold weather on the demand for heating oil. Table 5, developed by the National Oceanic and Atmospheric Administration of the Department of Commerce summarizes the impact of weather on heating fuel demand. For example, on average, once every 5 years temperatures will be sufficiently cold to increase heating oil demand by 3.9 percent above the normal consumption levels; this translates into a 120,000 barrels a day increase in demand during the winter. This measures only the direct impact of temperatures on heating oil demand and does not include the increased demand for oil which would be generated by the insufficiency in gas supplies to meet requirements associated with colder than normal weather.

THE SUPPLY OF DISTILLATE

The supply of distillate fuel oil to meet U.S. needs is composed of domestic production and foreign imports.

U.S. production of distillate is determined by supplies of domestic and imported crude oil, refinery capacity available to refine these crudes, percent of refinery capacity actually used, and the proportion, or yield, of distillates produced from crude oil and other materials which are refined.

Crude Oil Availability

U.S. production of crude oil and lease condensate peaked in 1970 and has declined gradually since that time. In 1972 production averaged 9,451 thousand barrels a day and it is expected to continue to decline to 9,240 thousand barrels a day in 1973 and 8,973 in 1974. To meet expanding demand, import of crude oils has been growing rapidly. Preliminary data indicate crude imports of nearly 3.3 million barrels a day in the second quarter of 1973. For 1972 imported crude oil was 18.8 percent of all crude oil refined domestically. This may increase to nearly 30 percent by 1974.

Table 6 shows that our foreign sources of crude supply are principally Canada, Venezuela, North Africa and the Middle East. As imports from the Western Hemisphere are currently near maximum levels, most of our incremental crude oil imports will come from the Middle East. While Middle East reserves are large, facilities are little more than adequate to produce and handle growing world crude oil requirements. For purposes of this study, it is assumed that needed crude imports can be sustained through the winter. However, producing nations are beginning to weigh the economic and political significance of their petroleum resources, and there is a potential for selected curtailments or interruption of oil flows from foreign sources.

Even though imports can be available, the substitution of foreign for domestic crude oil may adversely affect the ability to use our domestic refineries to the greatest possible extent. Much of the Nation's refinery capacity is designed to process only the low sulfur crudes which are predominantly produced domestically. Some refineries are incapable of processing the high-sulfur crude which may be available for import.

Refinery Operations

Actual domestic production of distillate is most strongly affected by domestic refinery capacity and its rate of utilization.

Following a prolonged period of excess refining capacity, the United States now finds itself with insufficient capacity to refine all the petroleum products which it requires. Lagging refinery construction has been attributed to a variety of factors including public protests against their construction on environmental and aesthetic grounds, lack of economic incentives, and uncertainty with respect to needed incremental volumes of crude oil under previous crude oil imports controls.

As of early this year, no construction was under way, and no firm plans announced, for any new refinery in the United States despite projections of demand growth of nearly a million barrels a day each year. Major revisions in oil import controls in April were designed to induce refinery construction. They quickly elicited a number of announcements of new facilities or expansions. However, none of these will be in operation during the coming winter.

A number of refineries are debottlenecking and expanding existing facilities, and these generally can be accomplished more expediently than new construction. The Office of Oil and Gas estimates that refineries nationwide had capacity to process 13.6 million barrels of crude oil in the third quarter of this year. About 150,000 barrels

a day of capacity may be added in the next six months. A year from now capacity may approximate 14.0 million barrels a day. Clearly, significantly increased refining capacity is not expected during the coming winter. The key factor then during the coming winter is the rate at which we utilize our existing refining capacity. Table 7 summarizes historical and expected refinery operations and the levels of refinery capacity use. While refinery rates hovered around 85 percent during most of 1971, during 1972 rates increased dramatically - reaching almost 94 percent during the 3rd quarter of 1973. However, it is unlikely that these rates can be maintained throughout the winter because:

- these rates are achieved by deferring current maintenance and units may need to be shut down in the near future for maintenance.

- attainment of high operating rates depends on avoidance of unexpected capacity losses from events such as hurricanes, floods, fires and equipment failures. Such events, though unpredictable, do occur. Indeed, equipment failures seem to increase in frequency when high operating rates are maintained for prolonged periods.

- increased dependence on sour imported crudes will result in the underutilization of refineries which are not designed for sour crudes. Some refineries will operate only to the extent to which sweet crudes are available. Others, in an effort to utilize available crudes, will experience capacity reductions and increased maintenance.

In this forecast of domestic distillate production, refinery operating rates have been projected by a regional analysis of refining capacity and crude oil availability. A winter season United States operating rate of 91.7 percent, will be used for the base case. Furthermore, it is assumed that the operating rate will continue to decline through 1974 so that the rate in the Spring quarter will be less than that in 1973.

Under fortuitous circumstances this rate might be as much as 2 percent higher. Refiners usually have an economic incentive to operate at higher rates provided they can obtain appropriate quality crudes. Less fortunate circumstances could readily reduce operations 2 percent or more. Hence, 2 percent higher and lower than the projected rate are considered as alternate possibilities later in the supply analysis.

A word of caution is needed in evaluation these operating rates. They are calculated using specific procedures and definitions of the U.S. Bureau of Mines. Capacities used herein denote a refinery's capacity to process crude oil. However, these same distillation units also are commonly used to process other oils, generally natural gas liquids and unfinished oils. Capacity so used, of course, is not available for crude oil processing. When U.S. refineries in aggregate process crude oil at 92 percent of capacity, their distillation facilities may be as much as 98 percent utilized.

Regardless of the percent of refinery capacity use, refiners can still vary their output of petroleum products. Distillate fuel is but one of a wide range of products produced from crude oil. About 23 percent of crude oil processed is refined into distillate fuel; a little less than half is produced as gasoline. Refiners have some capability to alter their processing to vary these proportions and maximize specific products such as distillate fuel oil. However, such decisions will be based not only on distillate needs, but also needs for other petroleum products -- the most important being gasoline. In the base case forecast, it is assumed that distillate yields will not be increased to a point beyond which gasoline production would be insufficient to meet gasoline demand through next summer. The following assumptions were used in estimating gasoline production:

- a 5.9 percent increase in 1974 requirements through next summer. This compares with a 6.0 percent increase in calendar year 1972 and an estimated 6.6 percent in 1973.

- imports reaching 150,000 barrels per day, up from 68 thousand barrels a day in 1972.

- inventories of gasoline by the end of the summer not dropping to less than 202 million barrels, the level of stocks that are expected to be needed to avoid widespread shortages.

Given these assumptions, refinery gasoline yields in Districts I - IV are estimated at 49 percent of crude and unfinished oils processed in the 1974 summer quarters and unusually high yields of 47.4 percent and 48.1 percent, respectively, in the fourth and first quarters this winter.

These high gasoline yields plus historical yields of other products such as kerosene and jet fuels, cannot be produced without some sacrifice in the production of distillate fuels. Under the conditions outlined above, distillate yields during the winter are expected to average 22.4 percent. This compares with a yield of 23.4 percent in the year-earlier period. These yields will be used for the base case. However, distillate yields can be increased at the expense of other products. It is estimated the maximum distillate yields through the winter in Districts I-IV might exceed 26 percent. This yield will be used in the sensitivity analysis of this forecast.

Given these factors it is possible to forecast domestic distillate production throughout the winter. The production of distillate through the winter is shown in Table 8.

THE WINTER FORECAST

The demand forecast derived previously, combined with the refinery production estimates above can be combined to estimate the supply/demand situation this winter. As previously indicated, all of these forecasts will show that demand exceeds supply by some margin and must be made up by imports. The following section estimates needed imports under a base case and also for several alternative outcomes. The section following assesses the likelihood of obtaining these imports.

Winter Situation and Import Needs

Inventories as of August 24, 1973, are 173.4 million barrels. If refinery capacity is used as expected and inventories by the end of March 1974 are to be maintained at 101 million barrels (to assure no shortages due to insufficient inventories) imports of distillate must average more than 650,000 barrels per day during the winter season.

Table 8 summarizes the overall supply/demand situation for the base case -- 91.7 percent refinery use and a normal winter.

Table 9 summarizes the net effect on imports given different assumptions about the weather, refinery use and yield ratios. The table only looks at PADs I-IV (The U.S. east of the Rockies) - this area is of most importance due to its great reliance on imported distillate. As indicated, if refinery use can rise 2 percent above the base projection (Case A) imported distillate needs would be reduced by 200,000 barrels per day. This is because both crude runs and yields of distillate are increased due to sufficient gasoline already being produced.

On the other hand if capacity use drops by 2 percent distillate (Case B), import needs will rise to 681 thousand barrels per day. Case B gasoline imports will also need to increase by 65 thousand barrels a day to 215 thousand barrels a day during the first three quarters of 1974 because base case gasoline production could not be sustained at the lower refinery operating rates. Imports of other products will also have to be 85 thousand barrels a day higher than in the base case to offset lower domestic production.

An additional option would be to increase distillate production at the expense of other products. If distillate yields were increased to maximum historic levels in each refinery district, yields in Districts I-IV would average 26.2 percent for the winter. Under these operating conditions, distillate production would be increased 256 thousand barrels a day. The increased production could be used either to meet higher demand or to replace a like volume of imports. Case C shows that if demand were

held constant imports could be reduced to 375 thousand barrels a day. Of course, if refining operating rates could not be increased, the lower production of other products which would result would have to be offset by increased imports of other products. In Case C, other products would need to rise 256 thousand barrels a day of which more than 100,000 barrels a day would need to be gasoline. As it would be extremely difficult to attain these import levels, there would be an increased probability of a summer gasoline shortage.

The effects of weather are also shown. If weather is abnormally warm (5-year average) and refinery throughput can be kept at the higher rate, distillate import needs would be 301 thousand barrels during the winter. This compares with 400 thousand barrels a day of imports during the last winter. On the other hand, a cold winter and low refinery use rates could together increase imports needs to 803 thousand barrels a day during the winter, an 88 percent increase over the previous winter. Clearly, even under the most fortuitous circumstances, imports must approximate last year's level and under less favorable conditions, greatly increased imports are necessary.

Availability of Imports

Table 10 summarizes the sources of U.S. distillate imports in 1971 and 1972. During 1971 and 1972, 80 to 85 percent of U.S. imports were from the Caribbean, with most of the remainder from Europe. In response to a cold fourth quarter of 1972 and eased import restrictions, imports (during the first quarter of 1973) jumped to 533 thousand barrels a day, over one-third of which came from Europe. The first quarter surge raised the average import rate for the winter to 400 thousand barrels a day. A peak of 672,000 barrels a day was attained in February 1973. Controls on distillate imports were suspended effective January 1, 1973.

For the coming winter, distillate imports must again come from these same sources--Europe and the Caribbean.

Current data on foreign operations and product availability are sketchy, but a reasonable estimate can be approximated for both the Caribbean and Europe.

Runs to stills in Venezuela and the Netherlands West Indies may average about 2.2 million barrels a day. Yields of distillate are low, after allowances for distillate blended with residual fuel. About 9 percent of crude runs result in distillate available for export. Thus, total availability may approximate 200 thousand barrels a day. Historically, about 40 percent of available distillate is shipped to the United States. With revised import rules in the United States

this percentage could be increased but only by diversion of shipments from other markets. A 60 percent U.S. share appears to be the highest reasonable estimate and would result in imports from current production of some 120 thousand barrels a day. By comparison, imports in the first quarter of 1973 averaged 151 thousand barrels daily. However, some of this was from inventories. Some inventory drawdown is likely in the 1973-74 winter, but stocks could be a lesser factor than they were a year ago. For purposes of this forecast, about 120 to 150 thousand barrels a day seems to be a range of imports.

Imports from elsewhere in the Caribbean, Central and South America, including Puerto Rico averaged 61 thousand barrels a day in 1971 and 66 thousand last year. Receipts from these areas rose to 162 thousand barrels daily in the first quarter of 1973. Runs aggregating about 1,730 thousand barrels a day, at a 15 percent distillate yield would produce 260 thousand barrels daily of which 50 will be required for blending. If 80 percent of available supplies are shipped to the United States our imports would approximate 165 thousand barrels a day. An additional 40 thousand barrels a day may be available from the Bahamas in the last half of the season when new capacity becomes operational. Inventory drawdowns could add to this rate, but those may be offset by rising quantities reserved for local consumption, particularly in Puerto Rico.

Europe presently obtains a distillate fuel oil yield of 28 to 29 percent on crude runs. This has risen from 25 percent 4 or 5 years ago, undoubtedly reflecting the increased use of light African crudes. Refinery yields have been increasing in direct proportion with indigenous demand for distillate in each succeeding year.

Europe imports more distillate fuel oil than it exports. Imports total about 300 thousand barrels a day. The largest single supplying area is Eastern Europe, although the Caribbean is still a significant source. Until recently exports of distillate fuel oil from continental Europe have averaged only about 30 to 40 thousand barrels a day.

U. S. distillate fuel imports from Non-Communist Europe have recently occurred in the following volumes:

	<u>Thousands of Barrels Daily</u>
1970	5.8
1971	12.5
1972	13.2
1973 (1st Qtr.)	167.8

As volumes rose sharply early in 1973, U.S. importers tried selectively to obtain lower sulphur distillates derived from African crudes. Nonetheless, it was necessary to import significant amounts of distillate in the 0.4 to 0.5 percent sulphur range and the average distribution was about the same as last year. Some of this was blended in the U.S. while the rest was used in areas where sulphur specifications were not restrictive.

The large volume of distillate fuel shipments from Europe to the U.S. in the early part of 1973 was facilitated by the mild winter in Europe. In view of the fairly well matched balance between refinery production and demand in Europe, it is doubtful that any large increase of distillate fuel exports could be expected. A maximum availability in the last quarter of this year and the first quarter of 1974 may be about the 165 MB/D rate experienced earlier this year. A cold winter would sharply reduce this availability. Very possibly European supplies may be conserved for local use in the early part of the winter with excesses being released for late season export if weather does not prove to be unusually cold.

This estimate assumes a refinery operating rate of about 85 percent, approximately equal to estimates of current operations. It further assumes that Common Market Countries will remain on schedule in their efforts to raise petroleum inventories to 90 days' supply by the end of 1974.

After allowances for other imports from minor supply sources, total foreign distillate available to the U.S. may approximate 550 thousand barrels a day. Use of these supplies will necessitate minor sulphur variances similar to those experienced last winter.

With European cooperation, exports to the United States could be increased by raising refinery operating rates (assuming crude oil availability) or by postponing European inventory objectives.

Summarizing the above and making allowances for relatively small imports from other areas, it is estimated that 550 thousand barrels a day of distillates may be available for import into the United States. It must be stressed that these estimates are potential volumes under normal temperature conditions worldwide. They assume that U.S. importers can maintain their buyer position in world markets, that U.S. price regulations will provide sufficient incentives for imports, and that high sulphur oils, particularly from Europe and the Middle East can be accommodated in the U.S. market. They indicate in total that we may be able to maintain approximately the same level of imports throughout the winter that we obtained for our highest quarter imports last year.

Possibility of Reduced Import Availability

There can be no assurance that 550 thousand barrels a day of distillate fuel will be available for import to the United States. Among factors which could reduce this availability are insufficient worldwide crude oil supplies, lower-than-assumed refinery operating rates, colder-than-normal weather in Western Europe, or a conscious policy of European nations to conserve available oil supplies in general and of low-sulphur fuels in particular.

As indicated, the projection of 165 thousand barrels a day from Europe assumes an 85 percent refinery operating rate. While this is a reasonable figure, slightly higher than the 84.8 percent rate attained in 1971, it is nonetheless considerably higher than the 79.8 percent rate indicated by preliminary 1972 data. If operations should average only 82 percent, it is probable that no distillate fuel would be available from Europe.

European demand for distillate fuel may approximate 4.7 million barrels in 1974, more than 40 percent more than U.S. demand. As a lesser portion is used for space heating, heating demand may not be greatly different from that in the United States. Accordingly, a moderately cold winter might reduce availability of U.S. shipment to a quarter of the base case estimate. A considerably colder winter could eliminate European exports and intensify European competition for supplies from the Caribbean. If the United States retained only its 40 percent position in supplies available from Venezuela and the Netherlands West Indies, rather than the 60 percent projected in the base case, our receipts from the area would be reduced by 50 thousand barrels a day. A combination of moderately cold weather and reduced refinery operating rates could have a similar impact. Cold weather in Eastern Canada could also increase competition for Caribbean supplies.

Overall, it is not unrealistic to recognize that circumstances could eventuate which would reduce U.S. access to distillate fuel imports to some 335 thousand barrels a day, 270 thousand barrels a day less than projected base case requirements.

Table 12 presents the range of import potentials. It shows (1) supplies equal to the 1972-73 winter, (2) lower import levels which could eventuate from higher European requirements or lower European production, (3) "most likely" availability, and (4) maximum supplies which could be generated relaxed sulphur specifications and economic incentives.

Possibilities of Increased Import Availability

Sulphur levels for both distillate and residual fuel may play an important role in our ability to import higher levels of distillate this winter.

Low sulphur residual oil production in the Caribbean is in part met by blending distillate fuel oil with residual. This blending is also used to improve other characteristics of the oil. While estimates vary, there are indications that between 75 and 200 thousand barrels of distillate might be made available from the Caribbean at the present time, if the residual fuel with which this distillate is now being blended can be sold instead with a higher sulphur specification.

Increasing the level of sulphur allowable in distillate can also increase our capability to import the quantities of distillate needed to meet demand.

The sulphur in the distillate imported last winter was:

	<u>0.3 S or Below</u>	<u>.3-.5 S</u>	<u>.5-1.0 S</u>	<u>Over 1.0 S</u>
4th Quarter 1972	70%	25%	5%	below 1%
1st Quarter 1973	71%	26%	3%	below 1%

Quite obviously our demands are being placed on the lowest sulphur production. Table 11 indicates that there are only a few areas where even lower sulphur fuels will be required this year as compared with last year. Therefore the distribution of aggregate demand by sulphur content will not change appreciably.

Much of Europe's unused refinery capacity is in Italy where refineries operated at only 70 percent capacity in 1972. Italian refineries could produce up to 51,700 B/D of distillate per 5 percent increase in capacity, based on Arabian Light crude. Other products, especially high sulphur residual fuel, would also be produced and it might be difficult to dispose of them. This in fact could become the actual constraint on greatly increased Italian production. The incremental crude would probably have to come from the Middle East as shortage of North African crude is a contributing reason for their current low operating rates. Tanker movements of crude from the Middle East to the Eastern Mediterranean, and of products to New York would be expensive and the distillate would contain about 0.8 percent sulphur.

In summary, modest local relaxations of sulphur standards will be needed to permit utilization of the 550 thousand barrels a day projected as a base case. More significant relaxations of sulphur standards will be needed, however, if additional quantities of distillate, which are now blended with residual fuel to reduce its sulphur content, are to be freed for import and use as distillate. Lower sulphur standards for distillate will also be needed if we are to utilize greater distillate supplies from Europe, especially from Italy, which some extraordinary measures might make available.

World distillate prices already exceed ceiling prices for domestically produced product. It is essential, therefore, that price regulations clearly permit higher import costs to be "passed through." Without this, importers will lack incentives to seek and import foreign supplies.

Given an early and sufficient relaxation of sulphur regulations and sufficient economic incentives, imports might be increased by as much as 400 thousand barrels a day, divided equally between the Caribbean and Italy. However, estimated supplies from neither of these sources can be increased readily.

Potentials for Reduced Demand

A significant potential exists for balancing supplies and requirements through a more efficient use of fuels.

Assuming that imports of 550 thousand barrels a day are attainable the United States winter distillate requirements could be met in full if weather proved to be moderately warmer than normal or if refinery operations are sustained at unexpectedly high rates. On the other hand, shortages could exceed 270 thousand barrels a day with cold weather and reduced refinery rates; if imports were only at the lowest project rate, the distillate shortage would approximate 500 thousand barrels a day. The base case indicates a 105 thousand barrel shortage.

Any shortage of fuels can create disturbing dislocations in the distribution system and can be extremely discomfoting to those who are unfortunate enough to live or work in the areas in which they occur. Nonetheless, these projected shortages must be kept in perspective when remedial options are evaluated.

A shortage of 105 thousand barrels a day is only 2.6 percent of projected U.S. distillate demand; an extreme shortage of 500 thousand barrels a day is more than 12 percent of demand.

A national determination to conserve fuels could quickly eradicate a 2.6 percent shortage and could reduce even the larger figure to manageable proportions. Some imprecise but indicative calculations demonstrate the potentials for energy conservation.

In oil heating areas, normal weather in October through March averages 5,230 degree days. If all heating customers reduced indoor temperatures only two degrees for each of the 182 days in those months, 364 degrees of heat, or almost 7 percent of the normal season total could be saved. The seasonal fuel saving would approximate 210 thousand barrels a day.

Savings of the same order of magnitude could be achieved if storm windows and doors were added to all heated structures now lacking them. Further savings are possible though improved thermal insulation.

Heat conservation measures need not be limited to users of oil heating. Fuel savings in gas space heating would reduce levels of gas curtailments, thereby reducing the call upon heating oils to replace gas.

Additional savings of distillates are possible through the substitution of other fuels which are more readily available. The President has called for greater use of coal and proposals are currently being considered to curtail conversions to low sulphur oils from other fuels where such conversions are not needed to meet primary air quality standards. Further refinery operations are flexible enough that to some degree each barrel of gasoline saved would permit the production of an additional barrel of distillate.

A serious fuel conservation effort, enlisting the participation of all citizens, could greatly reduce the threat of fuel shortages, except under extreme conditions, for 1974. Patently, such a volunteer effort cannot be expected to be fully effective, but conservation nonetheless has an obvious and important contribution to make in any national energy program.

TABLE 1

U.S. DISTILLATE DEMAND
(1000 Barrels/Day)

	<u>Heating</u>	<u>Industrial</u>	<u>Electric Utilities</u>	<u>On Highway Diesel</u>	<u>Other</u>	<u>Total</u>
1960	1196	94	11	100	471	1872
1965	1304	116	10	202	524	2156
1966	1295	129	10	223	561	2218
1967	1373	123	8	NA	NA	2272
1968	1395	125	23	339	504	2386
1969	1402	116	33	380	536	2467
1970	1428	120	68	408	516	2540
1971	1435	136	97	449	544	2661
1972*	1535	155	150	506	571	2917
1973**	1505	185	200	535	590	3015
1974**	1555	220	300	575	631	3281

*Estimated

**Forecast

Source: Bureau of Mines

TABLE 2

U.S. DISTILLATE DEMAND -- % ANNUAL GROWTH

	<u>Heating</u>	<u>Industrial</u>	<u>Electric Utilities</u>	<u>On Highway Diesel</u>	<u>Others</u>	<u>Total</u>
1960 to 1965	+9.0	+23.4	-9.1	+2.0	+11.3	+15.2
1966	-0.7	+11.2	0.0	+10.4	+8.0	+2.9
1967	+6.7	-6.4	+20.0	NA	NA	+2.5
1968	+1.6	+1.7	+187.5	NA	NA	+5.1
1969	+0.5	-7.2	+43.5	+12.1	+6.3	+3.4
1970	+1.9	+3.5	+106.1	+7.4	-3.7	+3.0
1971	+0.5	+13.4	+42.7	+10.0	+5.4	+4.8
1972*	+7.0	+14.0	+54.7	+12.7	+5.0	+9.6
1973**	-1.9	+19.4	+33.3	+5.7	+3.3	+3.4
1974**	+3.4	+19.0	+50.0	+7.5	+6.9	+8.8

*Estimated

**Forecast

1960 to 1970	+19.4	+27.7	+518.2	+308.0	+9.6	+35.7
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Calculated from Bureau of Mines Data

TABLE 3
ESTIMATED IMPACT OF NATURAL GAS CURTAILMENTS ON FINAL CONSUMERS
(Billions of Cubic Feet)
Winter 1973-1974

Future Requirements Committee Region	Firm			Interruptable	
	Residential	Commercial	Industrial	Electric Utility	Total
New England	0.0	0.0	2.0	0.0	10.4
Appalachian	0.0	0.0	26.9	0.4	84.8
Southeast	0.0	0.0	5.7	2.4	49.6
Great Lakes	0.0	0.4	19.0	3.5	66.1
Northern Plains	0.0	0.0	0.0	0.0	5.8
Mid-Continent	0.0	0.0	0.0	0.7	37.1
Gulf Coast	0.0	0.0	115.8	129.4	279.7
Rocky Mountain	0.0	0.0	0.0	0.0	0.1
Pacific Southwest	0.0	0.0	0.0	0.0	95.3
Pacific Northwest	0.0	0.0	0.0	0.0	0.1
Total	0.0	0.4	169.4	136.4	629.0

Note: Customers are listed from left to right in descending order of priority.

*Includes minor volumes of curtailments to commercial consumers.

Source: Federal Power Commission, Bureau of Natural Gas.

TABLE 4

U.S. Distillate Demand by Quarters and Winter Season
1971 through 1974
Thousands of Barrels Daily

<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
1Q 3695	1Q 3788	1Q 3885	1Q 4570
2Q 2258	2Q 2406	2Q 2500 E	2Q 2630
3Q 1886	3Q 2011	3Q 2150 F	3Q 2264
4Q 2955	4Q 3458	4Q 3538	4Q 3680

<u>Winter Season</u>	<u>Thousands of Barrels Daily</u>	<u>% Increase</u>
71/72	3369	3.7
72/73	3668	8.9
73/74	4048	10.4

E - Estimated

F - Forecast thereafter

Source: Bureau of Mines

TABLE 5

NATIONAL TOTAL HEATING FUEL DEMAND BY FUEL TYPE
IN PERCENT OF 42-YR. AVE. DEMAND

CRITERION	Gas	Oil	Elec.	LPG
Coldest year in 100	109.7	110.6	109.6	111.4
Coldest year in 10	105.4	105.9	105.3	106.3
Coldest year in 5	103.5	103.9	103.4	104.1
Warmest year in 5	96.5	96.1	96.6	95.9
Warmest year in 10	94.6	94.1	94.7	93.8
Warmest year in 100	90.3	89.4	90.4	88.6

Note: - Data are based on fitted Gaussian normal probability distributions, for probability points corresponding to criteria listed in first column. Decimal digits are tentative.

Source: National Oceanic & Atmospheric Administration - 8/20/73.

TABLE 6

SOURCE OF U. S. CRUDE IMPORTS
(% by Country of Origin)

	<u>Canada</u>	<u>Venezuela</u>	<u>North Africa</u>	<u>Middle East</u>	<u>Indonesia</u>
1966-69	35.2	28.0	10.3	16.8	5.4
1970	50.7	20.3	9.2	12.8	5.3
1971	42.9	18.0	10.7	20.2	6.6
1972	38.5	11.5	20.2	19.2	7.4

Calculated from Bureau of Mines data.

TABLE 7

U.S. Refinery Capacity and
Crude Oil Processing Rates
1971-1974
Thousands of Barrels a Day

	Refinery Capacity		Crude Oil Runs to Stills		Crude Runs as % of Capacity	
	Dist. I-IV	U.S.	Dist. I-IV	U.S.	Dist. I-IV	U.S.
1971						
1st Quarter	10,799	12,811	9419	11,136	87.2	86.9
2nd Quarter	10,875	12,922	9404	11,138	86.5	86.2
3rd Quarter	10,950	13,032	9543	11,320	87.2	86.9
4th Quarter	11,027	13,143	9465	11,202	85.8	85.2
1972						
1st Quarter	11,215	13,358	9532	11,365	85.0	85.1
2nd Quarter	11,215	13,353	9672	11,503	86.3	86.1
3rd Quarter	11,188	13,347	10,119	11,972	90.4	89.7
4th Quarter	11,167	13,342	10,052	11,947	90.0	89.5
1973						
1st Quarter	11,250	13,454	10,305	11,888	91.6	90.6
2nd Quarter	11,319	13,533	10,459	12,464	92.4	92.1
3rd Quarter E	11,388	13,613	10,651	12,746	93.5	93.6
4th Quarter F	11,456	13,692	10,524	12,600	91.9	92.0
1974						
1st Quarter	11,521	13,767	10,491	12,580	91.1	91.4
2nd Quarter	11,624	13,880	10,438	12,533	89.8	90.3
3rd Quarter	11,719	13,984	10,475	12,580	89.4	90.0
4th Quarter	11,811	14,086	10,530	12,650	89.2	89.8

E - Estimated

F - Forecast by the Office of Oil and Gas

Historic data from Bureau of Mines

TABLE 8

U.S. Distillate Fuel Demand
Winter 1972/73 and Projected Winter 1973/74
Thousands of Barrels a Day

	4th Quarter 1972	1st Quarter 1973	Winter 1972/73	4th Quarter 1973	1st Quarter 1974	Winter 1973/74	% Increase
Domestic Demand	3458	3885	3669	3538	4572	4048	10.4
Exports	4	6	5	4	4	4	
TOTAL DEMAND	3462	3891	3674	3542	4576	4052	10.3
Stock Change	-391	-478	-434	-152	-905	-524	
Refinery Production	2800	2880	2840	2864	2883	2873	1.2
Imports	271	533	400	526	788	655	63.8
TOTAL SUPPLY	3071	3413	3240	3390	3669	3528	8.9
Runs to Stillis	11,947	12,193	12,068	12,600	12,380	12,590	4.3
Distillate Yield from Crude and Unfinished Oils	22.9	23.8	23.4	22.2	22.7	22.4	

Source: Office of Oil and Gas

TABLE 9
Winter Distillate Fuel Supplies in Districts I-IV
(Thousand Barrels Daily)

Winter	Demand		Supply				Million barrels of ending stocks
	Including exports and transfers	Total	Refinery production	Other domestic	Imports	Stock change	
1971/72	3122	2530	2264	14	252	-592	89.4
1972/73	3388	2970	2560	11	399	-418	101.5
<u>Projected 1973/74</u>							
Base Case 91.7% refinery operations	3707	3120	2579	10	631	-537	90.0
Case A +2% refinery operations	3707	3120	2789	10	421	-537	90.0
Case B -2% refinery operations	3707	3120	2529	10	681	-537	90.0
Case C 91.7% refinery operations maximum distillate yields	3707	3120	2835	10	375	-537	90.0
Case D +2% refinery operations 1 year in 5 - warm weather.	3587	3000	2789	10	301	-537	90.0
Case E -2% refinery operations 1 year in 5 - cold weather	3829	3243	2529	10	803	-537	90.0

Source: Office of Oil and Gas

TABLE 10

U.S. Imports of Distillate Fuel
(Thousands of Barrels Daily)

	<u>1970</u>		<u>1971</u>		<u>1972</u>		<u>1973, 1st Qtr.</u>	
	<u>MB/D</u>	<u>% of Total</u>	<u>MB/D</u>	<u>% of Total</u>	<u>MB/D</u>	<u>% of Total</u>	<u>MB/D</u>	<u>% of Total</u>
Caribbean								
Bahamas	0.5		6.5		3.9		18.8	
BWI	-		-		2.1		-	
NWI	26.7		35.2		33.8		70.1	
Panama	0.5		0.5		0.1		1.3	
Puerto Rico	15.1		22.9		26.0		36.6	
Venezuela	58.0		60.7		49.2		80.6	
Virgin Islands	12.0		15.5		23.9		81.3	
Trinidad & Tobago	<u>10.7</u>		<u>15.4</u>		<u>7.6</u>		<u>12.3</u>	
Sub-Total	123.5	84	156.7	84	146.6	81	301.0	57
Other Western Hemisphere								
Canada	13.5		7.3		6.2		7.4	
Columbia	0.7		0.5		2.1		5.0	
Brazil	<u>0.1</u>		<u>-</u>		<u>0.4</u>		<u>6.3</u>	
Sub-Total	14.3	10	7.8	4	8.7	5	18.7	4
Europe								
Non Communist	5.8		12.5		13.2		167.8	
Communist	<u>3.5</u>		<u>5.4</u>		<u>8.6</u>		<u>29.8</u>	
Sub-Total	9.3	6	17.9	10	21.8	12	197.6	37
Middle East	-		2.0	1	3.3	1	13.7	2
Other	<u>0.3</u>	-	<u>1.5</u>	1	<u>0.4</u>	1	<u>1.5</u>	-
Total	147.4	100	185.9	100	180.8	100	532.5	100

Source: Office of Oil and Gas

TABLE II

EXPECTED CHANGES IN STATE SULFUR STANDARDS a/

<u>State AQCR or Area</u> <u>b/</u>	<u>Distillate</u>	
	<u>72/73</u> <u>reg.</u>	<u>73/74</u> <u>reg.</u>
<u>ME</u> Metropolitan Portland	2.5	1.5
<u>NY</u> Suffolk Co.	1.0	.2
Nassua-Rockland- Westchester	.36	.2
<u>PA</u> City of Philadelphia	.3	.2
<u>MICH</u> Wayne Co. (Detroit)	No Change	
<u>TENN</u> Davidson Co. (Nashville)	2.0	1.0
E. Tenn (excl. Knox Co.)	-	4.8
Tenn. R. Valley-Cumberland	-	4.8
Mid Tenn (excl. Davidson Co.)	-	4.8
W. Tenn; Memphis	-	4.8
<u>SD</u>	-	2.7

a/ Based on interpretation of State Implementation Plans.

b/ These areas represent approximately 13% of the U.S. residual oil consumption and approximate 7% distillate consumption (excluding Detroit which has no change in distillate regulations).

Source: Environmental Protection Agency

Table 12

A Range of U.S. Distillate Fuel Import Potentials
(Thousand Barrels Daily)

Source	(1)	(2)	(3)	(4)
	Winter 1972-73 rate	Reduced rate	Maximum Probable	"Maximum"
Canada	9	8	8	8
Venezuela and N.W.I.....	145	100	150	435 to 535
Other Western Hemisphere....	124	185	185	
Western Europe.....	87	-	165	165 to 365
Communist Europe.....	19	25	25	25
Middle East.....	13	15	15	15
Other.....	3	2	2	2
Total.....	400	335	550	650 to 950

Source: Office of Oil and Gas.

Senator MUSKIE. Thank you, Governor Love, for your statement. I apologize for the fact that I was delayed by business of another committee. I understand that has been explained so I won't belabor it.

I take it that business has been resolved. So we can go on.

Mr. LOVE. How did it come out?

Senator MUSKIE. Let me make a point at at the outset that I think it was well made in the testimony that Mr. Quarles was to deliver today before the Joint Committee on Economics. He said this: "Some of the misinformed would lay the blame for this shortage—this fuel shortage—at the door of environmental protection while the precise part played by environmental regulations is still unclear, it has certainly been exaggerated."

So what disturbed some of us, at least, was the rhetoric of the President's announcement of policy. It seemed to be the rhetoric of those who are all too quick to lay the blame for the energy shortage at the door of laws and regulations so recently adopted that they could hardly be a major factor that some would suggest.

To say there is no relationship would be unrealistic, too. So when I invited you to come here it was principally for the purpose of identifying the greater precision of the administration's view of the problem, the policies under consideration to deal with it and the agencies would have a responsibility and a role in shaping the temporary solutions.

We tried at the staff level to explore in the agencies the basis, the factual basis, for the President's announcement of policy. We weren't very successful. Frankly, we got the impression that there was none.

Your statement this morning I think goes some way toward clarifying that point. But, nevertheless, I think that there are particular questions that you touch upon somewhat in your statement that we would like to probe further.

Because there are so many members of the committee present, I think that we might each try to limit our initial questions possibly to 5 minutes. I think we will all cover question areas that others are interested in anyway. So I will try to limit myself to 5 minutes.

First of all, with respect to relaxing environmental standards I take it from your statement that there will be a positive effort not to relax Federal ambient air standards. What will be the safeguards to guard against that? What will be EPA's role? What will be Mr. Train's role in safeguarding against that possibility?

The reason I ask the question is this: It may well be, as you point out, that the interests of as clean air as we could get as some of the State implementation plans set emission standards greater than that to protect the ambient air standards of the Federal Government, but in cutting back on the State requirements it may well be that the cutback will have the effect of denigrating State or Federal ambient air standards.

I wonder what kind of machinery or procedure or policy would safeguard us against that.

Mr. LOVE. Mr. Chairman, as you know, under the umbrella, so to speak, of EPA, each of the States and some cities have developed implementation plans. Under the act, of course, there is the provision for variance. At the Federal level we legally, it is my understanding, have no power to adjust standards that have been set.

The procedure will be this: I am meeting with a group of about 10 Governors tomorrow to explain to them how we view the heating oil situation and the potential it has for shortage.

We are going to suggest to them that if they agree we believe it would be wise for them to seek on a specific basis on this area or that plant, and whatever it may be, the kind of variances that EPA then will look at on a case-by-case basis and presumably if it falls within the concerns that Mr. Train certainly has of protecting in the event that the variance would be granted.

We want to get the procedure, as I testified, started soon because of the leadtime involved and meeting what potentially could be a serious situation.

Beyond the review and examination of the hearing procedure, of course, in most instances or all instances, we, as I testified, are interested in trying to build the kind of system which can selectively direct the low sulfur fuel to the areas where it would be most needed.

Senator MUSKIE. Would it be made clear to them that the changes in emission standards should not be such as to endanger Federal ambient air standards?

Mr. LOVE. The primary standards, I believe, Mr. Chairman. The EPA for some time has suggested a delay of the implementation at the State level of the secondary standards.

Senator MUSKIE. What will Mr. Train's role be in monitoring this exercise?

Mr. LOVE. The authority to grant or not to grant variances rests in EPA.

Senator MUSKIE. Would he participate in the meeting with the Governors?

Mr. LOVE. Yes. He will be at the meeting.

Senator MUSKIE. Let me ask you this: It is obvious that you understand or agree, at least, with us in our understanding of the need to insure that adjusting our environmental policies to the energy crisis is sufficiently selective to avoid making changes in environmental requirements where it is not necessary.

How are you going to do this without an enforceable distribution policy for fuel? How are you going to insure that clean fuels go where they are needed most? How are you going to insure that implementing this policy does not operate to add to the difficulties of fuel deficit areas?

How can you possibly manage the available or projected fuel supply so that it is funneled into those areas where it is needed most in such a way as to insure that the impact on environmental standards is minimal?

Mr. LOVE. I apologize, Mr. Chairman, in not being fully responsive to that question. In my position as adviser on energy policy I have been in contact with the President and I am not at this moment at liberty to say exactly what that advice has been, but we expect to have some announcement in that general area very soon.

Senator MUSKIE. I was really probing not for an announcement of policy, but I was probing the commonsense of the proposition. My 5 minutes are up. I would hope that other members of the committee will address themselves to this question.

But I wanted to be sure it was opened up early in the hearing.

Mr. LOVE. Mr. Chairman, may I volunteer one other statement?

As I see this, the goal of the clean environment, which I share, I think potentially can be harmed to a greater extent if we indeed do have a crunch this winter.

You have already referred to the "blame-the-environmentalists" kind of attitude that seems to prevail with this whole energy thing. Neither you nor I agree with that, but I am afraid if we let some people get cold and stranded that that kind of feeling has at least the potential of growing.

I think that for the environmental goal, as well as the energy goal, we have a very real stake in making this thing work.

Senator MUSKIE. There is the other point that was illuminated so clearly in a very dark period. The smog alerts of the east coast around Labor Day, that you know it is very clear to anybody who isn't purely blind that the consequences of a failure to meet environmental standards is going to become more and more visible during that period. For instance, emergency admissions to the hospitals related to the respiratory ailments grows by 15 percent. So that is going to become more and more visible, too.

So what we seek here is a balanced program. Your responsibility is energy.

The President has every right to expect you to give full commitment to that responsibility. But I think we have got to be sure that against that is balanced a similar primary responsibility for the environmental. I am trespassing on Senator Buckley's time. I apologize.

Senator BUCKLEY. Not at all.

Governor Love, first of all, I want to say that I find your statement reassuring as to my principal concern, namely the public posture of the administration. I hope that your intention not to violate primary standards through relaxation is a message that goes out today.

One deficiency in your statement, I believe, is that I see nothing in it that reflects any policy towards energy conservation.

You state that if we have an unusually cold winter this year our import requirements might rise to 800,000 barrels a day. That presupposes that we keep the thermostats turned up to our accustomed levels.

I understand that our British brethern can survive the winters at somewhat lower than 72 degrees.

I was wondering, given the fact that burning 800,000 barrels a day of high sulfur content fuels is going to have some effect on the sulfur content of the air, are you thinking at the same time in terms of other standby regulations—specifically, conservation measures—that might one way or another really lessen the need for imports of that size?

Mr. LOVE. In the first place, that 800,000 is somewhere near the top of the scale insofar as everything not working well. Even at that point, of course, not all 800,000 barrels would be high sulfur fuel. As long as Libya continues we are still going to get some more of the sweet, low sulfur product from there and there is some from Nigeria and so forth.

I couldn't agree more that regardless of what the situation turns out to be that we must strongly push a conservation ethic. It is a little more limited. It can be effective in limiting in effect the kind of thing that can be done with gasoline. There isn't perhaps that much swing.

But certainly the need to convince people that they need that thermostat set lower, that the homes be properly insulated to the extent that they have storm windows and so on, which is an essential part of it. I didn't respond perhaps to the last part of your question. What was that?

Senator BUCKLEY. Do you have a standby policy that you are ready to implement under these circumstances that would in effect help offset some of the degradation aspects of burning more high sulfur fuel, by offsetting the demand?

Are you thinking of planning for such a contingency?

Mr. LOVE. If I understand you correctly, we do have in the planning stage a contingency plan which would end up in the rationing of fuel if it became necessary.

We do not foresee the need to implement it now. But I think that is the only other contingency plan that we presently contemplate.

Senator BUCKLEY. I would hope you would think in terms of conservation measures as well.

Mr. LOVE. We certainly are going to stress that.

Senator BUCKLEY. In another area, Governor, you state that "... the result was that over most of the State the restrictions were far more strict than was required to achieve the ambient air standards."

Have you been able to measure the amount of oil that could be released by relaxing the standards in a manner that would not violate primary ambient air standards?

Mr. LOVE. Yes. We have secured various numbers. I don't know how good they really are in that it is a complex thing to compute. We go through the amount that is used to blend the high sulfur residual with the Caribbean refineries. Someone has put a 200,000 barrel per day a gain on that if we did indeed relax. I am not sure that I can assure you of the exact amount. We believe that it would be major. It might make a very real difference.

Senator BUCKLEY. Would it be agreeable with you if some member of the staff of the subcommittee were to track down and try to find out the methodology here?

Mr. LOVE. Yes. I know that EPA has been looking at it. We can get some methodology there. Our analysis section at the Department of Interior also has some help and we can be putting some of those numbers together that would be helpful to you.

Senator BUCKLEY. Given the fact that the EPA has been working in this area for a number of years now and has developed a high degree of expertise in trying to analyze sulfur content and air quality of different areas, has the EPA been assigned a specific responsibility to work with you and your office in helping monitor and have a specific monitor of air quality and do they have a specific responsibility to give you the benefit of their information and recommendations?

Mr. LOVE. Whether formally assigned, certainly we have been meeting, I with Russell Train and my staff with the staff of EPA on many occasions recently. There is another meeting scheduled this afternoon. Russell Train will be at the meeting with the Governors tomorrow.

Ultimately, as I would repeat myself, it is EPA which is going to have the discretion to grant or not grant variances.

Senator BUCKLEY. Thank you. I think my 5 minutes are up, Mr. Chairman.

Senator MUSKIE. Senator Randolph?

Senator RANDOLPH. Thank you very much, Mr. Chairman.

Mention has been made of Russell Train in his capacity as Administrator of EPA. I call attention, Mr. Love, to the release from the Environmental Protection Agency that was made on September 13. EPA notified three utilities of Clean Air Act violations and scheduled hearings for October 18.

I think it is important to have the statement that was made by Mr. Train in connection with this subject matter placed in the record. These are his words.

Since March of 1972 the Japanese have had an operation of a successful stack gas cleaning unit. More recently in Louisville, Ky., the Louisville Gas and Electric Co. has successfully operated a stack gas scrubber with no significant problem.

There is more in the same vein. I will, Mr. Chairman, ask that it be placed in the record at this point.

Senator MUSKIE. Without objection.

[The material referred to follows:]

EPA NOTIFIES THREE UTILITIES OF AIR VIOLATIONS, SCHEDULES HEARING FOR OCTOBER 18

The Environmental Protection Agency today announced it will hold a public hearing beginning October 18, 1973, to consider the status of compliance with sulfur oxide emission regulations by power plants through the application of control technology for removing sulfur oxides from their stack emission gases.

At the same time, EPA said it has issued notices to three utilities of violation of sulfur oxide regulations established under the Clean Air Act. Section 113 (a) (1) of the Act empowers the EPA Administrator to issue such notices and, if the violation extends beyond 30 days of the notification, to issue an order requiring compliance.

The three companies are: Northern Indiana Public Service Company, Bailly Station, near Gary, Indiana; Public Service Company of Indiana, Wabash River Station, Terre Haute, Indiana; and West Pennsylvania Power Company, Mitchell Station, Courtney, Pennsylvania.

Stack gas cleaning systems are commercially available for removing significant percentages of sulfur oxides from emission gases. The progress of electric utilities in installing these systems will be a central issue under consideration at the hearings beginning October 18. The hearings, expected to last about two weeks, will be held at the Marriott Twin Bridges Motel, Route #1, Arlington, Virginia.

The owners and operators of these and a number of other power plants will testify at the hearing. Companies issued a notice of violation will be required to answer questions on the finding and nature of the violation, any efforts taken to achieve compliance, application of control technology both in general and as it relates to specific power plants, and schedules to achieve compliance with applicable regulations.

Other members of the power plant industry, related industries, and other interested persons have been called upon to attend the hearing and present their views on control technology for removing sulfur oxides from power plant emissions. Those wishing to file written comments should send them to the Director, Division of Stationary Source Enforcement, EPA, Room 3220, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. Comments must be received before noon October 12.

Representatives of other power company plants are expected to attend the hearing. Those plants are:

Tennessee Valley Authority, Widows Creek Station, Stevenson, Ala.

Tennessee Valley Authority, Kingston Station, Kingston, Tenn.

American Electric Power Co., Kammer Station, Wheeling Vicinity, West Va.

American Electric Power Co., Cardinal Station, Brilliant, Ohio.

Ohio Edison, Sammis Station, Stratten, Ohio.

Ohio Edison, Burger Station, Shadyside, Ohio.

Commonwealth Edison, Joliet Station, Joliet, Ill.

Commonwealth Edison, Waukegan Station, Waukegan, Ill.
 Kansas City Power and Light, Hawthorne Station, Kansas City, Mo.
 Kansas City Power and Light, La Cygne Station, La Cygne, Kan.
 Louisville Gas and Electric Co., Paddy's Run No. 6 Station, Louisville, Ky.
 Boston Electric, Mystic Station, Mass.
 Commonwealth Edison, Will County Station, Joliet Vicinity, Ill.
 Illinois Power Co., Wood River, Ill.
 Potomac Electric Power Co., Dickerson Station, Maryland.
 Philadelphia Electric Co., Eddystone Station, Eddystone, Penn.
 Duquesne Light Co., F. Phillips Station, S. Heights, Penn.
 Southern California Edison Co., Mohave Station, Clark County, Nev.
 Public Service of New Mexico, San Juan Station, Four Corners Vicinity, New Mex.

OPENING STATEMENT BY RUSSELL E. TRAIN

PRESS CONFERENCE SEPTEMBER 13, 1973

Good afternoon.

This will be a somewhat informal, get-acquainted press conference with an opportunity for you to ask questions shortly. However, I would like first to discuss a few matters of current interest before we get into the question period.

First, we are announcing today that we will hold a public hearing beginning October 18 to review the status of compliance with sulfur oxide emission regulations by power plants through the application of control technology for removing sulfur oxides from their stack emission gases. This hearing will be held here in the Washington area.

We have today issued notices of violation to three power plants that are not complying with emission regulations adopted pursuant to the Clean Air Act. We also expect testimony at the hearing from power companies that either are likely to need to install control equipment to comply with emission requirements or have experience with or have ordered such control equipment. In addition to power companies we expect testimony from vendors of control equipment, independent experts, state and local government officials, environmental groups, and other interested persons.

In a related matter, I would like to draw your attention to the decision last Monday by the U.S. Court of Appeals for the District of Columbia. It upheld EPA's new source performance standard for coal-fired power plants and for sulfuric acid plants.

The cases are significant because the Court upheld our approach to the adoption of new source performance standards. It said the record showed that technology was "adequately demonstrated, that cost has been taken into consideration, and that the emission standards are achievable." EPA was "pushing" technology to some degree in establishing those standards, and the Court upheld this approach when it agreed that it was not necessary that the standard we set was actually met by existing plants.

In the power plant case, the basis for the standard was EPA's determination that scrubbing technology could be used to control sulfur oxides. The power industry, with some exceptions, has been slow to install scrubbers, maintaining that their effectiveness had not been proven. The only alternative to scrubbers is use of low sulfur fuels. So this case supports our position, and if scrubbers are used on power plants, our high sulfur fuels can be used without compromising clean air goals.

The key constraint to more rapid utilization of coal in the United States has been the absence of an acceptable stack gas cleaning technology. That brings me to a third matter. Since March of 1972, the Japanese have had in operation a successful stack gas cleaning unit. More recently in Louisville, Kentucky, the Louisville Gas and Electric Company has successfully operated a stack gas scrubber with no significant problems.

The utility began pilot plant work on stack gas scrubbers operation on one boiler at the company's plant in Louisville. Robert L. Sansom, EPA Assistant Administrator for Air and Water Programs, has personally visited this plant. Mr. Sansom is present in case any of you might have questions on the subject. The success of this unit is largely due to the comprehensive knowledge of the chemistry of the process, and a knowledge that also appears to explain the Japanese success of a year ago.

In passing I might mention that there are now 33 sulfur dioxide control systems currently operating or under construction in the U.S. These represent about 13,000 megawatts or about nine percent of current U.S. coal-fired utilities generating capacity. We continue to believe stack gas scrubbing is feasible and that electric utilities should move forward vigorously to implement it so that the nation can fully use its vast coal resources and achieve clean air at the same time.

The President's Energy Message of last April singled out coal as our most abundant source of energy and pointed to the need for us to rely on it to a greater extent. In that message, the President endorsed EPA's clean fuels policy which is designed to delay the date of attainment of non health-related clean-up in order that clean coal technology can be given time to be applied on a pilot scale. That is the significance of the achievements in Louisville and Japan I have just described.

From the information now available to us, it appears that there could be a significant shortage of heating oil this winter. The situation is the result of insufficient production and desulfurization capacity at domestic refineries and the substantial price differential between domestic and imported distillate oil.

EPA's concern with the problem is twofold. First, there must be an adequate supply of heating oil to meet the Nation's needs. Second, if it is necessary to use heating oil that exceeds the sulfur limits established by the States—and it certainly looks to us that this is going to be necessary in some cases this winter—this must be done in a manner which will minimize the impact on air quality.

Based on our projections and an assessment of air quality problems, we will provide guidance to the States on preparation of contingency plans for dealing with the fuel situation. The plans would have to provide for variances from air pollution control regulations in some instances.

You may recall that a similar situation existed last winter. Fortunately it proved less serious than had been anticipated, largely because of mild weather. EPA indicated to the States then that temporary variances could be granted where fuel meeting their sulfur limitations was not available. We received a total of only 13 variance requests and approved six, affecting just two air quality control regions.

Since there was not sufficient time for formal variance procedures, EPA simply informed the States in these cases that it would not object to the temporary suspensions from compliance with implementation plan requirements.

We believe it is possible this year to develop plans that will minimize the impact on attainment and maintenance of health-related air quality standards.

What we are attempting to do this winter is not merely to react to the heating oil shortage as it develops, but rather to forecast the dimensions of the problem and work out, in advance, a plan for dealing with it in a manner compatible with consumer needs, the logistics of heating oil distribution, and environmental quality.

Ultimately, one of the most important aspects of solving our energy problems is energy conservation. EPA has a critical interest and involvement in this subject. Accordingly, I am pleased to see that General Motors, Ford, Chrysler, International Harvester, and nine foreign auto manufacturers have already notified EPA that they will participate in EPA's auto labelling program by putting window stickers on 1974 cars and light-duty trucks showing how many miles per gallon of gasoline to expect from the vehicle.

The foreign manufacturers include Volkswagen, Datsun, Alfa Romeo, Daimler-Benz, Volvo, Toyo Kogyo, Saab-Scania, British-Leyland and Subaru.

This voluntary program is in response to the President's energy message calling for the conservation of fuels, and should help make the motoring public more aware of the dimensions of the problem.

NOTICE

ENVIRONMENTAL PROTECTION AGENCY STATIONARY SOURCE ENFORCEMENT PROCEEDING

NOTICE AND PROCEDURE FOR PUBLIC HEARING

Commencing on October 18, 1973, at 9:30 a.m., a public hearing will be held to consider the status of compliance with sulfur oxide emission regulations by power plants through the application of control technology for removing sulfur oxides

from their emission gases. The hearing will convene at the Marriott Twin Bridges Motel, U.S. Route 1, Arlington, Virginia, and transfer to the Crystal City Theatre, 1811 Jefferson Davis Highway, Arlington, Virginia, starting October 23, 1973.

Notices of violation have been issued by EPA pursuant to Section 113(a) (1) of the Clean Air Act, as amended (42 U.S.C. § 1857c-2), with respect to the following power plants:

- (1) Northern Indiana Public Service Co., Bailly Station, Gary Vicinity, Indiana.
- (2) Public Service Co., Indiana, Inc., Wabash River Station, Terre Haute, Indiana.
- (3) West Pennsylvania Power Co., Mitchell Station, Courtney (Washington County), Pennsylvania.

Pursuant to Section 114(a) of the Clean Air Act, as amended (42 U.S.C. § 1857c-9), the owners and operators of these and other power plants, as listed below, have been requested to attend the hearing:

- (1) (a) Tennessee Valley Authority, Widows Creek Station, Stevenson, Alabama.
- (b) Tennessee Valley Authority, Kingston Station, Kingston, Tennessee.
- (2) (a) American Electric Power Company, Kammer Station, Wheeling Vicinity, West Virginia.
- (b) American Electric Power Company, Cardinal Station, Brilliant, Ohio.
- (3) (a) Ohio Edison, Sammis Station, Stratton, Ohio.
- (b) Ohio Edison, Burger Station, Shadyside, Ohio.
- (4) (a) Commonwealth Edison, Joliet Station, Joliet, Illinois.
- (b) Commonwealth Edison, Waukegan Station, Waukegan, Illinois.
- (5) (a) Kansas City Power and Light Co., Hawthorne Station, Kansas City, Missouri.
- (b) Kansas City Power and Light Co., La Cygne Station, La Cygne, Kansas.
- (6) Louisville Gas and Electric Co., Paddy's Run #6 Station, Louisville, Kentucky.
- (7) Boston Edison, Mystic Station, Everett, Massachusetts.
- (8) Commonwealth Edison, Will County Station, Joliet Vicinity, Illinois.
- (9) Illinois Power Co., Wood River Station, Wood River, Illinois.
- (10) Potomac Electric and Power Co., Dickerson Station, Dickerson, Maryland.
- (11) Philadelphia Electric Co., Eddystone Station, Eddystone, Pennsylvania.
- (12) Duquesne Light Co., F. Phillips Station, South Heights, Pennsylvania.
- (13) Southern California Edison, Mohave Station, Clark County, Nevada.
- (14) Public Service of New Orleans, San Juan Station, Four Corners Vicinity, New Mexico.

At this hearing each company issued a notice of violation will be required to answer relevant questions and present information bearing on:

- (1) the finding of violation;
- (2) the nature of the violation;
- (3) any efforts taken to achieve compliance;
- (4) application of control technology both in general and as it relates to specific power plants; and
- (5) a reasonable and expeditious schedule for achieving compliance with applicable regulations.

All other companies requested to attend the hearing will be expected to answer questions and present information bearing on items 3-5, as listed above.

In addition, the three companies issued a notice of violation and the first four companies, as listed above, issued a request for information pursuant to Section 114 will be requested to submit a detailed report to the Director, Division of Stationary Source Enforcement (DSSE), Environmental Protection Agency, Room 3220, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460 to be received no later than 12:00 noon October 12, 1973.

The Administrator encourages other members of the power plant industry, related industries, vendors of control equipment and other interested persons to attend the hearing and to present information and views pertinent to the application of control technology for removing sulfur oxides from power plants. The hearing is being held both to fulfill the statutory requirements of Section 113 (a) (4) of the Clean Air Act, as amended (42 U.S.C. § 1857c-8), and to elicit

information on the status of compliance by power plants generally through the use of sulfur oxide control technology.

Any person may participate in the public hearing through the filing of written comments or information with the Director, DSSE. Written matter may be submitted for inclusion in the record of the hearing at any time prior to completion of the hearing.

Any person desiring to make an oral statement at the hearing and not otherwise requested or invited to testify shall file a written request (10 copies, if practicable) to make an oral statement with the Director, DSSE, not later than October 12, 1973. Persons failing to submit timely written requests to give oral presentations at the public hearing shall not be entitled to appear at the hearing except at the discretion of the hearing panel. Such persons are not precluded, however, from submitting written statements for the record and written questions to be propounded by the hearing panel. Written requests to make oral presentations shall contain a summary of such person's oral statement. Direct oral statements by invited participants, other than the owners and operators of power plants to whom notices of violation have been issued, shall be limited to twenty (20) minutes, and all other participants shall be limited to fifteen (15) minutes, followed by such questioning as the hearing panel deems appropriate. Requests for additional time can be presented to the Director, DSSE but must include a showing that any information requiring additional time for presentation cannot be submitted appropriately as written matter.

The public hearing is designed to give all persons an opportunity to participate in this proceeding. Participants may present data, views, arguments, or other pertinent information concerning compliance by the above power plants with applicable regulations and may submit written questions to be propounded to a witness by the hearing panel. Participants in the proceeding may, in addition, submit written requests to question specified witnesses directly. Such written requests may be submitted at any time and shall be allowed at the discretion of the hearing panel. Requests to question a witness directly shall contain a showing that the issues to be addressed are critical to the issues in the proceeding and that interrogation of the witness by the requesting party is likely to be more effective in eliciting critical information than by the panel or through written questions submitted by such participant. Such requests shall specify the particular issues to be pursued on direct examination of a witness.

The panel may exclude irrelevant or redundant material or questions, and may direct that corroborative material be submitted in writing rather than presented orally.

A verbatim transcript of the proceeding will be made and copies will be available from the reporter at the expense of any person requesting them.

Date

Administrator

Senator RANDOLPH. In the current issue of Business Week there is an article that goes to this point. The Universal Oil Productions Co. explains in an advertisement called, "What Goes Up a Chimney? Nothing" that there is team work going on in reference to technology. Two persons within the company are talking and one says, "What it boils down to is that with most air pollutants we have a system of control." There is the reply from the other person in the company saying, "Not only control, but often a virtual elimination and for a broad range of industries, even the most serious offenders."

So I ask unanimous consent that that also be included in reference to this matter.

Senator MUSKIE. Without objection.

[The article referred to follows:]

UOP TEAMWORK IN TECHNOLOGY

"WHAT GOES UP A CHIMNEY? NOTHING."

Highlights of a dialog between John O. Logan, President of Universal Oil Products Company, and Richard Speer, UOP Executive Vice President

Mr. Logan: What it boils down to, then, is that with most air pollutants, we have a system of control.

Mr. Speer: Not only of control, but often of virtual elimination. And for a broad range of industries. Even the most serious offenders.

Mr. Logan: "Serious" is certainly the right word, Dick. What's more disturbing to me is that of the five major air pollutants, *each one* is considered injurious to health. Sulfur dioxide, in particular. But we've licked that problem, too, even for high-sulfur fuel users.

Mr. Speer: That's true, John. Actually, we have several proven systems for removing SO₂ from industrial flue gases. It's now possible to curb these noxious emissions with up to 95% efficiency. Some of these systems can simultaneously reduce *fly ash* by as much as 99%.

Mr. Logan: The ecologists' goal, of course, is a 100% pollution-free atmosphere. I don't think that's being too idealistic, do you, Dick?

Mr. Speer: Not when you realize that simply controlling stack gases and automotive exhaust fumes alone would eliminate 92% of it. The remaining 8% will yield to technology, too.

Senator RANDOLPH. There was given, Mr. Chairman, to me earlier today, a brochure describing the effort being made at General Motors to make coal burning environmentally acceptable. It is a very interesting and an intensely absorbing subject from the standpoint of what that company, an automotive and manufacturing company, is doing in connection with clean coal power.

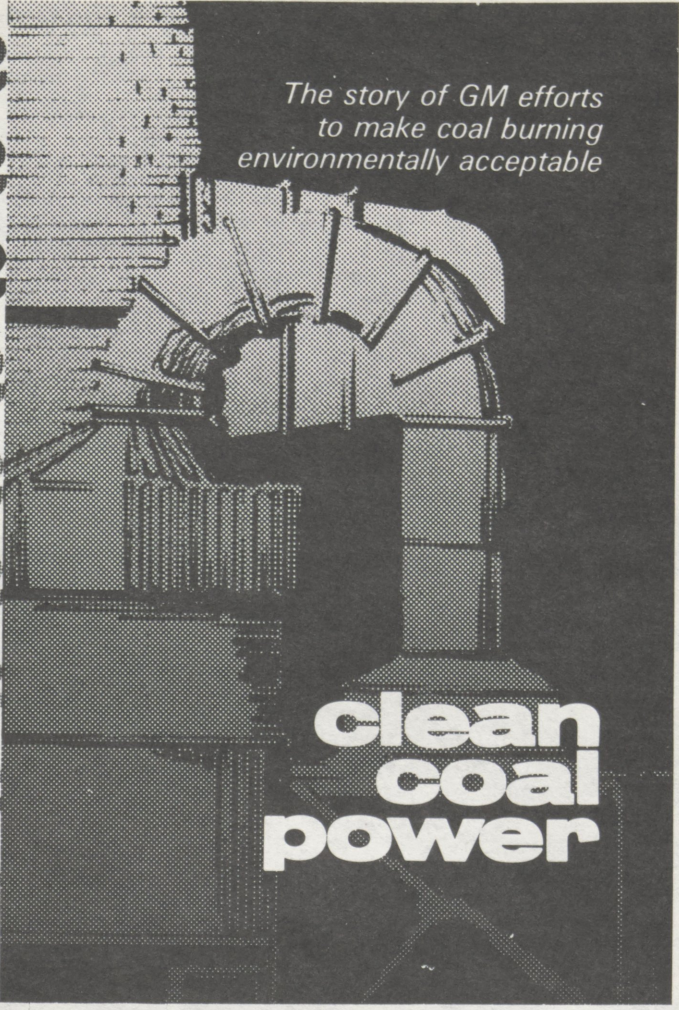
We do know that 48 percent of the noncoal reserves, Governor Love, of the world, enough to last for hundreds of years, are in the United States. They are not in some other part of the world.

I ask unanimous consent that the successful efforts which General Motors feels have been in process and the real advancements have been made be included in the record at this time.

Senator MUSKIE. Without objection.

[The brochure referred to follows:]

*The story of GM efforts
to make coal burning
environmentally acceptable*



**clean
coal
power**

Our ability to put energy to good use has been a major source of this nation's vitality and strength. Once abundant and cheap, energy is fast becoming our economic Achilles heel. The U.S. has a shortage of natural gas. We are using much less coal because it pollutes the air we breathe. This puts extreme pressure on petroleum. By 1980, the U.S. may be importing as much as 50 percent of its requirements, mostly from the politically sensitive Middle East.

Prudence requires that we become more energy self-sufficient. It is important to use available energy wisely, but it is even more important to increase the supply. This is fundamental to realizing our national goals.

The U.S. has an abundance of coal, but the amount of low sulfur coal able to meet national clean air standards is very limited in the heavily industrialized eastern sector of the country. A sulfur dioxide scrubber, under development by GM since 1968, has proven itself capable of removing over 90% of sulfur oxides from flue gases in pilot operation. This performance is equivalent to burning the lowest sulfur coal available. It is now being installed at the Chevrolet-Parma plant and is expected to be in full operation early next year. To our knowledge it is the first full scale system of its kind anywhere in the United States.

Confidence is running high that the innovative Double-Alkali system will help stimulate greater use of coal not only in industrial boilers, but also by electric utilities—the largest coal burning industry. This could help free more natural gas and low sulfur oil for uses where there is no economically feasible alternative.

It has been GM policy to share such technology with any interested organization. Accordingly, our efforts and progress are discussed in this booklet, as well as much of the process technology itself. Further information may be obtained from the Plant and Environmental Engineering Department of the Environmental Activities Staff...GM Technical Center, Warren, Michigan 48090.



A handwritten signature in dark ink, appearing to read "E. Starkman". The signature is fluid and cursive, with a long horizontal stroke at the end.

E. S. Starkman
Vice President
Environmental Activities Staff

Counting on Coal

Almost everybody is talking about energy and fuel supplies today. And many people are trying to do things to make more energy available. General Motors Corporation people are working in many areas to conserve energy—in our plants as well as our products—and to develop methods for utilizing our most abundant energy source—old king coal.

America has vast supplies of coal—enough to meet our total energy needs for hundreds of years—that cannot be used in many parts of the country today because coal burning pollutes the air.

The GM effort to clean up coal really began in the middle 1960's. Previously, dust collectors—devices that mechanically or electrically filter small particles from the flue gases of coal burning boilers—were the only pollution control devices commercially available. They were capable of removing fly ash, the visible polluter, but they could not remove the pungent invisible gas, sulfur dioxide (SO_2). Without this capability, we cannot avail ourselves of energy stored in our vast supplies of high sulfur coal.



Continental U.S. contains 48% of the world's known coal reserves—enough to last hundreds of years. Greater use of our most abundant fossil fuel can help ease the nation's energy dilemma.

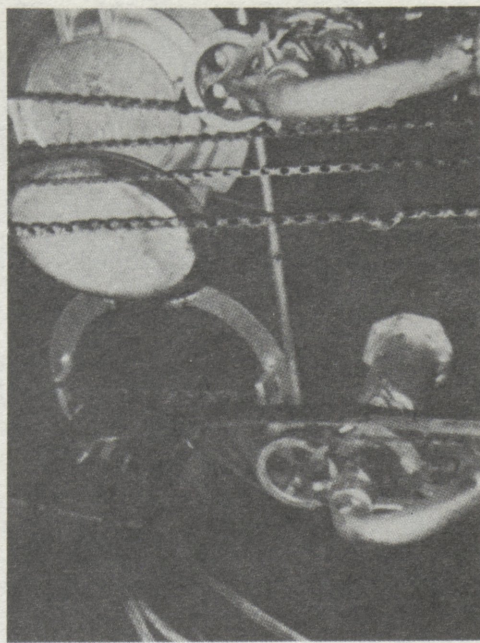
And so the goal became: find a way to remove sulfur from the coal burning process.

First Efforts

The coal industry and the government had been working toward the same goal. Their initial studies showed that it would be more efficient to remove SO_2 after the coal was burned than to remove sulfur from coal before it was burned.

Coal industry research indicated that low-cost materials could be injected into boilers to remove SO_2 . Building on this, a GM team comprising employees of the Environmental Activities Staff, GM Manufacturing Development, and the Chevrolet Motor Division began an intensive test program at the Chevrolet-St. Louis plant (now a part of General Motors Assembly Division) to evaluate the so-called Dry Additive Injection technique. In this system, a powdered alkaline material is blown into a coal-fired boiler where it reacts with the SO_2 to form a chemical salt. The salt particles, carried by the flue gases, are removed by a dust collector. Lime, limestone, and "red mud" (a by-product of the aluminum industry) were proposed for use as the alkaline material. Limestone was eventually selected because of its availability.

The test program revealed that the location of the limestone injected into the boiler was critical. The temperature in the injection location had to be high enough to drive off the carbon dioxide from the limestone—to leave a "vacancy" for SO_2 —but low enough that the reactivity of the limestone was not destroyed.



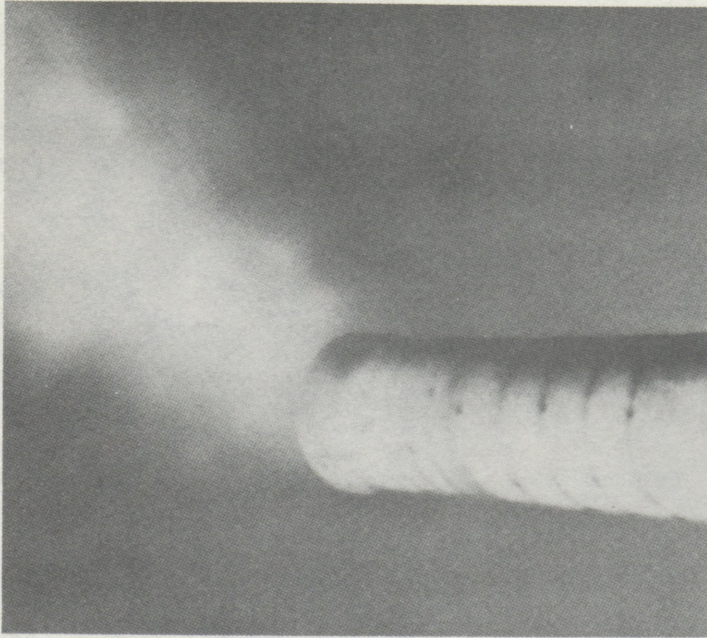
Powdered alkali is blown into a boiler through pressurized lines.

The size of the particles blown into the boiler also proved critical. The smaller the particles, the more SO_2 was removed. However, beyond a certain point, the dust collectors could not remove the small particles, and stack emissions increased rather than decreased.

The target for the St. Louis test was 70%. Even under optimum conditions, however, SO_2 emissions were reduced by only 30%. This inadequate performance eliminated the Dry Additive technique from further consideration.

Scrubbing It Out

A second approach, the wet scrubbing technique, seemed to offer the most reliable alternative. In this system, flue gases are bubbled through an alkali mixture. This mixture then "scrubs" the SO_2 gases from the rest of the flue gases in much the same way that the detergent in a washing machine removes soil from laundry.



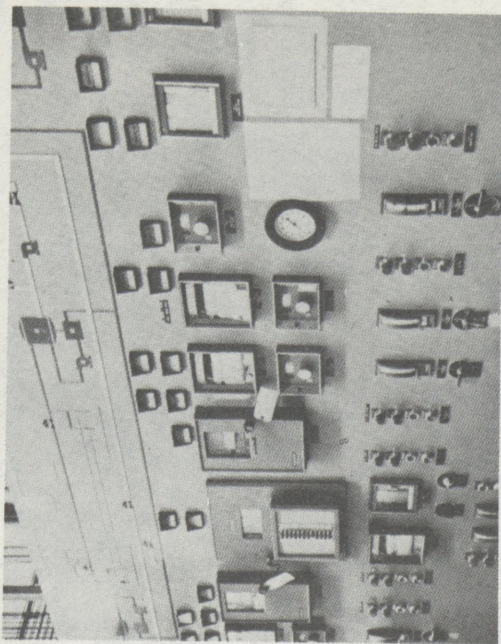
A reddish-brown plume from the chimney of a boiler equipped for "Dry Additive Injection" betrays the presence of particulates of "red mud" in the boiler exhaust gases.

The theory is simple. Just select an alkaline material that will combine with SO_2 (and there are many), mix them together and then remove the alkali- SO_2 compound.

The problem was in taking the system out of the realm of theory and into the "real world." Like many inventions, the first scrubbers worked better on paper than in practice.

The utility industry had experimented with a scrubbing system using a limestone slurry in the scrubbers. Early in its development, this system had scaling and plugging problems due to the reactions within the slurry, and experienced equipment breakdowns resulting from corrosion and erosion.

In evaluating the limestone slurry process, the GM team decided that it was potentially effective if the high maintenance problems could be solved. To prevent the plugging and scaling, they decided to use a water-soluble chemical in the scrubbing liquid, caustic soda, in place of the limestone slurry.



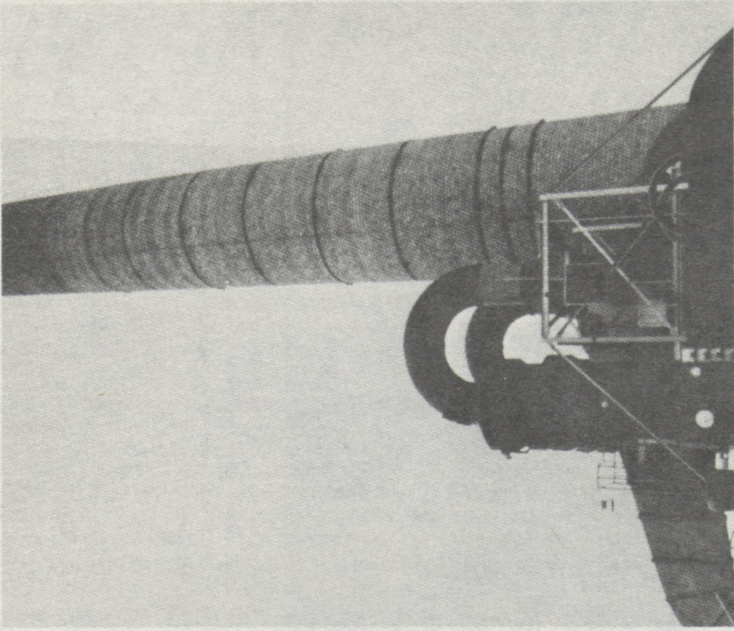
This is a portion of the instrumentation and control room at the St. Louis plant. The equipment operates the scrubber system, which has maintained over 90% sulfur dioxide removal rate since its installation in 1972.

Briefly, the system works like this: Caustic soda is dissolved in water and pumped into a scrubber. There, the flue gases are bubbled through the caustic solution. Carbon dioxide in the flue gases combines

with the caustic soda to form bicarbonate of soda, which in turn reacts with the SO_2 in the gases to form sodium sulfite. Some of the sulfite is oxidized to form sodium sulfate. This sulfite-sulfate mixture is then pumped from the scrubber.

Preliminary tests showed the system to be feasible and efficient. In 1971, construction of a full-scale facility was started at the St. Louis plant. The system was debugged and has maintained a 90% plus on-line operating rate since the fall of 1972. It has demonstrated the capability of removing more than 90% of the sulfur from flue gases.

Although successful in St. Louis, its application in other locations is questionable because of the problem of disposing of the sulfite in the scrubber effluent. In St. Louis, the water authorities have allowed the effluent to be discharged into the city sewer system after it has been aerated. In other locations with different waste treatment facilities, this might not be possible.



A scrubber crouches atop the General Motors Assembly Division plant in St. Louis.

Twice Is Nice

Early in the planning for a sodium-based scrubbing system, the GM team recognized that success would depend ultimately upon the elimination of its inherent water pollution problem. For this reason, they began in 1969 to develop a method for treating the scrubber effluent and then reusing it.

Laboratory tests confirmed the feasibility of regenerating the scrubbing liquid by adding lime. Lime reacts with the sodium sulfite and sulfate from the scrubber, causing the sulfur to precipitate, or "settle out," in the form of calcium sulfite and sulfate, and yielding a caustic soda solution to be returned to the scrubber. The precipitate is removed and dewatered to form a solid waste cake. The process is known as the Double-Alkali system.

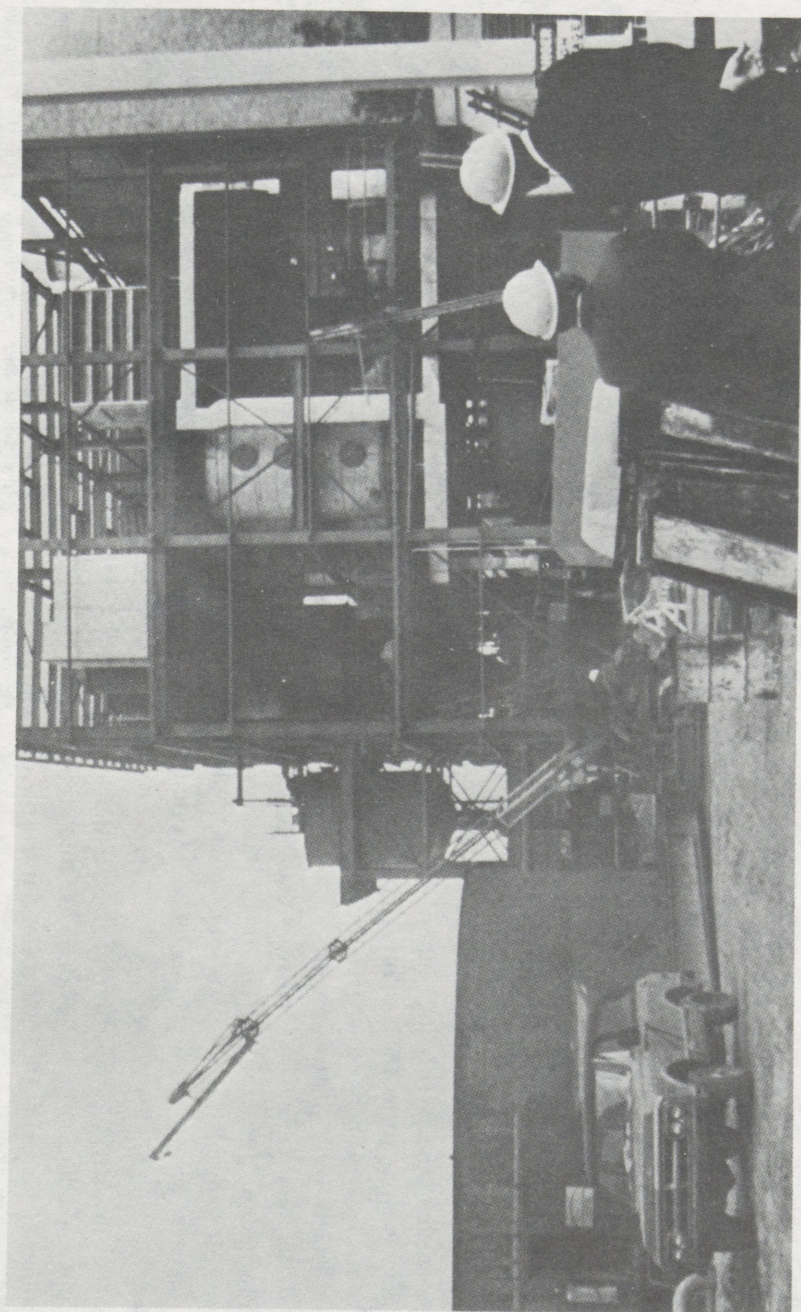
To investigate operating characteristics, a small pilot installation was located at the stoker-fired boiler facility of the Chevrolet-Parma plant, near Cleveland. Initial runs again showed more than 90% SO₂ removal.

By July of 1971, the reliability demonstrated by the pilot system recommended a full-scale installation. This is a Corporate project being coordinated by the Environmental Activities Staff. GM Argonaut Division started design of the installation in September 1972. Construction, now underway, is scheduled for completion in 1973.



The pilot model Double-Alkali scrubbing system at the Chevrolet-Parma plant near Cleveland, Ohio, reduced powerhouse emissions of sulfur dioxide by more than 90% during its 14-month test period.

Construction of the Double-Alkali scrubbing system at the Chevrolet-Parma plant.



The GM Double-Alkali System

Reduced to its simplest terms the GM Double-Alkali system is a three-step process:

- First the SO_2 gas is chemically "absorbed" into a liquid solution in the scrubber. This solves the air pollution problem, but can create a potential water pollution problem if the sulfur-laden solution is discharged to a sewage system not equipped to handle it.
- To prevent this, a second chemical is added to settle-out the sulfur into a solid cake-like substance which can be disposed of safely in a landfill.
- The liquid solution produced is then treated by a third chemical to make it suitable for re-use in the scrubber.

WHAT GOES IN

- *Coal which releases sulfur dioxide and fly ash when burned*
- *Water to replace that lost by evaporation*
- *Lime to remove sulfur from the scrubber effluent*
- *Soda ash to replace sodium lost in the filter cake*

WHAT COMES OUT

- *Ashes from the burned coal and the dust collector*
- *Carbon dioxide and water vapor through the stack*
- *Calcium sulfite and sulfate, plus ash particulate in the form of a waste cake*

How It Works

As installed, the Double-Alkali system takes the form of a large chemical processing plant, considerably more complex than the boiler itself. As the drawing indicates, its three basic sub-systems can be identified by separate color-keyed flow diagrams:

1. "Scrubbing" the SO_2 (Yellow)

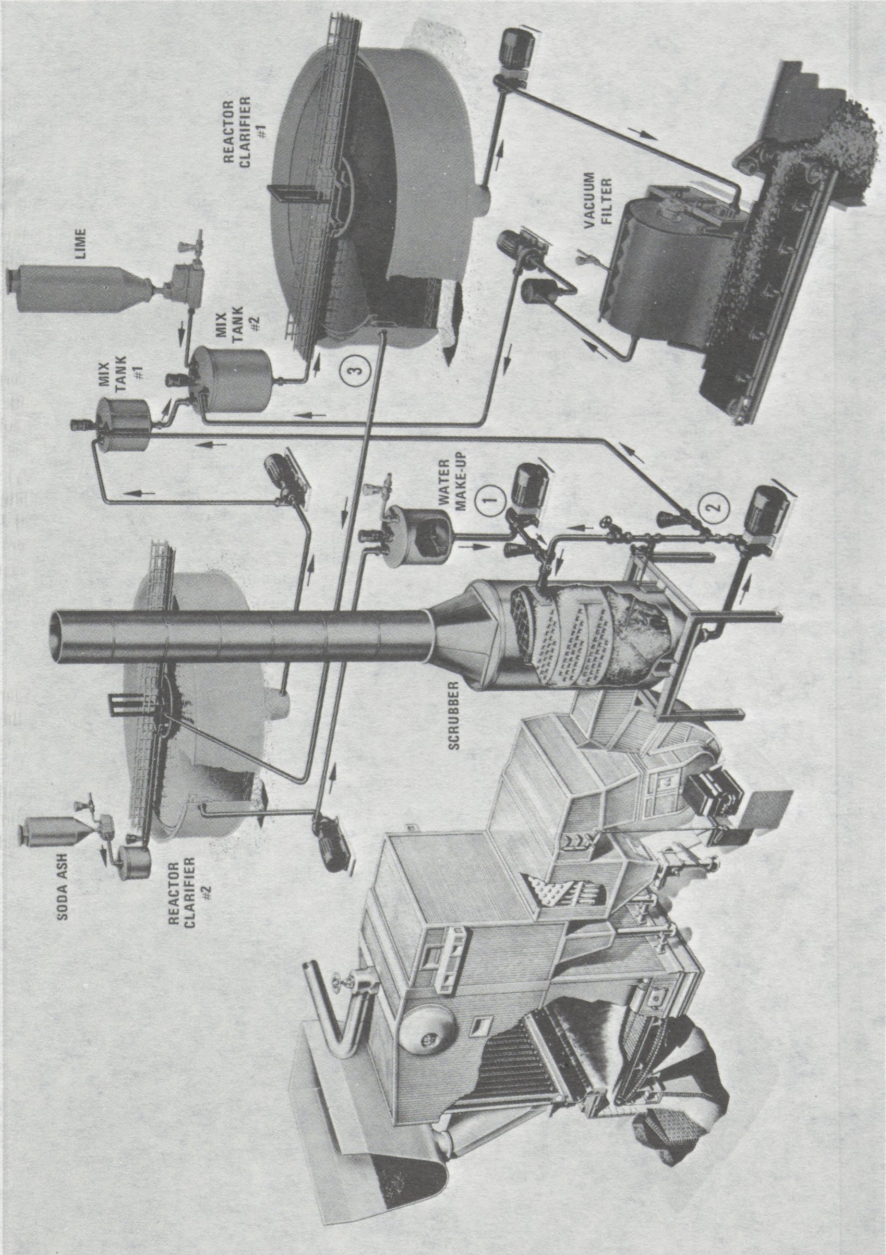
The process begins when the flue gas passes through a dust collector to remove particulate matter. It then bubbles upward through a solution of caustic soda inside the scrubber. Through a series of chemical reactions, the SO_2 is removed and trapped in the scrubber solution in the form of sodium sulfite and sulfate. Most of the liquid is recirculated through the scrubber, but a percentage is constantly being drawn off.

2. Converting to landfill (Green)

The portion being drawn off is pumped into Chemical Mix Tanks 1 and then 2, where it is mixed with calcium carbonate and calcium hydroxide (lime) respectively and into Reactor Clarifier #1. Here the sodium sulfite and sulfate from the scrubber continue to react with the lime and calcium carbonate to form calcium sulfite (CaSO_3) and calcium sulfate (CaSO_4), both of which precipitate, or settle out of the solution. These solids are pumped from the bottom of the tank into a vacuum filter where the liquid is drawn out and recirculated through the system. The resulting waste cake can be disposed of in an approved landfill.

3. Regenerating the solution (Blue)

The sodium hydroxide solution formed in Reactor Clarifier #1 is transferred into Reactor Clarifier #2 where a limited amount of soda ash is added. Chemical reaction forms calcium carbonate (CaCO_3)—a precipitate that is pumped back into Chemical Mix Tank #1 to pretreat the scrubber effluent. The cleaned up sodium hydroxide is then pumped back for re-use in the scrubber. Water is added to compensate for evaporation.



Looking Ahead

In anticipation of success at Parma, an engineering evaluation is already under way to consider potential sites for other scrubber installations.

The Environmental Protection Agency's Control System Laboratory has asked to join General Motors in a joint study of the Double-Alkali system. Tentatively, this study will begin in 1974. This proposal is consistent with GM's policy of sharing knowledge and experience on scrubber technology with all interested parties.

While the General Motors SO₂ control team continues to pursue clean energy from coal, other teams are examining other methods to make coal's energy clean and convenient. These methods include gasification, or transforming coal into clean-burning gaseous fuels.

Why is GM spending so much time and effort to clean up coal? One reason is that we use a great deal of energy each year and as other fuels become scarce and more expensive, we want to be able to take advantage of one of our greatest natural resources—an abundant coal supply. And we want to continue to maintain and improve the environment to the very best of our ability.

Senator RANDOLPH. I have indicated that in these three situations from the Louisville Gas & Electric Co., from the UOP Co., and from the General Motors Co., they are saying that we have the technology in part perhaps more than we realize, Mr. Love, to do this job of having clean fuels.

I only regret that frankly the Federal Government—let's say without blame to any particular source—hasn't been moving forward as you, I am sure, would know we should have moved forward many, many years ago; is that correct?

Mr. LOVE. I think it is so true that in the whole energy problem I have found that everything should have been done yesterday or last year or 10 years ago. I think it is time that we do, with a sense of urgency, get on with the job. I really feel that it needs to be pushed.

On the stack gas cleaning, I couldn't agree more that that holds the potential of a near- or middle-term alleviation for the problem. But as I am sure you know, even when we acquire the consistent, reliable stack gas cleaning technology there are also other problems with the disposal of the residue, with the whole problem of getting the coal industry back into production. Strangely enough we have, with all of those reserves, almost a shortage of deliverable coal at the present time.

Senator RANDOLPH. I want to emphasize that coal can be made, let's say, environmentally possible, in connection with our energy thinking. We can have clean coal and from it the power which I have indicated is needed. In this connection, I ask unanimous consent that the decision of the U.S. Court of Appeals in the case of *Appalachian Power, et al. v. EPA*, be included in the hearing record as an appendix.

Senator MUSKIE. Without objection. (See p. 105.)

Senator RANDOLPH. Governor, early this year we had before us in the Senate as you and my colleagues will recall, the fuel allocation bill. At that time I offered an amendment, sense of the Congress, and it was adopted, which calls for a reduction of vehicle speed by 10 miles per hour. That was to save gasoline.

In connection with that action I addressed a letter which I shall ask unanimous consent to include in the record to all of the Governors of the 50 States.

We have had replies now from some 55 percent of the Governors and most of them are on the affirmative side.

I think, also, that I would ask that we place in the record a newspaper account of a Gallup survey with the heading "Public Favors Limits on Speed To Save Gas." This is as recent, of course, as September.

Senator MUSKIE. Without objection.

[The letter and the Gallup survey referred to follows:]

U.S. SENATE,
COMMITTEE ON PUBLIC WORKS,
Washington, D.C., June 7, 1973.

DEAR GOVERNOR: On June 4 the Senate adopted my amendment declaring it to be the sense of the Congress that speed limits should be reduced on our country's highways as a gasoline conservation measure. This amendment calls on the states to lower speed limits on all Federal-aid highways by 10 miles per hour or to 55 miles per hour, whichever is greater.

In view of the present gasoline shortage and the immediate prospects for its becoming even more severe, I believe this action could be instituted with relative speed and would produce significant savings in gasoline on a short term basis as

we attempt to secure a permanent solution to this problem. For your information, I enclose a copy of the Senate debate on this amendment.

The provisions of this amendment are not mandatory. The fuel shortage is a matter of serious national concern, and lowering speed limits is one way in which we can respond immediately, with positive results.

With best wishes, I am

Truly,

JENNINGS RANDOLPH.

PUBLIC FAVORS LIMITS ON SPEED TO SAVE GAS

United Press International

PRINCETON, N.J.—Although the American driver is frequently depicted as addicted to high speeds, a majority in a recent Gallup survey aware of an "energy crisis" favor reducing speed limits by 10 miles per hour as a way of conserving gas.

The 83 per cent in the survey conducted in June who said they had heard or read about the "energy crisis" were asked:

It has been proposed that, as a way to conserve gas, speed limits on the Nation's major highways be reduced by 10 miles per hour. Do you think this is a good idea or a poor idea:

	Percent
Good idea.....	51
Poor idea.....	27
No opinion.....	5
Not heard, read.....	17

Senator RANDOLPH. Governor, what similar recommendations are going to be made by you and others and publicized so the public will be not only aware, but encouraged to do something? Then it will be not just the Government acting, but the public acting in efforts of this kind so that they can perhaps live, live at least comfortably, with reduced energy that you have indicated might happen this winter?

Mr. LOVE. It may be repetitive. But let me stress again the need—the vital necessity—for dampening, that increase in demand for energy. It is my opinion, as I said in my opening remarks, that there is little chance we are going to materially increase our supply of energy for a period of at least 3, maybe 5 years, and if we are indeed to avoid chaotic conditions we are going to have to dampen the demand in an orderly way.

In addition to the action taken under the terms of the President's last energy message of actually cutting back some 7 percent at the governmental level, which by the way is moving very well, I think, we established an Office of Energy Conservation in the Department of the Interior. It is not, in my opinion, sufficiently funded, staffed as yet, but we are pushing. I have been pleased with at least the preliminary work that has been accomplished there.

We in the very near future will be pushing a much more detailed and aggressive energy conservation program than we presently are because it seems to me that that is the only relatively near-term solution.

Senator RANDOLPH. Mr. Chairman, I have stayed within my 5 minutes. I know members will want to question and comment upon the Governor's statement.

I am not sure what my schedule permits, but I do want permission, Mr. Chairman, to have several questions to which I will ask Governor Love to provide answers for printed in the record.

Senator MUSKIE. Without objection, I understand Senator Clark also would like to do that. Of course, any member of the committee may do so.

[The questions from Senator Randolph and Senator Clark follow:]

UNITED STATES SENATE,
COMMITTEE ON PUBLIC WORKS,
Washington, D.C., September 19, 1973.

HON. JOHN A. LOVE,
Director, Office of Energy Policy, The White House,
Washington, D.C.

DEAR GOVERNOR LOVE: I appreciated the opportunity to discuss the issues surrounding our energy situation at yesterday's hearing before the Subcommittee on Air and Water Pollution. The problem of providing energy which is adequate for our needs and consistent with our environmental objectives is a difficult one, but with the earnest cooperation of men such as yourself, I am sure we can reach that end.

At the conclusion of my brief period of questioning, I stated that I would submit several written questions to you. I hope that you will be able to respond quickly to these questions which are enclosed.

Again, thank you for your testimony on this important subject of critical interest to the Committee on Public Works.

With kind personal regards, I am

Truly,

JENNINGS RANDOLPH,
Chairman.

QUESTIONS FROM SENATOR RANDOLPH

Question 1. I notice that there is very little in your statement about energy conservation. What steps are being taken for this winter to minimize energy demand in non-critical areas, and to provide for the utilization of available energy supplies with maximum efficiency? In addition, for the longer term, has your office considered the savings in energy which might be realized from limiting the size of new automobiles or the speed of existing automobiles in use?

Answer 1. We are starting a public campaign to encourage energy conservation. This is being led and coordinated by the Office of Energy Conservation, Department of the Interior, and includes very active participation by the Department of Commerce, the Office of Consumer Affairs, and a number of other Federal agencies.

They are considering, among a number of other things, the savings which might be realized from limiting the size of new automobiles and reducing speed limits.

Question 2. Section 7(a) of the regulations you proposed on August 29 provided for exceptions from the prohibitions on fuel-switching in any case where "any person subject to this regulation can demonstrate that compliance would cause an undue economic hardship".

Have you considered the offsetting economic losses which might accompany even temporary delays in attaining the secondary ambient air quality standards, which were intended to prevent economic damage from air pollution?

Answer 2. We have, of course, considered the economic losses that might accompany even temporary delays in obtaining the secondary air quality standards. In practice, any such losses would appear to be extremely small. The secondary standards for sulfur oxides were set to prevent damage to vegetation. Some very rough estimates by the USDA indicate the total sulfur oxide damage to vegetation to be about \$6M per year for the whole country. This is quite a small sum in relation to the total cost of control. Thus, it appears that any economic damage which may result will be more than offset by the savings in control costs.

Question 3. On page 6 of your statement, you suggest that higher sulfur fuels could be burned during the warm season without violating Federal standards. Does this mean that these higher sulfur fuels will begin to be burned soon, in advance of winter weather?

Answer 3. The risk of causing violations of ambient air standards could be reduced significantly if high sulfur fuels were burned during the warm seasons while preserving the low sulfur fuels for use during the cold season. However, in practice, State laws and EPA regulations are such that permission to burn high sulfur fuels will probably not be granted until the winter crisis is upon us. Thus, I do not anticipate that there will be any significant increase in burning of high sulfur fuel in the very near future.

Question. 4. The First Circuit Court of Appeals, in a case dealing with the Environmental Protection Agency's approval of the implementation plan of Rhode Island, states that exemptions or variances proposed to be given by states must be individually and specifically approved by the Administrator of the Environmental Protection Agency. On pages 4 and 5 of your statement, however, you suggest that needed variances will be quickly granted. Since individual hearings will apparently be necessary on such variance requests, how can such quick action be assured?

Answer. 4. While there may be a large volume of variance requests to be approved, this does not mean that each request cannot be acted on quickly. I hope the EPA will be able to do so.

It is also possible that some States might choose to make permanent provisions in their State Implementation Plans which would affect a number of sources. This would minimize the number of actions that EPA might have to take.

QUESTIONS FROM SENATOR CLARK

Question 1. When the President mentioned relaxing air quality standards, what exactly did he mean? What steps is he taking or does he plan to take to relax the standards?

Answer 1. When the President mentioned relaxing air quality standards, what he had in mind was reducing the sulfur emission limits where this could be done without threatening the standards under the Clean Air Act. The steps being taken include having the Governors of key oil using states in and explaining the policy to them and having members of the Administration request the States to make such changes in regulations.

Question 2. Do you agree with Russell Train that relaxation of air quality regulations only means granting temporary variances in emergency situations?

Answer 2. In many cases, the States have set emission levels that apply to the whole State on the basis of conditions in their largest cities. In such cases, it may be possible to make permanent relaxation of the emission limits in the areas outside of the polluted cities. Thus, a State might very well choose to request a permanent relaxation of ambient air standards. In certain areas, often rural, such relaxation would help to free up low sulfur fuel for use in the polluted urban areas, minimizing the risk of a serious enough emergency to require temporary variances given under emergency conditions.

Question 3. What is your reaction to Train's saying that mandatory allocation should be used along with variances—so that the variances can be kept to a minimum?

Answer 3. There is no reason to believe that mandatory allocation will reduce the need for variances. The need for variances arises because our total domestic production of low sulfur fuel is less than the amount that consumers are attempting to buy. A mandatory allocation program just spreads this low sulfur material around without increasing the total supply.

In order to make any mandatory program administratively feasible, it will be necessary to base it on historical use in certain periods. This will result in freezing the pattern in fuel distribution to that which prevailed in a base period. This loss of flexibility can very well make it harder to direct low sulfur fuel to our urban areas. To the extent we can use our powers under the mandatory program to encourage use of the low sulfur fuel where they are most critically needed, we will be doing so.

Question 4. By what percentage will relaxing standards increase fuel supplies?

Answer 4. We have estimated that relaxing of sulfur standards will make it possible to import 200,000 more barrels a day of distillate fuel oil. In addition, relaxation of residual fuel oil limits should make it possible to free up an additional 100,000 barrels a day of distillate now used for blending in the Caribbean. It is also anticipated that relaxation of residual fuel limits will encourage individuals to switch to residual fuel oil and away from distillate fuel oil, freeing up additional distillate fuels. Finally, we are faced with a shortage of residual fuel oil and a relaxation of sulfur limits is needed to permit increased imports of fuel oil.

Question 5. Why do you consider relaxing Clean Air standards a more viable alternative for dealing with fuel shortages than a mandatory allocation program?

Answer 5. Mandatory allocation programs are devices for spreading shortages around, not for increasing the supply. Relaxation of sulfur emission limits (which does not necessarily mean relaxing the ambient air standards set under the Clean Air Act) is a measure intended to increase the total supply. Thus, the two are not really alternatives. As you know, we are pursuing both policies concurrently.

Question 6. What is the current status of the mandatory allocation program?

Answer 6. At this time we are in the process of writing a mandatory program for distillate fuels. We have already implemented one for propane. The program for distillate fuels will be implemented in the very near future.

Question 7. President Nixon has talked about conservation measures and called for conservation within government agencies, but his State of the Union message included no mention of fuel conservation. Is there any real commitment within the administration to conservation?

Answer 7. There is a real commitment to fuel conservation within the Administration.

Question 8. Do you have a list of proposals on energy conservation—dealing with possibilities like decreasing car size, improving building insulation, increasing mass transit? Is the Administration doing any work along these lines?

Answer 8. The Office of Energy Conservation has developed a list of proposals on energy conservation. These include improving building insulation, increased use of mass transit, greater use of small cars, weather stripping, utilization of high levels of ventilation and lighting only when required, etc. The Office of Energy Conservation and other Federal Agencies have major programs to develop and implement such proposals.

Senator MUSKIE. Senator Domenici?

Senator DOMENICI. Mr. Chairman, may I inquire of the Chair what we are going to do in terms of time? Is the witness going to return after lunch? A number of us have a 12:30 p.m. policy luncheon on our side of the aisle. We are going to be late for it. Is he going to return after lunch or what did the Chair have in mind?

Senator MUSKIE. I understand that Governor Love has a 2 o'clock hearing. I thought that we might continue until 1 o'clock. It may be that we could then make a judgment as to whether we might like the Governor to come back at some other time, if not this afternoon.

But until 1 o'clock and we have completed the first round of questions, that might be useful.

Senator DOMENICI. I will proceed and probably won't even take my 5 minutes.

Governor Love, I am concerned. If you look on page 5 of your statement there is a sentence that says, "An alternative strategy would be to direct the lower sulfur fuels to our polluted cities and to use the higher sulfur materials elsewhere." A similar statement is made at the top of page 4 with reference to Maryland's rural area versus its urban areas and a state of pollution and nonpollution, so as to speak.

As I understand it this is within the framework of not having any impact on the primary standard, but rather than that, you are talking in the area of degradation or the significant degradation question that has been raised and passed upon by the Supreme Court as far as our Federal laws are concerned.

Could you tell me what procedure do you intend to use with reference to this approach of degradation, if that is what you are going to use by causing the high sulfur to go to the area that is cleanest and be burned there in the lower sulfur where it is presently polluted?

What procedure are you going to use to determine where it goes and to assure us that it is a temporary situation?

Mr. LOVE. In the first place, until we know what significant degradation is, it is going to be difficult to devise a strategy. The EPA currently is holding hearings. I think that I have heard where there has been at least some possibility of the Congress acting as far as clarifying its intent in regard to significant degradation.

If it is interpreted in one way, it can very significantly interfere with many of the possible programs that would be devised to produce more energy.

Insofar as the current, what I would define as an emergency kind of situation, it would have to be within some sort of program. The program would direct the fuel, I suppose negatively, by the action of the EPA in refusing to grant a variance in one specific area and granting it in another.

Senator DOMENICI. One other part of this problem that comes to my mind is the question of allocation of these various shortage commodities that you refer to in the area that you testified to. I am not speaking of gasoline and everything else. But I did not notice any mention in your plan to your being involved in utilizing authority to come up with a forced plan versus something voluntary. Would you just comment on that briefly, please?

Mr. LOVE. As you know, we have had this very intensely under consideration and discussion. I testified yesterday before a House committee that I specifically had no power to implement a mandatory program. My position is adviser to the President. I would rather leave that at the moment.

We expect to have some conclusion very quickly on that.

Senator DOMENICI. So that is under discussion at the executive level as to your recommendations or the President to the Congress in that area?

Mr. LOVE. Yes.

Senator DOMENICI. Is it actively being discussed now?

Mr. LOVE. Yes.

Senator DOMENICI. One other aspect, with reference to the process called the gasification, which is extremely clean in terms of its environmental involvement and can produce at one phase or another fuel to be burned for the production of energy and is indeed clean, I note no discussion of it here. I take it that is because this is a very short term analysis, but you would agree that it has some significant merit in terms of the whole area of utilization of our coal in a clean manner to produce the kind of energy we are talking about here, that in stable, stationary type of facilities for energy distribution?

Mr. LOVE. I certainly do. As I say, the midterm kind of solution, it seems to me, must lie in large part in the utilization of our coal resources, the stack technology, the gasification, the liquefaction, the whole problem of surface mining, the transportation and so on. All of these must be solved and solved quickly if we are indeed to respond to this situation in the appropriate time.

You know that El Paso Natural Gas has a proposed gasification plant with the coal mine in the Navajo reservation that they are in the process of finding their way through the various agencies that do have some response. Again, it is an example of the inherent, built-in de-

lays we have in practically all of these things that we have to address ourselves to.

Senator DOMENICI. That one is in New Mexico, as you note, the one you are referring to.

I have one last question. With reference to the nonsignificant degradation procedure that we are going through in EPA you will be in contact with them as they develop recommendations to us while you develop this program of going to the Governors for the approach to utilization of sulfur where the air is cleanest on a temporary basis; is that correct?

Mr. LOVE. Yes, that is correct. Although, as the Chairman is aware, I consider my charter as advocate for energy, I think that is certainly a large part of my function. Certainly neither I nor the administration simply want to do energy at any cost whatsoever. We will be following with a great deal of interest.

I think that somehow, perhaps through a structured program that would be somewhat parallel to the environmental impact statement, we do need to make sure that decisions taken at the governmental level of any major consequence at least take a look at the effect that they may have on the supply or demand for energy.

Senator DOMENICI. Thank you, Mr. Chairman.

Senator MUSKIE. Senator Biden?

Senator BIDEN. Thank you, Mr. Chairman.

I, as others, Governor, have a number of questions. I would like permission to submit those for the record.

Senator MUSKIE. Without objection.

Senator BIDEN. I won't touch on specifics in other things that have been raised here.

Governor, I am a little confused as maybe others are, I don't know. You point out that this is a long-range problem, our energy problem. You see it getting worse before it gets better; that the interim solutions that have been offered, many of them seem not only to be short term, but possibly if not shortsighted maybe counter productive.

My concern is that what we are going to be doing by lessening some of the standards is quite possibly encouraging the oil industry not to develop the technology that is needed now in order to, for example, just refine our crude.

I wonder whether or not you see that as any possible threat, that once in motion, once in motion this lessening of the standards that the pressure to keep it in motion or at least not turn back the other way would be such that we are going to continue to move in the direction of, for example, deepwater ports, offered as a solution when at the same time we say we are going to develop offshore reserves and we see that within the near future we will be able to depend on our own oil reserves, energy reserves, yet we are going to spend billions of dollars constructing deepwater facilities and boats and ships to carry them.

Do you see any inertia in the other way?

Mr. LOVE. No. I don't share your concern. It may be that my judgment is affected by the concern that I have for the very near term, the heating oil being available for the people of the United States in sufficient quantity this year.

The kind of solutions, for example, the desulfurization equipment and refineries and so on, has a long leadtime and cannot possibly respond to the situation this winter. We have to at least do everything we can to maximize imports and increase the supplies to the extent we can to meet the potentially difficult situation.

The other comment that you made that it seems to me a misconception, if I understand the problem, is that somehow in the very short period of time we are going to become self-sufficient, I simply do not believe that to be true. Certainly not so far as petroleum supplies are concerned. We are using about 17 million barrels a day of petroleum at the present time, that in the past has been increasing on an annual basis of an additional 1 million barrels per day. So to make one example, if the Alaska pipeline came on line with 2 million barrels a day, 3 years from now, we would have already a net deficit of 1 million if we continue at that rate.

Senator BIDEN. That is the point some of us made at the time.

Mr. LOVE. The self-sufficiency that I see, maybe not self-sufficiency that would support the continual doubling of energy in a total of 15 years, but the self-sufficiency that I see is farther down the line but it relates to substitute fuels of coal, the oil shale, geothermal, the nuclear ultimately and perhaps hydrogen technology and fusion. But the petroleum situation if we are to maintain anything near our demand are still going to have to increase our imports for the period of at least 5 or more years, in the mid-eighties is usually the number used.

Senator BIDEN. That whole area is an area I would really be anxious to get into depth with you on. I hope you will have an opportunity to come back, because I am just a skeptical fellow that doubts some of the premises upon which some of the assumptions are made.

But to move to an area Senator Buckley made which I think is the most significant in that I think the administration is most shortsighted on, maybe we in the Congress, also, maybe the Nation as a whole, is conservation. We all continue to talk about what is going to happen, what our energy needs are going to be, without addressing ourselves to the question of what they should be and how we are going to attain that. Although we hear in the Congress and in the public and from the administration a good deal of rhetoric of the need to conserve, the need to tell the public, I don't expect you to be able to answer it now, but I am most anxious to hear it, specifically how that is going to be done, how we are going to make that recommendation.

The estimates that I am told, from the deepwater port hearings we are conducting and the oil companies, that we use 40 to 52 percent, depending on whose estimate you take, of all refined oil to make our automobiles run. Yet, I don't hear anybody really in terms of those in the position of being able to do something about it, like the administration, really directing themselves to that particular question.

As I said, that is too difficult to respond to in a few minutes.

I would like to ask you one very specific question. In the fuel allocation bill that was on the floor of the Senate not long ago, still in the House, I introduced an amendment making it mandatory. You have responded to Senator Domenici, I think, but I would like to try to pin down a little more. Is the administration taking the position in the House to delete that amendment which makes the allocation mandatory or is it taking no position at all with regard to that provision of the Senate bill which now makes it mandatory?

Mr. LOVE. To the best of my knowledge, we are taking no position in the House. We have been neither opposing it nor advocating it.

Senator BIDEN. Thank you very much.

[Senator Biden's additional questions follow:]

ADDITIONAL QUESTIONS FROM SENATOR BIDEN

Question 1. I would like to receive additional detail as to how your strategy of using higher sulphur fuels will work to relieve a possible shortage of fuels.

On the one hand your statement says, as do representatives of oil refiners, that many refineries in the United States were built to refine low sulphur fuel and cannot refine the largely higher sulphur fuels that are imported. Your statement seems to agree with one by the National Petroleum Refiners Association that even with environmental controls eliminated it would take a year or more to make technological changes necessary to develop capability to refine more sour crude without a shortfall in production. All of this seems confirmed by the fact that some refineries are operating at less than capacity because they cannot refine the only product available to them, sour crude.

On the other hand your policy seems to be to import, refine and use more sour crude as a means of meeting energy requirements.

Can you explain fully to me the apparent (but perhaps not real) contradiction of saying that we do not have the capability of refining more than limited quantities of sour crude but we must relax clean air standards to permit the use of more sour crude.

Answer 1. You are correct that many American refineries cannot utilize sour crudes. This is a major part of our current problem, since most foreign crudes are high sulfur. However, there are a number of refineries which are physically equipped to handle high sulfur crude, but which are utilizing domestic low sulfur crude for environmental reasons. In some cases, this is because the high sulfur products that would be produced cannot be marketed under existing sulfur regulations. In other cases, the problem is that emissions from the refinery itself would exceed legal limits if high sulfur coal were run. If environmental restrictions were relaxed sufficiently to allow these refineries to utilize high sulfur foreign crude, the low sulfur crude they are now utilizing could be diverted to the refineries that cannot physically handle high sulfur crude. Thus, indirectly our sulfur restrictions are resulting in the denial of low sulfur crude to certain refineries.

Question 2. In earlier discussion I expressed my concern that the proposed relaxation of sulphur emission standards—which is referred to as minimal—was only a beginning effort by the oil companies to lower clean air standards. Not only am I afraid that we will never restore the standards now being relaxed but that this is an opening wedge for greater relaxation. My concern is increased by National Petroleum Council estimates that expenditures for environmental needs in a large refinery may cost in excess of 10% of the total current plant investment. I have also heard that if refiners had to use sour crude for 20% of their present sweet crude capacity and meet environmental standards, the result might be a loss of one million barrels per day in production. So I would like to follow up with two questions.

(a) You indicated that your concern might be less than mine because you were primarily concerned with the fuel oil problem this winter. Do these really represent the Administration's priorities and, if so, could you explain further the justification for concentrating on this immediate problem to the apparent virtual exclusion of concern for the long range health of the nation as represented by clean air standards?

(b) In answer to another question you indicated that the relaxation of standards was temporary and would be lifted next spring, but might have to be relaxed again in future years. This strengthens my concern that the relaxation may become permanent because I would have thought that within the next few years the oil industry could have utilized technology to permit refining of low sulphur fuels from sour crude. Can you explain why the oil companies should not be taking steps right now that would make future relaxation of standards unnecessary?

Answer 2. I can assure you that we are not merely concentrating on the short term problem to the complete exclusion of the long range health of the nation.

If this was truly our priority, we would be requesting across-the-board relaxation of sulfur standards and immediate conversion of power plants back to coal.

However, for this winter, the Administration has come to the conclusion that there really is a choice between a fuel shortage for this winter or some relaxation of environmental rules somewhere. I have set out the reasons for this in my testimony. It appears clear that unheated homes represent very serious health hazards which are much more serious than any health effects resulting from sulfur oxides in the atmosphere. Thus, we have adopted a policy of requesting States to relax sulfur emission limits where this can be done without causing the levels of sulfur in the atmosphere to rise above the level which EPA has determined would be hazardous to health.

b. The oil companies could be taking steps now that would make future relaxation of standards unnecessary. However, any construction of desulfurization facilities will take several years. For technical reasons, one cannot desulfurize all of the barrel of crude, and some high sulfur residual remains. We must leave a market for this high sulfur residual. There are numerous areas in the country which can utilize such high sulfur residual fuel oil without threatening ambient air standards. There is little reason why in such areas the same sulfur limitations should be applied as are required for our largest metropolitan areas.

Question 3. I was very concerned that your testimony did not indicate a major commitment to a long-term, comprehensive energy policy. Such a policy would, of course, indicate a concern for immediate problems, but only in the long term context of conservation of energy, national growth policies, alternate energy sources, environmental priorities and a multitude of other factors. Would you comment on what is currently being done to develop such a policy and what its priority is?

Answer 3. We, of course, do have a long term comprehensive energy policy which has been set out on several occasions. It includes a \$10B program of research and development for new and less polluting forms of energy, development of alternative energy sources, protection of the environment and energy conservation.

Question 4. It is my understanding that our refineries turn an amazing 40-50% of a barrel of crude into gasoline. Based in the economics of refining and practice in other countries a figure nearer 20% would be reasonable. This high production of gasoline means there is less diesel fuel and less home heating oil per barrel of crude. Does it really make sense to allow the continuation of top priority to gasoline production if we are indeed short of fuels generally? If we are really in trouble doesn't it make sense to cut back on fuel for boats, for snowmobiles, pleasure driving, etc. to provide the essential fuels for trucks and busses, for farm machinery and for home heat? Is it not more sensible to refine fuels for essential purposes, assure their proper allocation through a mandatory allocation plan and cut back on other uses rather than opening the clean air act up?

Answer 4. You are right about the pattern of refining in the U.S. We have succeeded in producing a much larger volume of gasoline from crude oil than other countries have. On the world market it is significantly cheaper to purchase fuel oil than gasoline. In addition, American specifications are such that little European gasoline would be suitable for use in this country. Thus, given that we do have the capacity to produce a high volume of gasoline to meet our needs, we should do so and do our importing in the form of fuel oil, if we can. This minimizes the balance of payments effects of imports and maximizes the quantity we can import. However, you do have a point and I expect that this winter we will be trying to increase production of distillate fuels.

If we get into a real crisis, it is obvious we should be cutting back on pleasure driving before we make major cuts in use by trucks, farm machinery, and home heating. However, it should be realized that there is considerable scope for reducing the use of fuel in applications such as home heating. For instance, weather stripping can greatly reduce the use of fuel for home heating. It is very difficult to devise a scheme that reduces the use of fuel for boats, snowmobiles, and pleasure driving, while making it available for other uses. Even with a very cumbersome system of coupon rationing in WWII, it proved very difficult to prevent non-essential use of gasoline.

Because the States have frequently set sulfur regulations they go far beyond what is needed to meet the mandate of the Clean Air Act, there does not appear to be a conflict between meeting the requirements of the Clean Air Act and supplying fuel for other uses. However, it is not obvious that people would choose a lower level of sulfur in our atmosphere at the expense of being denied the use of boats and autos. This is especially likely in the geographical areas where the level of sulfur in the atmosphere is below where health effects are observed. It is not at all clear to me that the public would deny themselves picnics (by giving up gasoline use to go on them) in order to lower the level of sulfur oxide in the countryside that they can no longer have access to. This is especially likely when it is realized sulfur dioxide is a colorless gas and that the public would not be able to see the difference (even if they could get gasoline to go see for themselves) and that the sulfur dioxide level would be far below the levels that EPA considers hazardous to health.

Question 5. You indicated that you are working on an energy conservation program. In that connection I would like to raise three questions:

(a) Can you give me a detailed report on the status of your efforts to develop a conservation program and, assuming it is somewhat advanced, an outline of the kind of program you expect to put into action?

(b) Specifically what plans do you have for directing your efforts to major corporations which are so large that simply a shift (for example) to compact cars would result in major gasoline savings? Another example of the kind of thing I am thinking about is a policy of constructing office buildings to conserve energy. Can you tell me generally what type of program will be directed to these big users as compared to the homeowner and car driver?

(c) Are we going to abandon our efforts to save gasoline in the winter months when there is no "shortage" even though reductions in winter gasoline use could allow refining of other fuels in greater quantity?

Answer 5. a. The development of a conservation program is under the Office of Energy Conservation in the Interior Department. The program being developed has a number of elements, including advertising in the public media, as well as statements in support of energy conservation such as those that have been given at every possible opportunity. We are supporting measures such as increased insulation of homes, weather stripping of doors, slight lowering of temperatures in buildings and measures to reduce industrial use of energy.

b. A conservation program is being applied to all sectors of the economy including major corporations. The Federal Government is planning for Manchester, New Hampshire, an energy conserving office building to show what can be done to reduce use of energy.

c. We are not abandoning our efforts to save gasoline during the winter although the emphasis in our conservation drive will shift to conserving heating fuels.

Question 6. If we succeed in developing greater national oil resources, do we still need to construct super ports off our coast? Would not a lessening of dependence on mideast oil lessen the need for such ports?

Answer 6. We will not succeed nor would we necessarily want to develop sufficient domestic oil resources to eliminate the need for imports. This is true even if the Administration succeeded in getting all that it has asked for in the way of gas deregulation, the Alaskan pipeline, and off-shore drilling.

Even if we were not receiving Middle Eastern oil, super ports will be needed to handle oil from other areas.

Question 7. Again in connection with deep water ports and VLCC's, might it not make sense not to become too dependent on these things, even though the price of fuels might rise? In fact, might not a rise in gasoline costs, for example, represent a good energy conservation measure?

Answer 7. In general, there is much to be said for not becoming too dependent on foreign oil. However, given that we must import petroleum, it does seem wise to bring it in large ships to minimize the cost and preserve the environment. Preservation of the environment results because we reduce the number of ships bringing in the oil and hence reduce the chance of collision. Also such ports would be close to the ocean eliminating the trips into our crowded harbors and up our crowded rivers where the risk of an accident is greatest.

Senator MUSKIE. Senator Stafford?

Senator STAFFORD. Thank you, Mr. Chairman.

Governor Love, I found your statement very helpful. I noted at one point in it that the inventory of distillate for heating was 173.4 million barrels at the end of August. From some other information in front of me, I also noted that our daily consumption in the winter is 4 million barrels a day, which indicates to me there is about 45 days' supply of distillate if we were going into the winter.

If we should develop a shortage in home heating oil and distillate generally, would that likely occur before January?

Mr. LOVE. I think not. I think that if indeed we do hit the kind of problem that we might hit, I think it is going to be in the first quarter of next year.

Senator STAFFORD. However, would it not be fair to say that warnings that there could be a shortage should be taken seriously and the fact there may not be any between now and the first quarter of next year, there is no particular reason to assume that everything is fine and there is plenty of oil on hand. Is that a fair statement?

Mr. LOVE. That is certainly true. It is obvious that the inventories must be built up because the use exceeds our rate of production, and therefore we have to have an accumulated inventory and built up in sufficient time and there is leadtime again on that in getting the imports in and getting it transported.

Senator STAFFORD. Let me ask a parochial question at this point: There is still some home heating accomplished in the Northern New England States and mine, particularly, with kerosene. We had a dealer who handles kerosene among other distillates in our office yesterday whose normal inventory at this time is 175,000 gallons. He only has 10,000 gallons and his suppliers, BP, I think British Petroleum, apparently cut him off and won't supply him any further distillate.

Is there anything that your office could do about that?

Senator MUSKIE. I would like to cosponsor that question.

Senator STAFFORD. I had hoped you would.

Mr. LOVE. Do you know, Senator, was BP supplying that from Canada?

Senator STAFFORD. I don't know where it was coming from, but I could certainly get details on it.

Senator MUSKIE. The main source is largely in Canada, I think, and I suspect it may be from there.

Mr. LOVE. I have to confess that I am not sure about what the supply of kerosene is. We have been spending a good deal of time with propane and other problems, but I will be glad to take a look.

Senator STAFFORD. I have just been told that the dealer in question was getting his supply from Green Island in New York, whatever that might mean. But I thought I should mention that, since apparently this is going to occur in some of the Northern New England States this winter. It may be an overlooked matter behind all of the other problems we have.

Senator MUSKIE. It is regarded as an old-fashioned fuel for home heating, but it is used in modern jets. I think maybe we could cut down on jet transportation just long enough to insure we are warm in New England.

Mr. LOVE. In my youth, we called it coal oil.

Senator STAFFORD. That is still the word used around here.

Senator McCLURE. Would the Senator yield, because this may tie in with the demands that have been made by Con-Ed for the expansion of supplies for fuels for turbine, gas turbine generators, which are the least efficient means of providing electricity in terms of Btu. Yet, they are making these demands and it would hinge directly upon the kerosene supplies for New England.

Mr. LOVE. Con-Ed, and I am sure many other utilities, use turbines fueled by this jet fuel which is the same fraction as kerosene to provide peaking power. They report a very great concern about a shortage.

Senator STAFFORD. Mr. Chairman, I have a final question of the Governor. That has to do with the possibility of rationing that might become necessary. Have you gone as far in your contingency plans as to work out actual rationing plans in the event a shortage develops in distillate fuels?

Mr. LOVE. I can't give you the specifics. I can talk to you conceptually about it. It is a much more difficult thing to implement than to plan, for example, a rationing system for gasoline. The only thing you can do, I think, is identify those activities that are the least harmful to curtailing or do away with.

As to our economy and our society, the Northwest, as I mention in my statement, has a power hydroelectric shortage. They not only talk in terms of cutting back on some activities; but they are launching a stringent conservation campaign. Illumination of outdoor signs, night events such as a night football game mandated closing times—five 8-hour days, perhaps one shift a day—for stores are all being considered. It would be, I think, that we have to look to somehow being able to adjust and decide if you have a 15-room house and a 2-room house, and so on, it would be a difficult thing to do.

Senator STAFFORD. Governor, you shook me on that night football games. Does that mean we have lifted one blackout only to run into another?

Thank you, Mr. Chairman.

Senator MUSKIE. Senator McClure?

Senator McCLURE. I might just observe, too, if we could turn off all of the TV sets in watching all of the football games, we would conserve quite a lot of energy. I am not going to propose that because I would lose what support I might have for any other program.

One of the problems that has been referred to here repeatedly is the necessity for mandatory allocation, to be able to move fuels around precisely. I don't want to belabor that point, but you have referred in several places in your statement to getting low sulfur crudes to refineries that can handle only low sulfur crudes. That may require a mandatory allocation of crudes, making certain that the low sulfur fuels get to the areas where they are needed at the time they are needed and that they are not deprived by other areas that otherwise would use them also.

I just want to make one point and ask one question. I have seen this statement so often that I think it raises a question in the minds of many people; that is, that stocks of distillates are up. It was my understanding of the facts that the stocks are up 2.3 percent, but the demand is up 10 to 12 percent. So that in relation to demands, stocks

are actually a smaller proportion of the demand than they were last year. We are not gaining ground because of increased distillates. I think the fact that distillate stocks are up and is repeated so often in public comment lulls people into the expectation that there is no problem this winter, that we got through the summer without severe problems on gasoline, therefore we will probably get through the winter without severe problems on distillates. I think that is a disservice to the public understanding of what must be done in regard to meeting this winter's problems, which are very real.

You have suggested in your various programs that we not go any further in shifting fuels from high sulfur to low sulfur, we don't go any further from coal towards oil, that we don't go any further from residual to distillates. But you have specifically shied away from asking them to turn back the clock a little and move back into using some higher sulfur fuels even during periods of the year when they could use higher sulfur fuels than they are now using.

I refer to The Washington Post ad today, "Stop Wasting Scarce Petroleum by Getting the Electric Utilities out of the Home Heating Business." This was sponsored by the Petroleum Association, a member of the National Oil Jobbers Council. To do that will require a mandatory allocation. It would require something a little bit stronger than the statement you have indicated you are prepared to back. Is that correct?

Mr. Love. I think it would be stronger and separate and apart from what we have been talking about here in the past about mandatory, voluntary and so on.

Actually, to enforce the shift under some timetable, and of course it would take some time, you have to have the plants at once that need to be converted. However, to actually decree that they move from a specific fuel into coal or whatever would take further authority than I believe is possessed under the statute, the Eagleton amendment, at the present time. It also would require that a very close look be taken at the environmental impact of such shift such as away from coal now under boilers. Without a really proven stack technology, it would be perhaps wrong.

The end goal, obviously, has to be to move petroleum and petroleum products out from under boilers, because there simply is not going to be enough petroleum to use it that way. I think it is going to be necessary to reserve it for further uses.

Senator McCURE. I want to comment on one further point and ask you for your comment. You have suggested as Senator Domenici pointed out that we make certain that low sulfur fuels are sent to the areas where it is necessary and to the urban areas of the country. I would point out a dilemma with which we are confronted in my State and I think in Colorado, to a lesser degree. The Mountain States seem to have been plagued by shortages of gasoline more than other areas of the country I think because there was a marketing shift in favor of the urban areas at the expense of the rural areas.

Secretary Butz, as I have pointed out, has called for an increase in agricultural production to meet the food crisis in our country and to meet the real crunch the housewife is getting in the supermarket as food prices go up because of food shortages. Secretary Butz is exactly right, we must expand food production. But if we are going to expand food production, it requires increased energy. The very areas of the

country that would suffer most under the policy of sending low sulfur distillates to the urban areas at the expense of rural areas would make it impossible for us to meet this commitment of increased and expanded food supply in the rural areas of our country.

I don't know that you have an answer to that question, but it seems to me we must confront it. It must be confronted in real terms and in positive actions, for example, "yes, we will give the urban areas the low sulfur fuel they need when they need it, but we are going to reserve distillates for the rural areas in order to produce the food that this Nation so vitally and so desperately needs for the consumers of this country."

Mr. LOVE. Just to add one other problem on top of that, Senator, which I am sure you are familiar with. In addition to energy generally in the agriculture area, a large percentage of the fertilizer we use is a product of gas production. It is declining. The hydrous-ammonia industry is primarily going down, it is only at about 80 or 85 percent capacity and the demand is up. But generally both on your concern about agriculture, and other concerns about other energy uses, it points out one very great difficulty. Of all of the people who have written, or called, or called on me, I haven't found anybody who didn't think that his or her or their use of energy needed a priority at or near the top.

Senator McCLURE. That is where you are, I guess, to make those decisions as between the conflicting groups. I guess on behalf of agricultural production I will take my chances in terms of a national assignment of priority. I think the President's voluntary allocation program called for an absolute priority for agriculture and for transportation. I would think that that will be followed as we move into the area of mandatory allocations. I don't see how we can do otherwise, if we are going to meet our goals next year as far as food production is concerned.

But this hearing is directed primarily toward the air quality problem. I am concerned about the impact that food production has upon air quality programs and how much impact the air quality programs have upon food production in the context of this hearing.

I will conclude only by saying that in that context the Council of Environmental Quality in its report which is the fourth annual report of the Council of Environmental Quality makes reference to whether or not environmental goals have had an impact upon the fuel crisis. There is no doubt left from the language of the Council on Environmental Quality that air quality standards also played a role and they amplify upon that. I would certainly agree with our chairman of this subcommittee that it is not a total problem, but it does play a role. I think we must recognize it as we grapple with these various problems.

Thank you, Mr. Chairman. I wonder if I could submit some questions on behalf of Senator Baker?

Senator MUSKIE. Of course, without objection.

[Senator's Baker's questions follow:]

UNITED STATES SENATE,
COMMITTEE ON PUBLIC WORKS,
Washington, D.C., September 21, 1973.

Hon. JOHN LOVE,
Director, Office of Energy Policy, The White House, Washington, D.C.

DEAR GOVERNOR LOVE: I wish to thank you for the promptness with which you responded to our invitation to testify before the Subcommittee on Air and Water Pollution regarding the President's energy policy and the Clean Air Act and for

the candor with which you described the potential conflict between sufficient energy and clean air.

I regret that my schedule did not allow me to remain for the entire hearing and to raise certain questions regarding recent actions of the Office of Energy Policy. Although I know how busy you and your small staff are in attempting to find answers to the difficult questions of energy policy facing the Nation, I would appreciate your providing for the record of the September 18 hearing answers to the enclosed questions regarding the OPE August 29 Proposed Rule Making on priorities for use of certain low-sulfur petroleum products. Please enclose any additional supporting documents as well.

I would appreciate your response to these questions not later than Monday, October 1, so that we may enclose the material in the hearing record. I wish you all success in carrying out the task which you have begun with such promise.

Sincerely,

HOWARD H. BAKER, Jr.

QUESTIONS FROM SENATOR BAKER

1. Sec. 110 of the Clean Air Act provides for State adoption and Federal approval of implementation plans to achieve national primary and secondary standards. Upon approval such places have the force of Federal as well as State law and may be so enforced. Regulations proposed by the Office of Energy Policy in the Federal Register of August 29, 1973, set priorities for use of certain low sulfur petroleum products. The regulations prohibit industry, utilities, etc. from: a) switching from coal to petroleum products, b) switching from residual fuels to home heating fuels, or c) increasing quantities of distillate blended into residual fuel oil except where absolutely needed to meet primary ambient air quality regulations. (emphasis added) The regulations purport to "preempt, in part, State implementation plans and associated individual source compliance schedules required under the Clean Air Act—"

Question. Upon review of the Economic Stabilization Act as amended by P.L. 93-28, I find no legal authority for preemption of the Clean Air Act or any regulations, rules, or implementation plans pursuant to it.

a. What is the legal authority for preemption of the Clean Air Act?

b. What legal memoranda or opinions from EPO, EPA, Justice Department or elsewhere exist which justify this preemption? Will you provide these for the record?

c. Why were these regulations issued by EPO and not at least in part by EPA which by law administers the Clean Air Act?

d. I understand that EPA opposed issuance of these regulations on grounds of the law as well as on the public policy grounds that they (1) would have minimal impact on improving fuel supply or decreasing demand, (2) would seriously jeopardize achievement and maintenance of Clean Air Act standards, notably in big cities, and (3) would preclude fuel switching by older plants that have no other real alternatives. Is this essentially a fair statement of EPA's objection? In any event, how do you answer these points?

e. The Clean Air Act provisions in question were drafted carefully to ensure that sources of pollution had to meet requirements which were uniformly stringent by given deadlines. This assumed that, under "the polluter pays" principle, the regulated parties would search out solutions to the pollution they were causing and apply those which were most cost-effective. Now, through these regulations, the Federal Government would forbid one means, and in some cases, the only means, available to clean up some sources of emission. How equitable is this blanket prohibition, regardless of whether it achieves any significant fuel supply savings?

f. I understand that these regulations, in practical effect, would apply to only a few power plants and a handful of other sources, since most fuel switching has already taken place. How many sources would be affected? Please identify them and their location. Doesn't this limited practical effect point up the inequity of the regulations?

g. Is there an environmental impact statement on these regulations? If so, please provide it together with the required EPA and other agency comments. If not, why not?

h. How have these regulations been changed pursuant to the recent Interior Department hearings on them? When will they be published?

ANSWERS TO SENATOR BAKER'S QUESTIONS

1. a. The Economic Stabilization Act gives authority to allocate fuel and set priorities for its use. This regulation sets a priority that says that where coal or residual fuel oil can be burned and is now being burned, such users shall have a lower priority for the use of such fuels than users who may not be able to use coal. The fact that some users are currently using coal provides very clear evidence that they are physically equipped to use this relatively abundant fuel. A similar argument applies for residual fuel oil, and for high sulfur residual fuel oil in particular.

b. Discussions were held with EPA and the Justice Department on the legal aspects of this question.

c. These regulations were issued by the EPO because we have the authority delegated by the President to act under the Economic Stabilization Act in this matter. EPA does not. These regulations were discussed extensively with EPA before being issued. EPA adopted a policy of their own encouraging people to shift away from the use of coal.

d. It is not appropriate for me to comment on what actions EPA recommends on these regulations.

e. Faced with a very serious national fuel shortage, preventing some sources from shifting their operations so as to contribute to this fuel shortage certainly appears to be an equitable action. In particular, it keeps those now using a low sulfur fuel from being denied fuel because other users converted to low sulfur fuel.

f. You are correct that these regulations would affect only a small number of power plants. We do not know what sources would be affected. Regulations that would affect only a small number of people are not necessarily inequitable.

g. There is an Environmental Impact Statement and I am enclosing it.

h. We will be making some modifications taking into account the comments we received at the Department of the Interior hearings. They will be issued after such suitable modifications have been made, and the legal requirements of NEPA have been met.

Senator MUSKIE. May I add this comment to the last comment?

The tendency to which I object is the tendency to isolate environmental costs or causes of the energy problem from all of the others. You hear about the automobile standards, ignoring all of the other penalties, most of them greatly associated with the automobile, including the size of the automobile, but all of the attention focuses upon the last, the environmental one. That is my objection.

I am not going to belabor it. I would like to suggest, Governor, before I get into my last two or three questions, since several other members of the committee expressed an interest in a more comprehensive discussion of some of these issues, that we arrange another visit by you to this committee at the right time and that right time may well be following a further definition of the policy; following a meeting of the Governors and other Governors. Your policy is in a condition of flux at the moment. You haven't worked out all of your implementation plans. You obviously have some new policy decisions under consideration.

So at the right time I think we would like you back and we can agree upon the time later.

I would like to put one question that has persisted throughout all of this questioning in the context of a table that is found in the discussion paper that was circulated. I do it with reference to a statement that you made this morning.

You said this: "Because of lack of desulfurization capacity, and use of Middle Eastern crudes, her"—I would gather you mean Middle East—"distillate supply averages about 0.6 percent sulfur."

This table that I would like to put in the record identifies the oil sulfur regulations in the various air quality regions in urban America.

I assume you have seen the table, but let me just refer to some illustrative examples that would seem to me highlight the problem.

With respect to distillates and the 1972-73 heating season, the New Jersey-New York region required 0.2 percent. The requirement is the same for the 1973-74 season.

Going down through and in metropolitan Providence, the requirement was 1 percent; 1 percent in 1972-73. It is the same for 1973-74.

In the case of the Niagara Frontier Region, it was 3 percent in 1972-73 and the same for 1973-74.

[The discussion paper referred to follows:]

DISCUSSION PAPER

CURRENT DISTILLATE SITUATION

AUGUST 6, 1973

A question has been raised as to whether specific policy actions should be taken to prevent coal to oil switching and the practices of blending distillate with heavy fuel oil to meet sulfur regulations. This paper presents the facts and, in the case of coal, the status of existing policies aimed at discouraging coal-to-oil switching.

DISTILLATE BLENDING

The central point of concern is whether sufficient supplies of distillate will be available to meet demands for home heating and farm use through next summer. Many believe that distillate is being burned either directly in power plants or blended with heavy fuel oil to meet sulfur regulations associated with the Clean Air Act. This section of the paper focuses directly on what is known about the extent to which distillate is being blended with heavy fuel oil to meet sulfur regulations.

Extent of distillate blending

Basically, there are four areas where distillate might be blended to meet environmental regulations:

1. Domestic refineries, U.S. refineries, which account for about 33 percent of the heavy fuel oil market, have increased output of residual fuel oil this year over last year. This increase is primarily due to an increase in refinery utilization. A study of the production of refined products by U.S. refineries shows that product yields per barrel of crude throughput have remained fairly constant. This would not be the case if domestic refineries were blending distillate with residual to meet heavy fuel oil sulfur requirements.

2. Blending at distribution points such as terminal operations. There is no real way to pin down the extent that blending is taking place at distribution points; however, this may not be very large.

3. Blending of distillate by users. The table below shows that amount of distillate purchased by power plants in 1971 and 1972 and should include any distillate that is being blended by utilities with residual to meet environmental regulations. The table breaks out use by power plants in to three categories: gas turbines, internal combustion engines and other.

DISTILLATE USE IN STEAM ELECTRIC POWER PLANTS¹

[Thousands of barrels per day]

	1971	1972
Uses in power plants:		
1. Gas turbine.....	82	132
2. Internal combustion engine.....	12	15
3. Other.....	3	39
Totals.....	97	186

¹ All data based on FPC reports.

Gas turbines are essentially jet engines that run on natural gas or diesel fuel (light fuel oils) and cannot be run on heavy fuel oil. The consumption of distillate in gas turbines increased significantly from 1971 to 1972. Two factors contributed to this increase. First, natural gas curtailments forced utilities to burn distillate as a replacement fuel. Second, although gas turbines are primarily used for peaking purposes, in the last few years some utilities have chosen to use gas turbines as a means of increasing their base load capacity.

The internal combustion engine is essentially a diesel engine run on distillate fuel oil or gas and like the gas turbine, is primarily used by utilities for peaking purposes.

The "other" category includes three uses of distillate not accounted for in the first two categories:

1. Distillate use to start up boilers (primer fuel).
2. The use of distillate in boilers designed solely to burn natural gas. This would be the case where natural gas curtailments forced utilities to convert their boilers to distillate.
3. Burning distillate directly to meet environmental regulations. This would be the case if simple economics would favor the use of coal or residual fuel oil but the sulfur regulations forced them to use distillate.

The use of distillate as a primer fuel probably does not account for more than 3,000 bbls/day.

The table shows that increased reliance on gas turbines and large scale natural gas curtailments have clearly been responsible for nearly all the increased use of distillate by power plants. In 1971 the other category probably only including the use of distillate as a primer. This category grew significantly in 1972 but most of this increase is due to curtailments in power plants in the southwest where gas only boilers are predominant.

4. Off-shore refineries. By far most experts believe that to the extent distillate blending is taking place most would occur in Caribbean refineries; the major supplier of heavy fuel oil for the east coast. Rough estimates of distillate blending have been made for 1972 and for the first four months of 1973, based on an analysis which looked at: the type of crude oil imports (especially by sulfur content), refinery configuration (done refinery by refinery), and the sulfur content of the output mix from the Caribbean refineries. These estimates indicate that as much as 175,000 bbls/day of distillate was blended with residual in 1972 and 80,000 bbls/day for the period from January to April 1973. These are probably upper bound estimates, since it was assumed, for lack of decent data, that low sulfur crude inputs *have not* increased above 1971 levels. If the refineries have been able to obtain more low sulfur crude then the amount of distillate used for blending would be lower. Despite the fact that distillate blending is down from last year, these refineries have been able to increase output of very low sulfur residual by almost 200,000 bbls/day.

These data need to be refined but it appears that two factors are accounting for the drop in the demand for distillate used for blending purposes. One of them is the large increase in desulfurization capacity (160,000 bbls/day) in Venezuela and Trinidad, and the second is the increased price premium for distillate relative to residual in U.S. markets. The price premium makes it more profitable to sell distillate as distillate rather than blending it with residual fuel oil.

Outlook

The key factors in the outlook are that distillate stocks are up significantly over this time last year (159×10^6 bbls vs 154×10^6 bbls) and production rates have increased significantly with a rise in utilization rates to 96 percent. The problem will continue to be studied but it is clear that the current situation gives us reason to be optimistic about this winter.

There are a number of factors which could aggravate the situation. If the winter is extremely severe or crude oil availability becomes a problem the situation could deteriorate. One problem that would aggravate the situation is if the sulfur regulations get much tighter this winter. Table II summarizes the sulfur regulations in effect in the major fuel oil consuming areas on the east coast. The table shows that with few exceptions the sulfur regulations will be the same this winter as they were last winter.

OIL SULFUR REGULATIONS

[Percent sulfur by weight]

AQCR	Residual winter heating season			Distillate winter heating season		
	1972-73	1973-74	1975	1972-73	1973-74	1975
New Jersey-New York.....	0.3	0.3	0.3	0.2	0.2	0.1
Connecticut Interstate.....	1.0	.5	.5	1.0	.5	.5
Metropolitan ¹ Philadelphia.....	.5	.4	.4	.2	.2	.2
Metropolitan Boston.....	.5	.5	.5	.5	.5	.5
Metropolitan Providence.....	1.0	1.0	1.0	1.0	1.0	1.0
National Capital Interstate.....	1.0	.8	.8	.7	.6	.6
Hartford-New Haven, Springfield.....	1.0	.6	.6	1.0	.7	.7
Metropolitan Baltimore.....	1.0	1.0	1.0	.3	.3	.3
Merrimack Valley Southern N.H.....	1.2	1.7	1.0	.6	.6	.6
Niagara Frontier.....	3.0	3.0	1.0	3.0	3.0	1.0
S.W. Pennsylvania.....	.8	.8	.8	.8	.8	.8

¹ Will remain at 0.5 if the now pending revision by the city of Philadelphia is approved.

Policy Actions

One possible policy action that could be taken to reduce the amount of blending is to forbid the sale-purchase of residual fuel oil when distillate has been blended in to meet sulfur regulations. There are undoubtedly problems with implementing this policy but some comments can be made based on the above discussion.

The outlook for distillate has improved considerably both with respect to production and stocks. If refinery runs continue at current high rates we should be able to avoid any serious problems this winter.

It is clear that distillate blending at electric power plants to meet sulfur regulations has been insignificant.

Distillate blending to meet sulfur regulations at Caribbean refineries may be substantial but appears to be declining.

To the extent that prohibiting blending would have any effect, a rise in the sulfur content of residual fuel oil is certain to lead to air quality deterioration in eastern seaboard cities trying to meet health related air quality standards. Almost all the blending appears to be directed at meeting the very low sulfur regulations for the large cities such as New York, which are now violating health standards. A move that would jeopardize the attainment of health standards in these cities would run counter to administration policy.

PROHIBITION OF COAL TO OIL SWITCHING BY ELECTRIC UTILITIES

AUGUST 6, 1973

SUMMARY

The prohibition of coal to oil switching by electric utilities is under consideration as a partial solution to the anticipated oil deficit. This discussion considers factors which bear on a decision to proclaim such a prohibition.

Coal to oil switching has been taking place for many years, particularly in the northeast portion of the U.S. Prior to 1970, the reason for switching was primarily economics. Oil was cheaper, easier to obtain, and easier to handle than coal. The stated reason for switching since 1970 has in most cases been the cost of meeting environmental regulations. Low sulfur oil was considered a lower cost and more certain alternative than low sulfur coal or high sulfur coal coupled with stack gas cleaning to remove sulfur oxide.

From 1970 to date (mid-1973), power plants burning an aggregate of 19 million tons of coal per year have switched to oil. This is equivalent to 208,000 barrels of oil per day. Additional switching of coal to oil through 1975 is projected to be 6.5 million tons of coal per year, equivalent to 71,000 barrels of oil per day.

The decline in the rate of switching probably is due to several factors. In response to the EPA Clean Fuels Policy (discussed in a later section of this paper), many states either already have revised sulfur regulations or are considering revisions which will defer regulations in geographical regions which now meet primary standards. Thus plants in these regions may continue to use existing sources of coal and have no need to consider switching to oil. Also, it is increasingly evident that reliance on oil is becoming uncertain, its use is being discouraged, and the price of oil relative to coal will be increasing. These considerations place strong disincentives on further switching and make the use of stack gas cleaning or low sulfur coal, particularly if not required by 1975, a more attractive alternative.

In any event, the maximum potential for oil savings as a result of a coal to oil switching prohibition appears to be about 71,000 barrels per day or 0.6% of 1970 U.S. requirements for oil.

The consequences of prohibiting this switching could be severe. Most of the remaining power plant boilers scheduled to switch to oil are in regions where ambient air quality substantially exceeds the sulfur oxide primary standard. Some of these boilers are too old to justify the expenditure of stack gas cleaning equipment or low sulfur coal which would be required to meet standards by 1975 if use of oil were prohibited. The alternative would be to shut down these older boilers, thereby exacerbating the expected electric power generating shortage.

A more detailed discussion of coal to oil switching and the EPA Clean Fuels Policy is given in the following sections.

COAL TO OIL SWITCHING

A number of steam-electric plants in the U.S., particularly in the northeast, shifted from coal to oil in the 1950's and 1960's. The primary reason for this shift probably was economics. More recently, stringent emission regulations for sulfur oxides and particulates, developed by the states in response to the Clean Air Act, have created an additional shifting of demand from coal to oil to provide an economically attractive fuel source which can meet the regulations. Most of the switching is contained in states east of Mississippi River where the majority of U.S. coal is consumed. As shown in Table I, by 1975 approximately 26 million tons of coal demand will have shifted to oil, creating an oil demand of some 104 million barrels per year or 280,000 barrels per day. About 74% of this switching has already occurred. Since 1970, power plants with an annual coal consumption of 19 million tons have converted to oil. Based on a survey of electric utilities, it is expected that an additional 6.5 million tons of coal will be converted by 1975.

Most of the switching (20 of the 26 million tons) is in air quality control regions (AQCR's) where ambient air quality levels for sulfur dioxide now substantially exceed health-related standards. These regions are designated Priority I and IA AQCR's.

TABLE 1.—THE COAL-TO-OIL SWITCHING PICTURE

[Million tons coal per year]

EPA region ¹	Total switching 1970-75	Total distributed by time group		Total distributed by AQCR priority	
		1970 to mid 1973	Mid 1973 to 1975	I and IA	II and III
I.....	2.4	2.3	0.1	2.0	0.4
II.....	8.3	6.3	2.0	6.4	1.9
III.....	4.7	4.1	.6	2.6	2.1
IV.....	1.7	1.7	0	1.2	.5
V.....	8.4	4.6	3.8	7.4	1.0
Total.....	25.5	19.0	6.5	19.6	5.9
Oil equivalent (barrels per day) ²	279,400	208,200	71,200	214,800	64,600

¹ Composition of EPA region is shown on map in Appendix A.

² 1 ton coal equals 4 barrels oil.

AREAS ADOPTING MORE STRINGENT SO₂ OIL REGULATION¹ FOR THE 1973-74 WINTER HEATING SEASON²

State AQCR or area	Regulation changes from 1972-73 to 1973-74				1973-74 regulations ¹
	Residual oil (No. 5 and 6)		Distillate oil (No. 2)		
	1972-73 regulation	1973-74 regulation	1972-73 regulation	1973-74 regulation	
Maine: Metropolitan Portland-----	2.5	1.5	2.5	1.5	Secondary standards.
New York:					
Suffolk County-----	³ 1.0	.3	1.0	.2	Primary standards.
Nassau, Rockland, Westchester-----	.36	.3	.36	.2	Do.
Pennsylvania: City of Philadelphia-----	.5	.3	.3	.2	Do.
Michigan: Wayne County (Detroit)-----	1.25	1.0	(⁴)	(⁴)	Do.
Tennessee:					
Davidson County (Nashville)-----	2.0	1.0	2.0	1.0	Secondary standards or better.
East Tennessee (excluding Knox County); Tennessee River Valley, Cumberland-----		4.8		4.8	Primary standards.
Middle Tennessee (excluding Davidson County) West Tennessee; Memphis-----		4.8		4.8	Secondary standards or better.
South Dakota-----		2.7		2.7	Do.

Based on interpretation of State implementation plans.

¹ These areas represent approximately 13 percent of the U.S. residual oil consumption and approximately 7 percent U.S. distillate consumption (excluding Detroit) which has no change in distillate regulations.

² Have been burning 2.5 percent residual oil.

⁴ No change.

AMOUNT OF RESIDUAL OIL CONSUMPTION AFFECTED BY PROPOSED MEASURE

	Total (millions of barrels) ¹	Percent of U.S. consumption
Total U.S. residual oil consumption.....	838.0	100.0
Less:		
Nonpowerplant consumption.....	(487.3)	58.2
Powerplant consumption in areas not changing their sulfur regulations.....	(307.6)	36.7
Powerplant consumption in areas not achieving the primary standard.....	² (4.6)	² .5
Equals rough upper bound of the volume of residual oil affected by proposed measure..	² 38.5	² 4.6

¹ 1971 data.

² Assuming Philadelphia (17,000,000 barrels) would meet primary standards, which is questionable.

Source: Bureau of Mines data; Dave Camp (EPA, Durham).

COMPOSITION OF U.S. RESIDUAL OIL DEMAND

[In percent]

	1972-73	Cumulative	1973-74	Cumulative	1975	Cumulative
0.3 to 0.36.....	18.4	18.4	25.7	25.7	25.7	25.7
0.5.....	17.1	35.5	17.2	42.9	22.6	48.3
0.7.....		35.5		42.9	2.9	51.2
0.9 to 1.....	29.5	65.0	24.9	67.8	26.7	77.9
1.1 to 1.5.....	5.4	70.4	2.1	69.9	8.9	86.8
1.6 to 2.....	2.6	73.0	3.5	73.4	4.3	91.1
2.1 to 2.5.....	4.0	77.0	3.6	77.0	3.1	94.2
2.6 to 3.....	1.3	85.3	8.3	85.3	2.8	97.0
3.1 plus.....	.1	85.4	.1	85.4	.9	97.9
No registries.....	14.6	100.0	14.6	100.0	2.1	100.0
Total ¹	100.0		100.0		100.0	

¹ Approximately 96 percent of demand in contiguous United States.

COMPOSITION OF U.S. DISTILLATE OIL DEMAND BY SULFUR CONTENT REQUIREMENTS

[In percent]

Percents	1972-73	Cumulative	1973-74	Cumulative	1975	Cumulative
0.1-----	0		0		10.9	10.9
0.2-----	14.4	14.4	20.5	20.5	9.7	20.6
0.27 to 0.36-----	16.1	30.5	11.4	31.9	15.6	36.2
0.4-----	1.3	31.8	1.3	33.2	1.3	37.5
0.5-----	11.9	43.7	15.1	48.3	15.6	53.1
0.9-----	1.8	45.5	1.8	50.1	1.8	54.9
1-----	16.9	62.4	12.3	62.4	9.9	64.8
1.1 to 1.5-----	4.5	66.9	5.1	67.5	13.0	77.8
1.5 plus-----	14.8	81.7	14.7	82.2	15.3	93.1
No registries-----	18.3	100.0	17.8	100.0	6.9	100.0
Totals ¹ -----	100.0		100.0		100.0	

¹ Includes approximately 93 percent of distillate consumption in the contiguous United States.

AMOUNT OF DISTILLATE OIL CONSUMPTION AFFECTED BY PROPOSED MEASURE

	Total in thousands of barrels per day ¹	Percent of U.S. consumption
Total U.S. distillate consumption-----	2,920	100.0
Less: Non power plant consumption-----	2,734	93.6
Less: Use in gas turbines-----	132	4.5
Less: Use in internal combustion engines-----	15	.5
Equals other-----	39	1.3
Less: Other natural gas curtailment-----		
Less: Distillate burned to meet primary standards-----		

¹ 1972 data.

Sources: FFC reports, Dr. Tewksbury (Foster Associates).

OIL SULFUR REGULATIONS

[Percent sulfur by weight]

AQCR	Percent of U.S. demand	Residual, winter heating season			Percent of U.S. demand	Distillate, winter heating season		
		1972-73	1973-74	1975		1972-73	1973-74	1975
New Jersey-New York ¹ -----	20.0	0.3	0.3	0.3	16.0	0.2	0.2	0.1
Connecticut Interstate-----	1.0	1.0	.5	.5	1.5	1.0	.5	.5
Metropolitan Philadelphia ¹ -----	6.4	.5	2.4	2.4	3.1	.2	.2	.2
Metropolitan Boston-----	4.8	.5	.5	.5	4.3	.5	.5	.5
Metropolitan Providence-----	4.3	1.0	1.0	1.0	3.3	1.0	1.0	1.0
National Capital Interstate ¹ -----	3.8	1.0	.8	.8	1.7	.7	.6	.6
Hartford-New Haven, Springfield-----	3.0	1.0	.6	.6	2.7	1.0	.7	.7
Metropolitan Baltimore-----	1.7	1.0	1.0	1.0	1.3	.3	.3	.3
Merrimack Valley southern New Hamp- shire ¹ -----	1.2	1.2	1.7	1.0	1.6	.6	.6	.6
Niagara Frontier-----	.7	3.0	3.0	1.1	1.3	3.0	3.0	1.1
Southwestern Pennsylvania-----	.7	.8	.8	.8	.7	.8	.8	.8
Total U.S. demand-----	48.0				37.0			
Regulations as a weighted average of the 10 AQCR's-----		.63	.57	.52		.55	.50	.41

¹ Regulations are weighted by demand in interstate AQCR's where more than 1 set apply.² Will remain at .5 if the now pending revision by the city of Philadelphia is approved.

SUMMARY OF ACTIONS

Region I

Massachusetts granted two variance requests, one to Texaco and another to Northeast Petroleum Corporation. The sulfur regulations for No. 2 and No. 6 fuel oils were relaxed from .3% and .5% to .5% and 1%, respectively. The variances covered the period from 1/30 to 2/27 and were utilized in full. The EPA regional office did not accept the variance requests. In their judgment Texaco and Northeast had failed to prove that a shortage actually existed.

Rhode Island and Connecticut rejected verbal requests by Texaco.

Region II

Variances were requested for the entire State of New Jersey and the New Jersey-New York-Connecticut Interstate AQCR. Variances were granted only for the New York portion of the interstate AQCR. Four companies were granted variances: Texaco, Northville Industries, Asiatic Oil and Meenan Oil. Time and quantity limitations were placed on the sale of the fuel oil and penalties ranging from \$.75 to \$2.00 per barrel depending on sulfur content were imposed. As of March 3, 63% of the variance had been utilized.

Region III

Four variance requests were reported by Region III. Texaco, Inc., requested variances from Pennsylvania and Delaware to market No. 2 fuel oil with a sulfur content in excess of .3% and No. 5 and No. 6 oil with a sulfur content of greater than .5% in the Philadelphia Interstate. Neither request was granted because the city was able to find alternative suppliers.

In Virginia, the VEPCO power plant at Possum Point requested a variance from 1% to 2.3% for heavy fuel oil. The State granted the request on the basis of economic hardship and the finding that no appreciable degradation would result.

The crises at VEPCO's Reeves Avenue Plant in Norfolk was averted because the lack of oil availability resulted in a return to coal burning which meets regulations for the Norfolk area.

FUEL SHORTAGE VARIANCE REQUEST TABLE

Region	State AQCR and fuel	Penalty	Requested change in regulation (percent)	Quantity	Action taken	Variance utilization	Mar. 31
I	Massachusetts (Boston) Texaco, Inc., and White Fuel Corp.: No. 6	I	0.5 to 2.8	15 percent of 1st quarter sales	State granted EPA rejected.	Variance utilization full.	
	No. 2		0.3 to 0.5	3 percent of 1st quarter sales	No. 6 up to 1 percent		
	Northeast Petroleum Corp. No. 6		0.5 to 1	100 percent of February sales	Variance granted over period Jan. 30 to Feb. 27.		
I	Rhode Island: Texaco, Inc. No. 6	I	0.72 to 2.2	Never quantified	Rejected		
I	Connecticut (entire State): Texaco, Inc. No. 6	I	0.5 to 2.8	338,000 bbl; approximately 1 percent of utilities' yearly consumption.	do.		
II	New York, New Jersey, Connecticut AQCR	I				Penalty	
	Texaco, Inc.: No. 6		0.3 to 2	300,000 bbl to Mar. 10	Accepted	New York imposed a penalty on the sale of these fuels:	111,331
	Northville, Ind.: No. 6		0.3 to 2	504,903 bbl to Mar. 31	do.		708
	No. 6		0.3 to 1.7	208,663 bbl to Mar. 31	do.		154,785
	Asiatic Oil: No. 6		0.3 to 1	1,500,000 bbl to Mar. 31	do.		318
	Meenan Oil: No. 2		0.1 to 0.5	120,000 bbl blending only; approximately 2 percent of No. 6 yearly consumption and 0.3 percent of No. 2 consumption.	do.	0.3 to 1 percent	11,531
				Never specified	Rejected	\$0.75/bbl	50
II	New Jersey: Texaco, Inc., No. 6	I				1 to 2.8 percent	1,214,891
III	Pennsylvania, metropolitan Philadelphia: No. 6					\$2/bbl	308
	No. 2		Greater than 0.5 percent.	282,000 bbl	Rejected—found alternative suppliers.		832
			Greater than 0.3 percent.	96,000 bbl			
	Delaware, metropolitan Philadelphia: Texaco No. 2	II	0.3 to 0.5 percent		Rejected—(a) crises eased; (b) found alternative suppliers.		
	Virginia, District of Columbia: VEPCO—Possum Point plant, heavy fuel oil.	I	0.1 to 2.3 percent		Accepted by State until June 1975—(a) increase in emissions not significant; (b) additional expense would be a hardship in community; (c) no appreciable degradation.		
III	Virginia (Norfolk): Crises averted—The Reeves Avenue plant switched from oil to coal which meets the regulations for the Norfolk area.						

¹Utilization as of Mar. 3.

Mr. LOVE. Three?

Senator MUSKIE. Three. Therefore 11 air quality regions identified. The sulfur requirement is identical for both 1972-1973 and 1973-1974 except in two or three instances.

In the case of Connecticut, interstate, the requirement drops from 1 to 0.5. In the case of Hartford-New Haven-Springfield, it drops from 1 to 0.7. In the case of National Capital it drops from 0.7 to 0.6. But largely the requirements are the same for both heating seasons.

The second point I would like is that in most of them, the majority of these regions, the requirement is above the 0.6 percent at which you say the Middle Eastern crudes average out.

If that is the case, then it seems to me an argument can be made that since you can take care of, meet the sulfur requirements in a majority by number—I don't know what it is by population—but by number of the air quality regions with Middle Eastern crudes on the average, the argument could be made for using the domestic crudes on a selected basis under a policy that would effectively divert them into these areas for the areas of lower requirements.

That might well take care of a substantial portion of the problem. Would you want to comment on that?

Mr. LOVE. I don't think I can be very helpful in specifics on that. I certainly will review that and I would, of course, confirm that it is not our intent to burn or use high sulfur fuels where it is not necessary, but I also would suggest that if this committee or Mr. Train, or whoever it might be, could assure me that there is no problem, I would be less interested, but I have a very real concern about the situation and we will review that in mind.

We don't want to simply burn it when we don't need it.

Senator MUSKIE. Let me ask you a specific question. This table enumerates some things you, yourself, suggested as policy guidelines. So the question that is rather obvious is, do we know how much distillate fuel we have or can expect to have that would meet, that would come under the standards of the more restrictive air quality regions?

Mr. LOVE. I don't have those numbers down. But I am sure we can make a pretty good estimate on that, yes.

Senator MUSKIE. What are the options for insuring that that relatively clean fuel goes into the areas where it is needed? What are the options for insuring? What are the possible policies that would move it where it is needed?

Mr. LOVE. Of course, first, historically the restrictions themselves, the refusal of the consumers to buy, obviously, when they can't use it without violating the standards, historically has pushed the better fuels into those areas that have the higher restrictions.

If the market, and the market system I suppose would break down as a result of shortages and so on, then the only other strategy that I know of would be to somehow restrict.

Senator MUSKIE. Part of your case is that some areas have required where it isn't absolutely necessary to that isn't an effective mechanism. That is your argument here. Since more has been acquired than is necessary, somehow we have got to moderate the requirements.

But then the next question is if we moderate the requirements how do we insure that the fuel goes where it is needed most?

Are you contemplating a determination date or recommending a termination date for variances?

Mr. LOVE. Yes. They would be designed simply for the winter months, terminating in April.

Senator MUSKIE. So if your recommendation is adopted there would be an automatic reversion to the requirements that are moderated?

Mr. LOVE. Yes. We intend to make this simply a temporary thing. But in the event we cannot, over the years ahead, increase quickly the desulfurization activities and so on, I don't see that the situation next winter will have improved very materially.

We have to work toward that. While we intend to make this temporary, until we find longer-range solutions, it is possible that we are going to have to be looking at the same situation again.

Senator MUSKIE. I guess I had better leave that longer-term question to another hearing. I noticed you looking at your watch. I know your commitment at 2, so I won't delay you longer, but only on the understanding that we will get another opportunity to examine this developing policy and hopefully influence it in a sound way.

Thank you, Governor.

I will submit some written questions to you.

[The questions referred to follow:]

[QUESTIONS FROM SENATOR MUSKIE]

Question 1. At the conclusion of the hearing, you stated, with regard to your proposal that sulfur oxide restrictions be relaxed: "In the event we cannot over the years ahead increase quickly the desulfurization activities and so on, I don't see that the situation next winter will have improved very materially." "While we intend to make this temporary, until we find longer range solutions, it is possible that we are going to have to be looking at the same situation again."

The recent report of the Federal Interagency Committee: Evaluation of State Air Implementation Plans (the SOCTAP Report) has stated that one of the important factors limiting installation of available stack gas cleaning technologies is: "An anticipation that regulations may be altered in the near future."

(a) Doesn't the fact that sulfur regulations will now be relaxed two winters in a row, along with the suggestion in your concluding remarks that further relaxations may occur in the future, significantly reduce pressures on industry to adopt new technology to clean up sulfur emissions?

(b) What counter policies do you propose to maintain maximum pressure on industry to adopt sulfur oxides control technology to counter the disincentives inherent in your position that standards will be relaxed if they cannot be met?

(c) Senator Randolph pointed to the availability of sulfur oxide control technology during the hearing; and the SOCTAP Report confirms: "Sulfur dioxide removal from stack gases is technologically feasible in commercial-sized installations." To provide adequate demonstration of these processes and develop a strong commercial market for them, is there any reason why such presently available stack gas control technologies should not be immediately applied to all Federally owned steam electric power plants, such as those operated by the Tennessee Valley Authority?

(d) By significantly reducing pressures to adopt desulfurization technology in favor of a policy that clean air standards will be ignored if they cannot be met, do we run a risk of very serious dislocations in the future if it should be found that, as some studies have indicated, the threats to health from sulfur oxide pollution are more serious than we had previously believed? Also don't the present disincentives to clean fuels technology defer the date when we can achieve energy self-sufficiency in a way that will assure that public health will not be threatened?

Answer 1. a. It may have some effect in this direction, although I am not certain that it would be at all a significant reduction in those pressures.

b. EPA is quite effective at exerting pressure on industry, as are the Congressional Committees.

c. There are several reasons why such stack gas technology should not be immediately applied to all installations. The primary one is that no domestic stack gas cleaning facility has yet demonstrated acceptable reliability. Another one is the extremely high cost that would be involved. The TVA advised us that this would cost about \$1B for them alone. They have clearly documented that such devices are not needed to meet the ambient air standards in the vicinity of their plants. Thus, there seems to be no reason to impose such a large burden on consumers. Because the TVA is non-profit, it is clear that such costs would be borne by their customers.

An additional reason is that there will probably be major changes in stack gas cleaning technology in the near future. Construction of a number of identical plants using an unproven technology can easily result in the need to make major modifications to all those facilities to correct faults found in the first ones. If we wait until a technology has been shown to work reliably, we may be able to avoid being locked into a technology that either does not work or works poorly.

This is the same argument that has led the military to adopt a fly-before-buy policy, even though national security was at stake.

A third reason, of course, is that you usually have to shut down the power plant to install stack gas cleaning equipment. If adequate power is to be maintained to the TVA, the installation of any such equipment would have to be spaced over a period of time. Our ability to construct and install stack cleaning equipment is very limited. If we were to divert this capability to TVA installations, it would have to be at the expense of installations in areas that display a more serious need for such devices.

d. We do not run an appreciable risk of more serious dislocations in the future since we are already proceeding at a very rapid pace at removing sulfur oxide pollution. It is not clear what disincentives to clean fuels technology you are referring to.

EPA, through our new source performance standards programs and ambient air standards, has provided extremely powerful incentives for clean fuel technology. These have had the effect of greatly decreasing our probability of achieving energy self-sufficiency.

Question 2. Currently, several of the major coal producing companies are owned by companies whose primary purpose is the production and sale of oil and other petroleum products. This would appear to severely restrict the competitive factors which otherwise might encourage new technology developments, including pollution control equipment, to improve the competitive position of coal vs. oil. Is the Department of Justice anti trust division currently investigating the control of some major coal companies by oil companies, and if not, would you be prepared to recommend such an investigation and if necessary, action under the anti trust laws to improve competition in our energy industries?

Answer 2. I do not know if the Department of Justice is currently investigating the control of major coal companies by petroleum companies. It would be inappropriate for me to recommend what action, if any, they should take.

Question 3. What are the current and projected exports of low sulfur coal and refined and unrefined petroleum products for the years, 1973 and 1974?

Are any restrictions on the exports of these products being considered?

Answer 3. There are large exports of low sulfur coal principally for metallurgical purposes. In 1970, 70 million tons of coal were exported at a value of \$950M. Most of this is low sulfur coal. It is logical to believe that the current efforts to force the burning of low sulfur fuel through new source standards and regulations under State Implementation Plans will result in decreases of the exports of such coal. The values in 1973 were probably similar. Thus, our clean air standards are likely to have a major impact on our balance of payments. Exports of refined and unrefined petroleum products are extremely small, going primarily to areas in Mexico and Canada which are adjacent to the U.S. We are not now considering restrictions of exports of low sulfur coal. Should a large volume of exports of refined products occur, we may have to consider restrictions on exports.

Question 4. As we discussed at the hearing, homeowners in Maine, Vermont and some other states are facing the prospect of shortages in kerosene to heat their homes this winter. As we also discussed, these homeowners will be competing for fuel supplies with the nation's major airlines since jet fuel and kerosene are similar petroleum products resulting from the same refining process. Also, travel by jet aircraft is, according to a Department of Transportation Study, the "least energy efficient" of major transportation modes and we know that there is a significant over capacity of jet aircraft on routes between some of our major metropolitan areas.

(a) In light of the inefficiencies and over capacity in some jet airline transportation, do you believe it would be appropriate to impose controls to reduce the inefficiencies of the commercial airlines operations in order to make more kerosene available for home heating?

(b) What actions are you taking, directly or through cooperation with the Federal Railroad Administration, the Civil Aeronautics Board and Amtrak to improve the competitive position of rail passenger service—the most energy efficient transportation mode—compared to airline service—the least energy efficient transportation mode—in short distance trips where the two modes of transportation are or could be competitive?

(c) Would you support a subsidy for passenger rail service in order to promote its utilization in place of less energy efficient modes?

Answer 4. a. This would appear to be a matter for the Civil Aeronautics Board. The CAB is looking at the scope for reducing the use of jet fuel, as are the airlines themselves. They are adopting, where possible, policies that allow for increased load factors and for reduced flight speeds. Both serve to conserve fuel.

b. I have not attempted to set transportation policies in my current job. This is the job of Secretary Brinegar, who is cognizant of the current energy shortage problems we face.

c. As I indicated before, transportation policies are not my responsibility. I would have to defer to Secretary Brinegar to develop a recommendation for an administration position on questions such as rail subsidies.

Question 5. Much discussion of the energy crisis has focused on proposed solutions that relate to weakening environmental laws. Another area that may hold promise for action is in the management of the Federal system with its vast purchasing power and position of leadership and visibility in the nation. Therefore, with regard to the Federal system I would like to know what actions are being taken to conserve energy. Specifically:

(a) The Federal Government other than the Department of Defense, purchases almost exclusively vehicles with gasoline engines because of the present lower initial purchase cost of gasoline engines. Diesel engines have been demonstrated to be significantly more energy efficient than gasoline engines and to have lower operating and maintenance cost which make the ultimate cost of diesel vehicles cheaper than gasoline vehicles. In light of this, has the General Services Administration been directed to revise its purchasing practices, at least as regards to trucks, to purchase diesel trucks instead of the gasoline trucks it presently buys? What is the position of your office with regard to the purchase of diesel automobiles by the Federal Government in order to create a market for those vehicles in this country?

(b) Have the General Service Administration, the Department of Housing and Urban Development, and other Federal agencies implemented policies which would cease the practice of constructing or renting buildings, or subsidizing construction or rental of buildings, which have sealed windows or otherwise depend on constantly operating heating and air conditioning systems for ventilation?

(c) Federal Government currently subsidizes parking by its employees to encourage them to drive motor vehicles to work but provides no comparable subsidy for those who take more energy efficient public transportation modes. Are you prepared to recommend that this policy be revised?

(d) Is there any reason why the Federal Government should continue to purchase and/or operate the number of large, fuel inefficient cars it currently provides free for many of its top executives. Is there any reason why these cars could not be smaller and more efficient?

Answer 5. a. The Office of Energy Conservation is looking at ways to reduce the use of energy by the Federal Government. One thing that should be looked

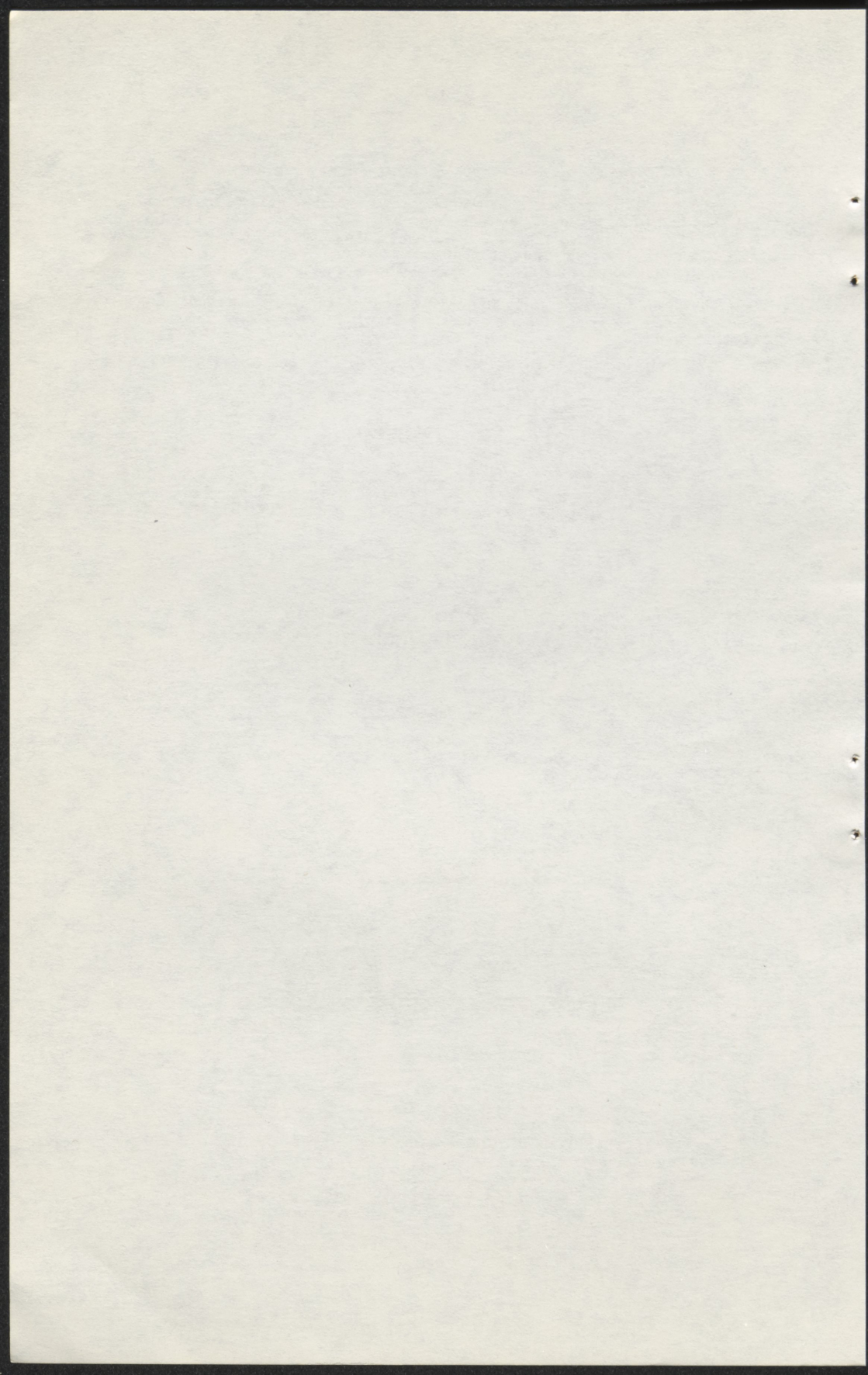
at is the use of more energy efficient vehicles. In some cases, these could be diesel powered.

b. The Office of Energy Conservation, along with the Agencies mentioned, are looking at methods to save energy in buildings. I would point out that sealed windows can be very efficient in reducing the amount of infiltration of outside air that has to be heated. Much depends, obviously on a number of factors.

c. The Office of Energy Conservation is currently examining a number of ideas and options to encourage more efficient use of automobiles (car pools) and public transportation. The Department of Transportation has been funding various bus lanes and other experiments. Several ideas are being explored.

d. There may be some scope for having smaller and more fuel efficient cars. and, in fact, GSA is purchasing a larger proportion of such cars now, and will continue to do so.

[Whereupon, at 1:15 p.m., the subcommittee recessed, to reconvene subject to the call of the chair.]



APPENDIX

Notice: This opinion is subject to formal revision before publication in the Federal Reporter or U.S. App. D.C. Reports. Users are requested to notify the Clerk of any formal errors in order that corrections may be made before the bound volumes go to press.

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 72-1072

ESSEX CHEMICAL CORPORATION, ET AL,
Petitioners,

v.

WILLIAM D. RUCKELSHAUS,
Administrator, Environmental Protection Agency,
Respondent.

No. 72-1079

APPALACHIAN POWER COMPANY
INDIANA AND MICHIGAN ELECTRIC COMPANY
KENTUCKY POWER COMPANY
OHIO POWER COMPANY,
Petitioners,

v.

ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

Petitions for Review of an Order of the
Environmental Protection Agency

Decided September 10, 1973

Robert C. Barnard, with whom *Donald L. Morgan* and *Edward Maguire* were on the brief, for petitioners in No. 72-1072. *Kenneth L. Rachman, Jr.* and *Douglas E. Kliever* also entered an appearance for petitioners in No. 72-1072.

H. Edward Dunkelberger, Jr., with whom *Theodore L. Garrett* was on the brief, for petitioners in No. 72-1079.

James R. Walpole, Attorney, Department of Justice, with whom *Kent Frizzell*, Assistant Attorney General, *Edmund B. Clark* and *Martin Green*, Attorneys, Department of Justice, were on the brief for respondent in No. 72-1072.

Thomas C. Lee, Attorney, Department of Justice, of the bar of the Supreme Court of Michigan, *pro hac vice*, by special leave of court, with whom *Kent Frizzell*, Assistant Attorney General, *Edmund B. Clark* and *Martin Green*, Attorneys, Department of Justice, were on the brief, for respondent in No. 72-1079.

Turner T. Smith, Jr., filed a brief on behalf of Long Island Lighting Company and National Asphalt Pavement Association, as *amici curiae* urging reversal.

Before: *WRIGHT* and *TAMM*, *Circuit Judges*, and *DAVIES*,* *Senior United States District Judge* for the District of North Dakota.

Opinion for the Court filed by *Circuit Judge TAMM*.

TAMM, Circuit Judge: These two appeals, consolidated for purposes of argument and decision, are taken from the action of the Administrator of the Environmental Protection Agency [EPA] in setting "standards of performance" for new or modified stationary sources of pollution pursuant to the mandate of § 111 of the Clean Air Act, as amended [Act], 42 U.S.C. § 1857 c-6 (1970). Among the stationary sources for which standards were set are sulfuric acid plants, subject to challenge in No. 72-1072, and coal-fired steam generators, subject to challenge in No. 72-1079. See 40 C.F.R. §§ 60.1

*Sitting by designation pursuant to 28 U.S.C. § 294(d)

et seq. Even when limited to the scope of review prescribed by the Supreme Court in *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402. (1971), we find that the Administrator's action as to certain aspects of the standards must be remanded for further proceedings; as to the bulk of the standards, however, we find that the Administrator has acted properly within the scope of his authority and not in abuse of his discretion.

I.

On March 31, 1971, pursuant to the requirement of § 111 of the Act, 42 U.S.C. § 1857 c-6 (1970),¹ the EPA published a list of categories of stationary air pollution sources which significantly contribute to the endangerment of public health and welfare. The list included steam generators, incinerators, sulfuric acid plants, nitric acid plants, and portland cement plants. 36 Fed. Reg. 5931 (March 31, 1971). Thereafter, on August 17, 1971, proposed regulations were published establishing federal standards of performance for each new source category on the list. 36 Fed. Reg. 15704 (August 17, 1971). Issued concurrent with the proposed regulations were documents entitled "Background Information for Proposed New-Source Performance Standards" and "Summaries of Test Data," which set forth the justification

¹ 42 U.S.C. § 1857c-6(b) (1970) provides in pertinent part:

(1) (A) The Administrator shall, within 90 days after December 31, 1970, publish (and from time to time thereafter shall revise) a list of categories of stationary sources. He shall include a category of sources in such list if he determines it may contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare.

(B) Within 120 days after the inclusion of a category of stationary sources in a list under subparagraph (A), the Administrator shall propose regulations, establishing Federal standards of performance for new sources within such category.... [H]e shall promulgate, within 90 days after such publication, such standards with such modifications as he deems appropriate.

for the new proposed standards. In December of 1971, after receiving and evaluating more than 200 comments from interested parties,² the EPA published final regulations, 40 C.F.R. part 60, incorporating only minor changes from the proposed regulations. 36 Fed. Reg. 24876 (December 23, 1971).

On January 21 and 24, 1972, Essex Chemical Corp., et al. (No. 72-1072), Portland Cement Association (No. 72-1073), and Appalachian Power Co., et al. (No. 72-1079), petitioned for review in this court pursuant to § 307(b)(1) of the Act, 42 U.S.C. § 1857h-5(b)(1) (1970),³ challenging the standards set by the EPA for sulfuric acid plants, portland cement plants, and coal-fired steam generators, respectively. Shortly thereafter this court issued its decision in *Kennecott Copper Corp. v. EPA*, 462 F.2d 846 (D.C. Cir. 1972), concerning a national secondary ambient air quality standard promulgated by the EPA pursuant to § 109(b) of the Act, 42 U.S.C. § 1857c-4(b) (1970), wherein a remand was ordered so that the EPA might "supply an implementing statement that will enlighten the court as to the basis on which [the Administrator] reached the . . . standard" *Id.* at 850. In light of the *Kennecott Copper* decision the EPA subsequently published a "Supplemental Statement in Connection with Final Promulgation," 37 Fed. Reg. 5767 (March 21, 1972), in order to avoid the problems presented in *Kennecott Copper*

² See 36 Fed. Reg. 24876 (December 23, 1971).

³ 42 U.S.C. § 1857h-5 (b) (1) (1970) provides in pertinent part:

A petition for review of action of the Administrator in promulgating . . . any standard of performance under section 1857c-6 of this title . . . may be filed only in the United States Court of Appeals for the District of Columbia.

and thus "ensur[e] the rapid conclusion of judicial review of the validity of the [stationary source] standards." *Id.*⁴

II.

On June 29, 1973, another panel of this court issued an opinion remanding the record to the EPA for further proceedings regarding the standards of performance for portland cement plants, *Portland Cement Association v. Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973). While the records in the two cases *sub judice* are substantially different from that in *Portland Cement* and consequently engender differing conclusions as to the legality of the standards, several issues are so similar and so conclusively dealt with by the *Portland Cement* decision that they can be treated summarily by this court in its determinations today.

1. NEPA Impact Statement

One issue raised and extensively briefed in both No. 72-1072 and No. 72-1079 is the consequence of the Administrator's failure to file an "impact statement" pursuant to § 102(2)(c) of the National Environmental Policy Act of 1969 [NEPA], 42 U.S.C. § 4332(2)(c) (1970).⁵ Petitioners

⁴ In issuing the "Supplemental Statement" the EPA thus hoped to avoid a remand similar to that required in *Kennecott Copper Corp. v. EPA*, 462 F.2d 846 (D.C. Cir. 1972), by providing additional information regarding the bases for the standards prior to argument and decision in this court.

⁵ 42 U.S.C. § 4332(2)(c) (1970):

[A]ll agencies of the Federal Government shall —

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on —

(i) the environmental impact of the proposed action

here allege (as was alleged in *Portland Cement*) that the EPA, merely because it is an environmentally oriented agency, is not exempt from the NEPA provision that in "major Federal actions significantly affecting the quality of the human environment," all Federal agencies are subject to the requirement that the responsible official file "a detailed statement . . . on . . . the environmental impact of the proposed action." Petitioners pointedly note that an impact statement, if filed, would have required the EPA to consider factors such as alternative adverse environmental effects and cost/benefit analyses to a considerably more significant degree than that which the record shows actually occurred.

The *Portland Cement* panel, per Judge Leventhal, extensively analyzed the considerations pertaining to a general, limited, or non-existent exemption for the EPA from the NEPA impact statement requirements. See *Portland Cement, supra*, slip op. at 5-21. The panel concluded, leaving for another time the consideration of whether the EPA was completely exempt from the rigors of an impact statement,⁶ that the EPA was exempt at least in its action in promulgating the § 111 standards. The determination was founded upon a "proper" construction of the § 111 mandate that the "standard of performance" reflect "the best system of emission reduction" and require the Administrator to take into account "the cost of achieving such reduction." As "[t]hese criteria require the Administrator to take into account counter-productive environmental effects of a proposed standard,"⁷ as well as economic costs to the

This issue was also extensively briefed by amicus curiae Long Island Lighting Co. in No. 72-1079, and amici curiae Long Island Lighting Co. and National Asphalt Paving Co. in No. 72-1072.

⁶ We likewise refrain from any broader determination of an EPA exemption from the NEPA impact statement requirement.

⁷ The EPA argues that §§ 312(a) and 313 of the Clean Air Act, 42 U.S.C. § 1857j-1, 2 (1970), calling for the preparation annually of

industry," the decision that an impact statement is not required in this specific instance strikes a "workable balance between some of the advantages and disadvantages of full application of NEPA." *Id.* at 18-19. The court stated:

What is decisive, ultimately, is the reality that, section 111 of the Clean Air Act, properly construed, requires the functional equivalent of a NEPA impact statement.

Id. at 16. Finding no good reason to divert from or expand upon the logic of the *Portland Cement* decision, we adhere to the position that no NEPA impact statement need be filed by the Administrator in making his § 111 determinations.⁸

"economic cost studies for Congress" and a report concerning the "progress and problems of the air pollution control programs under the Act," is an adequate alternative to considering in each case the "counter-productive environmental effects of a proposed standard." See Brief for Respondent in No. 72-1072, at 29-31, and Brief for Respondent in No. 72-1079, at 27-28. Such a general year end study simply is not an adequate substitute for a case by case analysis of adverse environmental effects, even to the extent that the case by case analysis is limited by time constraints imposed by Congress. We note that if our interpretation of "best system" did not include a requirement that such factors be considered on such a basis then § 111 of the Clean Air Act, as construed, would in all likelihood not require the "functional equivalent of a NEPA impact statement," and the workable balance would no longer exist. See *Portland Cement Assoc. v. Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 15 n. 40. Compare *Getty Oil Co. v. Ruckelshaus*, 467 F.2d 349, 359 (3d Cir. 1972), cert. denied, 409 U.S. 1125 (1973).

⁸ See especially *Portland Cement Assoc. v. Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 17 n. 41, for a discussion of the actions of other courts regarding the impact statement requirement for the EPA, generally relating to the § 110 determination of state plan compliance with the Clean Air Act. See also *Buckeye Power, Inc. v. EPA*, Nos. 72-1628, -29, -32 (6th Cir. June 28, 1973), issued one day prior to the *Portland Cement* decision, a § 110 decision holding an impact statement unnecessary because to do otherwise "would mean that an agency whose sole purpose is the improvement of the environment, would have to file an Environmental Impact Statement with itself." *Id.*, slip op. at 19.

2. *Opacity Standard*

The standards promulgated by the Administrator restrict "acid mist" discharge to no greater than "10 percent opacity" in sulfuric acid plants and "particulate matter" discharge to no greater than "20 percent opacity" in coal-fired steam generators.⁹ See 40 C.F.R. §§ 60.83(b), 60.42(b). Opacity is defined as the "degree to which emissions reduce the transmission of light and obscure the view of an object in the background." 40 C.F.R. § 60.2(j). A 10 percent opacity standard was established for the portland cement stationary sources of pollution and the *Portland Cement* court, impressed both by the arbitrariness of the test — it is essentially a subjective test on the part of trained inspectors who attempt to judge the per cent of opacity present in a smoke plume — and the persuasive challenges on the part of the petitioners,¹⁰ found that further consideration and explanation of the efficiency and objectivity of the test was necessary prior to its adoption as a standard:

[I]t is one thing to use a method of testing to observe possible violations of a standard; it is another to constitute that method as the standard itself. If the opacity test is to be a standard, and if violations can

⁹ "Acid mist" is defined as "sulfuric acid mist, as measured by test methods set forth in this part," 40 C.F.R. § 60.81(b), while "particulate matter" is defined as "any finely divided liquid or solid material, other than uncombined water, as measured by Method 5." 40 C.F.R. § 60.41(c). In the instance of both acid mist and particulate matter alternative methods of measurement other than the opacity test are promulgated. See 40 C.F.R. §§ 60.42(a), 60.83(a), which set quantitative limits based upon emissions actually detected by appropriately objective test methods.

¹⁰ See especially the discussion in *Portland Cement Assoc. v. Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 51, pertaining to a test conducted for the National Center for Air Pollution Control (U.S. Dept. H.E.W.).

result in enforcement actions without further testing, the standard must be consistent with the statute and congressional intent.

Portland Cement, supra, slip op. at 50. Similar opacity standards are challenged in both suits before us today and the principles requiring further consideration are unchanged. The record must be remanded for additional consideration and explanation by the Administrator regarding the reasonableness of the opacity standards.¹¹

3. *Startup, Shutdown, Equipment Malfunction*

Petitioners in both No. 72-1072 and No. 72-1079 raise objections in varying degrees regarding the EPA's failure to provide that lesser standards, or no standards at all, should apply when the stationary source is experiencing startup, shutdown, or mechanical malfunctions through no fault of the manufacturer.¹² Petitioners allege that nowhere in the record has there been a showing that the standards can be equalled during periods of less than normal operation, when plant efficiency and consequently pollution emissions vary

¹¹ Since the record was remanded in *Portland Cement* for a similar reconsideration of the opacity standard, and since the challenges basically are directed at the test itself rather than particular standards set thereunder, we do not believe that the reconsideration will require much more effort on the part of the EPA than is already required by *Portland Cement*.

¹² See, e.g., in No. 72-1072, the Comments of Stauffer Chemical Co., J.A. at 76, 81; Manufacturing Chemists Assoc., J.A. at 121, 137; American Cyanamid Co., J.A. at 267, 268; and in No. 72-1079, the Comments of Edison Electric Institute, J.A. at 123, 126; Michigan Electric Assoc., J.A. at 140, 144-45; Consolidated Edison Co. of New York, J.A. at 188, 197. The comments in No. 72-1079 were substantially directed to the time within which initial performance tests were to be conducted. 40 C.F.R. § 60.8 now provides that the tests must be taken "[w]ithin 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility"

significantly from the norm. On August 18, 1972, EPA Acting Administrator Fri admitted that "[a]t the time of promulgation, it was known that even in the case of sources which ordinarily complied with the standards and which followed proper operating and maintenance procedures, there could on occasion occur malfunctions or other events (process startups and shutdowns) during which emissions might temporarily exceed the standards."¹³ 37 Fed. Reg. 17214 (August 25, 1972). Concurrent with that statement regulations were proposed providing a framework within which unavoidable excesses of the standard would normally not be considered violations of the regulatory guidelines (so long as certain reporting requirements were fulfilled). The identical issue was raised in *Portland Cement* and the court there found the challenge persuasive enough to merit a remand. The significance of the proposed regulation was fully recognized:

If the EPA adopts, or intends to adopt, this proposed regulation, it may take the attendant flexibility into account, on remand, as pertinent to the manufacturers' objections, even though the new regulation has been proposed in a proceeding with a different docket number and caption.

Portland Cement, supra, slip op. at 47. We agree that such variant provisions appear necessary to preserve the reasonableness of the standards as a whole and that the record does not support the "never to be exceeded" standard currently in force. Thus, we remand for further consideration of this issue, noting that the proposed regulation should play an integral role in any reconsideration.

¹³ The Acting Administrator specifically stated that "[a]s promulgated, the standards contained no explicit provision to deal with such occurrences," but that "[s]uch occurrences generally are dealt with by the exercise of discretion in the Agency's enforcement activities." 37 Fed. Reg. 17214 (August 25, 1972). See generally *Portland Cement Assoc. v. Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 44-47.

III.

The focal point of our analysis of the EPA'S standard setting must be the statutory statement defining "standard of performance." Section 111 of the Act, 42 U.S.C. § 1857 c-6(a) (1) (1970), states:

The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated.

It is the system which must be adequately demonstrated and the standard which must be achievable. This does not require that a sulfuric acid plant be currently in operation which can at all times and under all circumstances meet the standards; nor, however, does it allow the EPA to set the standards solely on the basis of its subjective understanding of the problem or "crystal ball inquiry." See *Portland Cement, supra*, slip op. at 29-31. An adequately demonstrated system is one which has been shown to be reasonably reliable, reasonably efficient, and which can reasonably be expected to serve the interests of pollution control without becoming exorbitantly costly in an economic or environmental way. An achievable standard is one which is within the realm of the adequately demonstrated system's efficiency and which, while not at a level that is purely theoretical or experimental, need not necessarily be routinely achieved within the industry prior to its adoption.¹⁴

¹⁴ The legislative history of § 111 of the Clean Air Act, as amended, 49 U.S.C. § 1857c-6 (1970), reveals that Congress was most concerned that new plants — new sources of pollution — would have to be controlled to the greatest degree practicable if the national goal of a cleaner environment was to be achieved. See *S. Rep. No. 1196*, 91st Cong., 2d Sess. 16 (1970); Summary of the Provisions of Conference Agreement on the Clean Air Act Amendments of 1970, 116 CONG.

In subjecting the Administrator's actions to judicial review we apply a test of reasonableness, wherein we are "not empowered to substitute [our] judgment for that of the agency" but must consider whether "the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park v. Volpe*; *supra*, 401 U.S. at 416. The judgment of the Administrator is to be weighted against his statutory function and limitations, the record searched to determine if indeed his decisions and reasons therefore are themselves reasoned, and at that point our function terminates. Our "expertise" is not in setting standards for emission control but in determining if the standards as set are the result of reasoned decision-making. Yet, even this limited function requires that we foray into the technical world to the extent necessary to ascertain if the Administrator's decision is reasoned. While we must bow to the acknowledged expertise of the Administrator in matters technical we should not automatically succumb thereto, overwhelmed as it were by the utter "scientificity" of the expedition.

A vast majority (97 per cent) of sulfuric acid plants in the United States produce sulfuric acid by means of a "contact" process, involving these three steps:

(1) Elemental sulfur or other sulfur-bearing raw material is burned to obtain sulfur dioxide gas [SO_2];

(2) Sulfur dioxide gas is converted into sulfur trioxide [SO_3], upon contact with a catalyst, generally vanadium pentoxide;

(3) Sulfur trioxide gas is then absorbed in sulfuric acid [H_2SO_4], through combination with the water in a 98 to 99 percent sulfuric acid solution with which it is circulated in an absorption tower.

Any unconverted sulfur dioxide gas passes through demister equipment (to eliminate acid mist, basically sulfuric acid mist

REC. 42384, 42385 (1970). The Conference Committee considered S. 4358, 91st Cong., 2d Sess. § 113 (1970) and H.R. 17255, 91st Cong., 2d Sess. § 112 (1970).

formed by the combination of sulfur trioxide and water vapor), and escapes out the stack into the atmosphere. The regulations permit sulfur dioxide emissions up to a level of 4.0 lbs. per ton of sulfuric acid produced, and acid mist emissions up to 0.15 lb. per ton of sulfuric acid produced, as measured by methods approved in the regulations. See 40 C.F.R. §§ 60.82, 60.83. Generally those plants burning an elemental sulfur feedstock — about 68 per cent of all sulfuric acid plants in the United States are subject to greater quality control, higher efficiency, and consequently experience less emission problems than those burning only sulfur-bearing raw materials.¹⁵ The latter, known variously as “recycle,” “spent acid,” and “wet gas” plants, serve an important environmental function, however, for among the raw materials used for feedstocks are wastes from petroleum refineries and other chemical processes.¹⁶

There are two types of sulfuric acid plants in general use today, “single” and “dual” absorption. The terms “single” and “dual” refer to whether the plant uses one or two stages

¹⁵ See Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 121, 134:

[Recycle plants] of necessity operate on a weaker feed gas of lower oxygen content, for a larger or smaller portion of the oxygen of the combustion air has been consumed by the carbon and hydrogen contents of the sulfur source.

The lower sulfur dioxide and oxygen concentrations of the feed gas both make it more difficult to achieve a high degree of conversion of SO(2) to SO(3) in the catalyst bed and require that larger volumes of gas be processed to manufacture a given quantity of sulfuric acid.

¹⁶ As noted, approximately 68 per cent of the contact process sulfuric acid in the United States is produced from elemental sulfur, with the remaining acid produced from spent alkylation acid and acid sludge from petroleum refineries (18-1/2 per cent); tail gas from smelters (9 per cent); iron pyrites (4-1/2 per cent); and hydrogen sulfide. See Control of Air Pollution from Sulfuric Acid Plants (Rough Draft) (EPA, Durham, North Carolina, August, 1971) [Control Document], J.A. in No. 72-1072 at 296, 301.

in steps #2 and #3 of the contact process. Dual absorption plants pass the sulfur dioxide gas which remains after a first conversion attempt through a second catalytic converter and absorption tower, thus generating a higher conversion efficiency and minimizing the ultimate gas emissions into the atmosphere. The dual absorption system is relatively new, and although it has been used extensively in Europe it has only recently emerged in the United States as a viable method of sulfuric acid production. At the time of EPA testing in preparation for the standards only one dual absorption plant was in operation in the United States, an elemental sulfur burning plant owned by the American Cyanamid Company.¹⁷

The EPA standards are applied to all types of contact process sulfuric acid plants, whether single or dual absorption and whether designed for use with elemental or recycle feedstock.¹⁸ The standards are based on information and data

¹⁷ See Comment of American Cyanamid Co. in No. 72-1072, J.A. at 267; Control Document, *supra* note 16, J.A. at 325; Background Information for Proposed New-Source Performance Standards [Background Information Document], J.A. in No. 72-1072 at 48, 57. The Supplemental Statement filed by the EPA on March 21, 1972, 37 Fed. Reg. 5770, indicates that as of March, 1972, there were three dual-absorption plants in operation in the United States, only a small percentage of the 76 designed or constructed throughout the world. One sulfite scrubbing process, the Olin Chemicals plant at Paulsboro, New Jersey, was in operation and tested by the EPA prior to the promulgation of the standards. See Comments of Olin Chemicals in No. 72-1072, J.A. at 242, and Background Information Document, *supra*, J.A. at 58. Four additional scrubbing systems were scheduled for activation in 1972.

¹⁸ 40 C.F.R. § 60.81 provides that the standards shall apply to:

"[A]ny facility producing sulfuric acid by the contact process by burning elemental sulfur, alkylation acid, hydrogen sulfide, organic sulfides and mercaptans, or acid sludge, but does not [apply to] facilities where conversion to sulfuric acid is utilized primarily as a means of preventing emissions to the atmosphere of sulfur dioxide or other sulfur compounds.

derived from (1) inspections and stack tests of existing facilities; (2) consultations with operators, designers, and state and local control officials; and (3) review of available literature on the subject. The EPA must rely upon the dual-absorption system as the adequately demonstrated system which will meet the standards for new elemental sulfur burning plants, and on a sodium sulfite-bisulfite scrubbing system as the adequately demonstrated system which will meet the standards for the new recycle and modified existing plants which become subject to the standards.¹⁹ The acid mist standard is based on a system of "high-efficiency acid-mist eliminators, including both fiber demisters and wire and tube electrostatic precipitators."²⁰

1. *Elemental Sulfur Feedstock – Sulfur Dioxide Standards*

Petitioners do not object to the EPA's selection of dual absorption as the "best system of emission reduction" which has been "adequately demonstrated" for use in elemental sulfur burning plants. They state in their Reply Brief:²¹

The exempted facilities are generally metallurgical plants that use acid plants for sulfur dioxide control purposes. See paragraph 15 of the EPA's statement accompanying publication of the final regulations, 36 Fed. Reg. 24876 (December 23, 1971), and Comment of the American Mining Congress in No. 72-1072, J.A. at 168, 172.

¹⁹ Although in the Supplemental Statement published on March 21, 1973, 37 Fed. Reg. 5770, the EPA indicated that the dual absorption process would be used to control sulfur burning plants and "many spent acid plants," there is nothing in the record to indicate any basis for the conclusion that the dual absorption process can perform efficiently in a recycle, or spent acid, plant. As such, dual absorption simply has not been "adequately demonstrated" within the meaning of § 111(a)(1) of the Clean Air Act, as amended, 42 U.S.C. § 1857c-6(a)(1) (1970), for use with other than elemental sulfur feedstock plants.

²⁰ Background Information Document, *supra* note 17, J.A. at 58.

²¹ Reply Brief for Petitioners in No. 72-1072 at 23 n.1.

Petitioners object to EPA's implications that industry is unwilling to utilize the best control technologies. Industry is agreeable to using dual absorption technology, which EPA finds best for the 80% of the industry that uses elemental sulfur feedstocks.

It is the designation of 4.0 lbs. of sulfur dioxide per ton of sulfuric acid produced as the "limitation achievable" through use of the dual absorption system that strikes the discordant note. Petitioners assert that the standard is unrealistically high, not based on the evidence in the record, and hence arbitrary and unreasonable. The bulk of the comments received by the EPA from interested parties — generally industrial companies subject to the controls — suggest a standard of 6.5 lbs./ton as a more reasonable alternative.

The EPA bases the 4.0 lbs./ton standard in three separate sources of information: (1) EPA supervised tests at the Warners Plant of the American Cyanamid Co. on February 17 and 18, 1971; (2) Available technical literature providing information on several of the European dual absorption plants; (3) American Cyanamid's own supervised tests at the Warners Plant.²²

The results of the EPA supervised tests are impressive. Three independent test runs measured sulfur dioxide emissions of less than 2.0 lbs./ton. Yet for purposes of our review the relevancy of the test results is at best minimal, for

²² See Background Information Document, *supra* note 17, J.A. at 57; Summaries of Test Data, J.A. at 66-69; Control Document, *supra* note 16, J.A. at 325-327, 355 n. 10; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770 (March 21, 1972). The Administrator also purported to rely upon discussions with dual absorption plant designers and operators, and state and local officials. Since nothing appears in the record concerning such discussions it is difficult for this court to assess them as a basis for the standards promulgated. See Background Information Document, *supra*, J.A. at 56, and Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770 (March 21, 1972).

as petitioners correctly point out the test data clearly indicate that during the tests acid production in the plant was only at approximately 52% of capacity. Since the regulations specifically provide that performance tests "shall be conducted while the affected facility is operating at or above the maximum acid production rate at which such facility will be operated," 40 C.F.R. § 60.85(b), and as nothing appears in the record to indicate any direct proportional relationship between emissions and plant production levels,²³ we are hard pressed to find much support for the EPA standards on the basis of these test results. A similar vice affects the relevancy of the literature regarding the European plants, for while purporting to show impressive emission controls — three of the plants reportedly average emissions of less than 3.0 lbs./ton — no data are provided indicating at what percentage capacity the various plants were operating when these results were obtained.²⁴

Filed with the comments of the American Cyanamid Co. were summaries of many of the company's own tests of its Warners Plant,²⁵ including the test data which prompted the EPA to state in the Background Information for Proposed New-Source Performance Standards [Background Document], J.A. at 57:

Testing by the operator showed full-load SO(2) emissions to be consistently less than 4.0 pounds of SO(2) per ton of acid, with emissions below 3.0 pounds per ton much of the time.

²³ The raw test data submitted by American Cyanamid Co. would seem to indicate the possibility of a roughly proportional relationship between the two. See Comment of American Cyanamid Co. in No. 72-1072, J.A. at 267.

²⁴ See Control Document, *supra* note 16, J.A. at 326.

²⁵ See Comment of American Cyanamid Co. in No. 72-1072, J.A. at 267-70.

While the test results hardly support the EPA's allegation of full-load emissions "consistently less" than 4.0 lbs./ton, they do suffice to convince us of the reasoned decision-making of the Administrator. The Warners Plant is designed for a conversion efficiency (percentage of SO(2) conversion to SO(3)) of 99.5, which amounts to a design expectancy of sulfure dioxide emissions in the 6.5 lbs./ton range.²⁶ The test results, however, both as reported by the EPA and as clarified and expanded in American Cyanamid's data, show that on three occasions when production was at or near full capacity emission levels of only 2.7, 3.5, and 4.0 lbs./ton were recorded. In fact, the *average* of the nineteen readings taken when the plant was near full capacity is approximately 4.6 lbs./ton. In sum, the proposed standard was exceeded on two occasions, equalled on another, and nearly equalled on the average of nineteen different readings. Keeping in mind Congress' intent that new plants be controlled to the "maximum practicable degree,"²⁷ we find that the 4.0 lbs./ton standard based on a dual absorption system for new elemental sulfur burning plants is the result of the exercise of reasoned discretion by the Administrator and cannot be upset by this court.

The petitioners additionally challenge what they feel to be an inadequate consideration of economic costs in the selection of the 4.0 lbs./ton standard. Essentially what they seek is a cost-benefit analysis comparing their desired 6.5 lbs./ton standard with the standard ultimately adopted.²⁸

²⁶ See Brief for Petitioners in No. 72-1072 at 22.

²⁷ Summary of the Provisions of Conference Agreement on the Clean Air Amendments of 1970, 116 CONG. REC. 42384, 42385 (1970).

²⁸ See, e.g., Comments of Stauffer Chemical Co. in No. 72-1072, J.A. at 73, 77, 81-82; Comments of Allied Chemical Corp. in No. 72-1072, J.A. at 240-41; Brief for Petitioners in No. 72-1072 at 61-65.

Again, we affirmatively defer to the *Portland Cement* decision, *supra*, slip op. at 22-23:

However desirable in the abstract, such a requirement would conflict with the specific time constraints imposed on the Administrator. The difficulty, if not impossibility, of quantifying the benefit to ambient air conditions, further militates against the imposition of such an imperative on the agency. Such studies should be considered by the Administrator, if adduced in comments, but we do not inject them as a necessary condition of action. (Footnote omitted.)

The record amply supports the EPA's contention that it has taken economic costs into account in selecting the best system, whether that system be dual absorption, the sodium sulfite-bisulfite scrubber, or acid mist controls.²⁹ It is not unlikely that industry and the EPA will disagree on the economic costs of these various control techniques. We have no desire or special ability to settle such a dispute, but we do find that the Administrator has considered economic costs as required by § 111 of the Act, 42 U.S.C. § 1857c-6(a)(1) (1970), and that his consideration is reasoned.³⁰

²⁹ See Background Information Document, *supra* note 17, J.A. at 60-61; Control Document, *supra* note 16, J.A. at 345-53; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770-71 (March 21, 1972).

³⁰ None of the procedural abuses present in *Portland Cement Assoc. v. Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973), are alleged in this case or appear evident from the record. The comments filed with the EPA prior to promulgation of final standards show an awareness on the part of all parties involved of the test data and literature upon which the proposed regulations were based. No challenge was directed at the accuracy of the test results. See Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 136: "Three tests were run by EPA and the company [American Cyanamid] has acknowledged that the results of these tests are accurate within reasonable analytical limits."

2. *Recycle Plants – Sulfur Dioxide Standard*

In contrast to the petitioners' position concerning elemental sulfur feedstock plants and the dual absorption system, their challenge regarding recycle plants is directed more to the sodium sulfite-bisulfite scrubber as the "best system . . . adequately demonstrated" than to whether the 4.0 lbs./ton standard is "achievable" thereunder.

The standard as applied to recycle plants must be analyzed through the utilization of a sodium sulfite-bisulfite scrubbing system, for there exists no data in the record supporting the proposition that any other system, dual absorption or otherwise, has been adequately demonstrated for use in such plants.³¹ A scrubbing system is separate from the acid producing process and differs from dual absorption in that it achieves emission reduction not by directly recycling unconverted sulfur dioxide gas back into the system, but by extracting the sulfur dioxide gas out of the exit gas stream through exposure to a sodium sulfite solution. This produces sodium bisulfite which upon heating yields sulfur dioxide gas (then fed back into the acid producing system) and sodium sulfite (then returned to combine again with sulfur dioxide in the exit gas stream). In order to retain high efficiency levels in the scrubbing system it is necessary to continuously add new solution and to drain off part of the old solution as "purge."³² The purge is collected in significant amounts, up to 52 lbs./ton of acid produced, and thus presents noteworthy disposal problems.³³

³¹ See note 19 *supra*.

³² Some of the sulfite and bisulfite becomes sulfate, which if allowed to collect will reduce and/or destroy the efficiency of the scrubber system.

³³ See Comments of E. I. duPont de Nemours & Co. in No. 72-1072, J.A. at 260.

Despite petitioners' protestations concerning the "ideal" conditions under which the EPA conducted its tests, we find adequate support for the conclusion that the standard is achievable in the results of tests conducted at the Olin Chemicals Co. plant, in Paulsboro, New Jersey. The tests were conducted under EPA supervision on March 26 and 27, 1971, when the Paulsboro plant was the only active recycle plant in the United States equipped with a sodium sulfite-bisulfite scrubber.³⁴ The results are impressive, reflecting sulfur dioxide emission levels of 2.59 and 2.85 lbs./ton, well below the standard. Equally important, however, is the fact that the tests were conducted when the plant was operating at or near full capacity.

As we have earlier noted, § 111 of the Act, 42 U.S.C. § 1857c-6(a)(1)(1970), requires that when the Administrator makes his "best system" and "achievable limitation" determination that he "take into account counter-productive environmental effects."³⁵ We cannot conclude on the basis of the record before us that the Administrator met this obligation in promulgating a standard to be applied to recycle acid plants. The record evidence indicates that the standard is achievable only through use of a sodium sulfite-bisulfite scrubber, yet no consideration of the significant land or water pollution potential resulting from disposal of the 52 lbs./ton

³⁴ See Background Information Document, *supra* note 17, J.A. at 57-58; Control Document, *supra* note 16, J.A. at 328-31; and Supplement Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770 (March 21, 1972): "One sulfite scrubbing process is now in operation in the United States and four more will be put into service in 1972. All are retrofit installations." Similar to the comments regarding the EPA test results obtained in the dual absorption Warners Plant, see note 30 *supra*, the Comments of the Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 136 state: "Data presented in 'Control of Air Pollution from Sulfuric Acid Plants' which relate to the Olin Corporation's sulfite-bisulfite system are correctly stated."

³⁵ See text at note 7 *supra*, and note 7 *supra*.

liquid purge byproduct is apparent. A 700 ton/day sulfuric acid plant operating at capacity will produce nearly twenty tons of the purge waste in only one day of operation, and while the scrubber will effectively cut air emissions from a 50 to 100 lbs./ton level its "counter-productive environmental effects" cannot be ignored.³⁶ Judge Leventhal's statement in *Portland Cement, supra*, slip op. at 19 n. 42, that "we cannot imagine that Congress intended that 'best' could apply to a system which did more damage to water than it prevented to air," seems particularly apropos.

We realize that the only apparent alternative to the scrubbing system is no control at all.³⁷ Since recycle plants amount to only about twenty per cent of the country's sulfuric acid plants, and since collectively the sulfuric acid plants in this country account for only about two per cent of the sulfur dioxide emission, such an alternative (at least in selected instances) might prove best for the environment as a whole.³⁸ We have no way of knowing; it is something the

³⁶ Most plants operate at least at 94 per cent efficiency which results in emissions generally in the 50 to 100 lbs./ton range. See Control Document, *supra* note 16, J.A. at 315.

³⁷ See note 19 *supra*. The EPA Control Document, *supra* note 16, J.A. at 332-35, discusses scrubber systems other than the sodium sulfite-bisulfite type, but also states, J.A. at 328:

To date only the sodium sulfite-bisulfite process has been demonstrated to be capable of meeting the SO₂(2) limit when taking cost into consideration. Others such as ammonia scrubbing can meet the standard but costs are highly dependent on the marketability of by-products for which there may be little demand.

Petitioners suggest that the EPA set the standard for recycle plants at 10 lbs./ton and base it upon use of a dual absorption system. There is no evidence in the record to support such an alternative.

³⁸ See Control Document, *supra* note 16, J.A. at 300, and Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 134.

EPA is uniquely suited to determine. We do know, however, that the feeble statements in the Background Document that "[m]ethods for disposing of these products will have to be considered by plant operators," and "process designers are investigating several means of handling these wastes," are poor substitutes for the reasoned consideration of this problem that is required.³⁹ The record is thus remanded to the Administrator for further consideration and explanation of the adverse environmental effects of requiring a 4.0 lbs./ton standard for recycle acid plants.⁴⁰

3. Acid Mist Emissions

Our review of the record leads us to conclude that ample evidence exists, in terms of both technical literature and results of EPA conducted tests, to satisfy us of the reasoned nature of the EPA's acid mist standard.⁴¹ The standard, 0.15 lb. of sulfuric acid mist per ton of acid produced, is deemed achievable through the use of either electrostatic or fiber precipitator systems, both of which are certainly adequately demonstrated.⁴² Petitioners' objections regarding the result oriented definition of acid mist (*i.e.*, whatever the prescribed method for testing detects, as opposed to the "accepted definition" of "liquid particulate matter exclusive of gas") is

³⁹ Background Information Document, *supra* note 17, J.A. at 58.

⁴⁰ We do not intimate what should be done or necessarily that the current standard will have to be changed, but only that the record does not demonstrate adequate consideration of the issue.

⁴¹ See Background Information Document, *supra* note 17, J.A. at 58-60; Control Document, *supra* note 16, J.A. at 336-342, and literature sources noted therein.

⁴² The demister systems are both commonly employed in industry, with fiber demisters the more popular of the two. See Background Information Document, *supra* note 17, J.A. at 58; Control Document, *supra* note 16, J.A. at 337.

considered, but we cannot say that the Administrator was arbitrary in promulgating such a definition.⁴³

IV.

Reviewing the coal-fired steam generator standards promulgated for particulate matter, sulfur dioxide, and nitrogen oxides, *see* 40 C.F.R. § 60.40 *et seq.*, and subjecting them to the various tests and scopes of inquiry discussed above, we find that with but one exception the record evidence supports the conclusion that they are the result of reasoned decision-making.⁴⁴ The evidence, including tests of prototype and full-scale control systems, considerations of available fuel supplies, literature sources, and documentation of manufacturer guarantees and expectations, convinces us that the systems proposed are adequately demonstrated, that cost has been taken into consideration, and that the emission standards are achievable.⁴⁵ *See* 42 U.S.C.

⁴³ For summaries of the petitioners' complaints regarding the definition, *see* Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 139-40, and Chemical Construction Corp., J.A. at 359-60. In the Supplemental Statement in Connection with Final Promulgation the EPA noted, 37 Fed. Reg. 5770 (March 21, 1972): "Complaints from the industry that it cannot meet the acid mist standard appear to be based on experience with other test methods than EPA's."

⁴⁴ The standard for particulate matter, defined in 40 C.F.R. § 60.41(c) as "any finely divided liquid or solid material, other than uncombined water, as measured by Method 5," is set at 0.10 lb. per million B.t.u. heat input; the standard for sulfur dioxide is set at 1.2 lbs./million; the standard for nitrogen oxides is set at 0.7 lbs./million. The standards contemplate the use of and vary according to the type of fuel used, either solid, liquid, or gaseous. Only the standards for solid fossil fuel are challenged in No. 72-1079.

⁴⁵ *See* Background Information for Proposed New-Source Performance Standards [Background Information Document], J.A. in No. 72-1079 at 22-42; Summaries of Test Data [Test Data], J.A. in No.

§ 1857c-6(a)(1) (1970). Although in the instance of the sulfur dioxide standards and the lime slurry scrubbing system the EPA tests give results indicating that a presently installed unit approaches rather than achieves the 1.2 lbs./million B.t.u. heat input standard,⁴⁶ when the results are considered in conjunction with the prototype testing data and the predictions and guarantees of domestic equipment manufacturers for plants under construction,⁴⁷ we cannot say that the standard represents "a clear error of judgment." See *Citizens to Preserve Overton Park v. Volpe*, *supra*, 401 U.S. at 416.

A lime slurry scrubbing system is the anticipated "best system" for use in coal-fired steam generators which burn coal of such a high sulfur content that separate control mechanisms are necessary to meet the standard.⁴⁸ This scrubbing system, like the sodium sulfite-bisulfite system used in sulfuric acid plants, produces significant quantities of sludge byproduct which present substantial disposal problems. The counter productive environmental effects of the system

72-1079 at 43-68; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5767-5770 (March 21, 1972).

⁴⁶ See Background Information Document, *supra* note 45, J.A. at 35; Test Data, *supra* note 45, J.A. at 58, 62.

⁴⁷ See Background Information Document, *supra* note 45, J.A. at 35; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5768, table #1 (March 21, 1972), which shows that companies such as Monsanto, Zurn, Babcock & Wilcox, are guaranteeing better than 80 percent sulfur dioxide removal on plants now under construction and using a lime scrubbing process. "Generally, the standard of 1.2 . . . can be met by the removal of 70-75 percent of the sulfur dioxide formed in the burning of coal of average sulfur content (i.e., 2.8 - 3 percent)." *Id.*

⁴⁸ See Background Information Document, *supra* note 45, J.A. at 34. It is possible through the burning of generally unavailable low sulfur content coal to meet the sulfur dioxide emission standards without the assistance of any control mechanism. *Id.* at 29.

were noted in comments to the EPA,⁴⁹ but the Administrator's consideration of the issue, at least as it appears on the record, is insufficient. The only statement in the Background Information for Proposed New-Source Performance Standards concerning such is merely an admission of the problem:

Lime-scrubbing systems are essentially throwaway processes that produce significant quantities of solid waste. For a 3.0-percent-sulfur coal, the additional wastes are roughly equal to the ash generated from burning coal.⁵⁰

Consequently, the record is remanded for further consideration and explanation by the Administrator of the adverse environmental effects of requiring a 1.2 lbs./million standard for those coal-fired steam generator plants which must use a lime slurry scrubbing system as the only means of achieving the standard.⁵¹

Accordingly, the record in No. 72-1072 and No. 72-1079 is remanded to the Administrator of the Environmental Protection Agency for further proceedings not inconsistent with this opinion.

So Ordered.

⁴⁹ See Comments of Edison Electric Institute in No. 72-1079, J.A. at 130; Comments of Babcock & Wilcox Co. in No. 72-1079, J.A. at 171.

⁵⁰ Background Information Document, *supra* note 45, J.A. at 35. :

⁵¹ We want to reiterate, *see* note 40 *supra*, that we express no view as to what the standards ultimately should be with regard to such plants. Perhaps some flexible standard should be adopted which recognizes that the lime slurry scrubber system should be used only where necessary to meet the EPA's primary ambient air standards, or perhaps in balance the counter productive effects of the system are outweighed by the need for cleaner air. We only want to be sure in view of the significant problem posed in the record that the Administrator has acted reasonably in promulgating the standard.

