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NATIONAL FUELS AND ENERGY POLICY

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HEARING

BEFORE THE

COMMITTEE ON

INTERIOR AND INSULAR AFFAIRS

UNITED STATES SENATE

NINETY-SECOND CONGRESS

FIRST SESSION

ON

S. Res. 45

TO AUTHORIZE A STUDY OF NATIONAL FUELS AND
ENERGY POLICY

FEBRUARY 25, 1971



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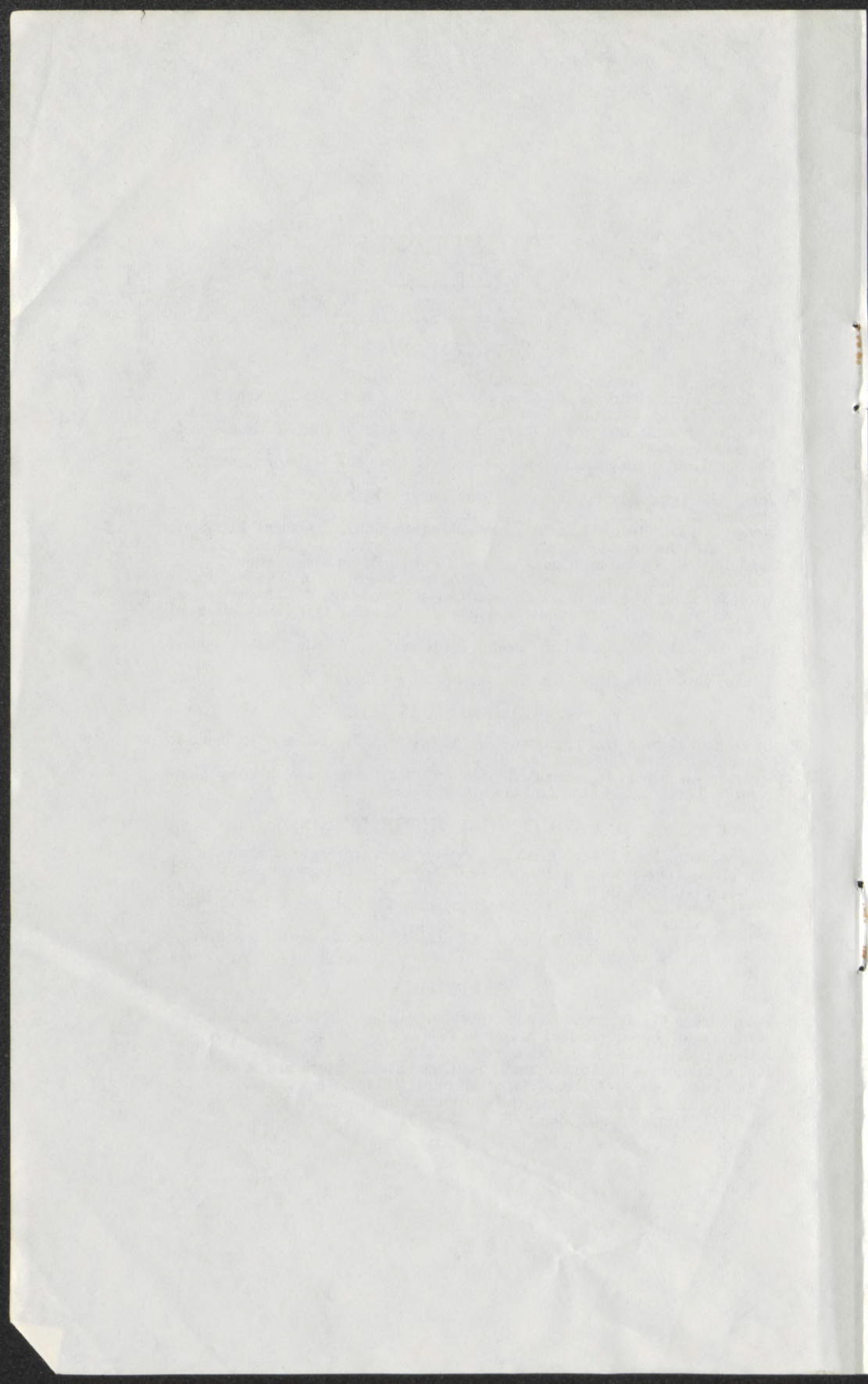
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NATIONAL FUELS AND ENERGY POLICY

U.S. SENATE,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The committee met, pursuant to notice, at 10:50 a.m., in room 3110, New Senate Office Building, Senator Henry M. Jackson (chairman) presiding.

Present: Senators Jackson (presiding), Anderson, Burdick, Jordan, Fannin, Hansen, Hatfield, and Bellmon.

Also present: Jerry T. Verkler, staff director; William Van Ness, chief counsel; Daniel Dreyfus, professional staff member; and Charles Cook, minority counsel.

The CHAIRMAN. The committee will come to order.

The hearing before the Senate Interior and Insular Affairs this morning is for the purpose of taking testimony on Senate Resolution 45, introduced by Senator Randolph, along with a number of cosponsors.

(The resolution referred to follows:)

(1)

92D CONGRESS
1ST SESSION

S. RES. 45

IN THE SENATE OF THE UNITED STATES

FEBRUARY 4 (legislative day, JANUARY 26), 1971

Mr. RANDOLPH (for himself and Mr. JACKSON) submitted the following resolution; which was referred to the Committee on Interior and Insular Affairs

RESOLUTION

To authorize a study of national fuels and energy policy.

Whereas adequate supplies of fuel and energy resources in all forms are essential to the continued welfare of the Nation, which includes national security, balanced growth, and safeguarding and enhancing the quality of the environment; and

Whereas authoritative estimates forecast that by the year 2000 the population of the United States will increase to approximately three hundred million persons and that the consumption of fuel and energy resources may increase over 200 per centum; and

Whereas the maintenance of adequate energy and fuel supplies at reasonable price levels, the continued fiscal stability of the basic energy and fuel industries, the proper development of adequate facilities for the production, distribution, trans-

portation, and/or transmission of fuel and energy resources consistent with environmental quality legal requirements and national goals, together with the manpower and equipment to meet these objectives, are essential to the well-being of our Nation; and

Whereas there now exist various and sometimes conflicting laws and regulations setting forth national goals which affect fuels and energy policy and which are vital to the development of fuel and energy resources; and

Whereas the Congress last reviewed national fuels and energy policy in 1962; and

Whereas, in view of these and other considerations, it appears that a Senate committee study of the fuels and energy industries is indicated to determine what, if any, changes in the implementation of existing and prospective Government policies and laws may be desirable in order to coordinate and provide an effective national policy to assure a continuation of reasonable and efficient sources of fuels and energy consistent with environmental quality laws and policies and with national security: Now, therefore, be it

1 *Resolved*, That the Committee on Interior and Insular
2 Affairs, or any duly authorized subcommittee thereof, is au-
3 thorized under sections 134 (a) and 136 of the Legislative
4 Reorganization Act of 1946, as amended, and in accordance
5 with its jurisdiction specified in rule XXV of the Standing
6 Rules of the Senate to—

7 (a) make a full and complete investigation and
8 study (including the holding of public hearings in ap-

1 appropriate parts of the Nation) of the current and pro-
2 spective fuel and energy resources and requirements of
3 the United States and the present and probable future
4 alternative procedures and methods for meeting antici-
5 pated requirements, consistent with achieving other
6 national goals, including the high priorities—national
7 security and environmental protection; and

8 (b) make a full and complete investigation and
9 study of the existing and prospective governmental poli-
10 cies and laws affecting the fuels and energy industries
11 with the view of determining what, if any, changes and
12 implementation of these policies and laws may be advis-
13 able in order to simplify, coordinate, and provide effec-
14 tive and reasonable national policy to assure reliable
15 and efficient sources of fuel and energy adequate for a
16 balanced economy and for the security of the United
17 States, taking into account: the Nation's environmental
18 concerns, the investments by public and private enter-
19 prise for the maintenance of reliable, efficient, and ade-
20 quate sources of energy and fuel and necessary related
21 industries, and the need for maintenance of an adequate
22 force of skilled workers.

23 SEC. 2. In carrying out the provisions of section 1 the
24 committee shall, in addition to such other matters as it may
25 deem necessary, give consideration to—

1 (1) the proved and predicted availabilities of our
2 national fuel and energy resources in all forms and
3 factors pertinent thereto, as well as to worldwide trends
4 in consumption and supply;

5 (2) projected national requirements for the utiliza-
6 tion of these resources for energy production and other
7 purposes, both to meet short range needs and to provide
8 for future demand for the years 2000 to 2020;

9 (3) the interests of the consuming public, includ-
10 ing the availability in all regions of the country of an
11 adequate supply of energy and fuel at reasonable prices
12 and including the maintenance of a sound competitive
13 structure in the supply and distribution of energy and
14 fuel to both industry and the public;

15 (4) technological developments affecting energy
16 and fuel production, distribuiton, transportation, and/or
17 transmission, in progress and in prospect, including de-
18 sirable areas for further exploration and technological re-
19 search, development, and demonstration;

20 (5) the effect that energy producing, transportation,
21 upgrading, and utilization has upon conservation, en-
22 vironmental, and ecological factors, and vice versa;

23 (6) the effect upon the public and private sectors of
24 the economy of any recommendations made under this

1 study, and of existing governmental programs and poli-
2 cies now in effect;

3 (7) the effect of any recommendations made pursu-
4 ant to this study on economic concentrations in industry,
5 particularly as these recommendations may affect small
6 business enterprises engaged in the production, process-
7 ing, and distribution of energy and fuel;

8 (8) governmental programs and policies now in
9 operation, including not only their effect upon segments
10 of the fuel and energy industries, but also their impact
11 upon related and competing sources of energy and fuel
12 and their interaction with other governmental goals, ob-
13 jectives, and programs; and

14 (9) the need, if any, for legislation designed to
15 effectuate recommendations in accordance with the above
16 and other relevant considerations, including such pro-
17 posed amendments to existing laws as necessary to inte-
18 grate existing laws into an effective long-term fuels and
19 energy program.

20 SEC. 3. The chairmen and ranking minority members
21 of the Committees on Commerce and Public Works or their
22 designees and the ranking majority and minority Senate
23 members of the Joint Committee on Atomic Energy or their
24 designees shall participate in the study authorized herein and

1 the Senators so appointed shall serve with the committee in
2 an ex officio capacity.

3 SEC. 4. The chairman of the Committee on Interior
4 and Insular Affairs is authorized to appoint an advisory
5 panel or panels of nongovernment experts in the fields of
6 fuels and energy and the environment. Such advisers shall
7 serve without compensation.

8 SEC. 5. For the purposes of this resolution the com-
9 mittee is authorized through January 31, 1972, (1) to make
10 such expenditures as it deems advisable; (2) to employ
11 upon a temporary basis, technical, clerical, and other assist-
12 ants and consultants; (3) with the prior consent of the
13 heads of the departments or agencies concerned, and the
14 Committee on Rules and Administration to utilize the reim-
15 bursable services, information, facilities, and personnel of any
16 of the departments or agencies of the Government; (4) and
17 with the prior consent of the chairmen of other committees
18 of the Senate to utilize the services, information, facilities,
19 and personnel of such committees as needed to assist in car-
20 rying out the purpose of this resolution.

21 SEC. 6. The committee shall report its findings, to-
22 gether with its recommendations for legislation as it deems
23 advisable, to the Senate by September 1, 1972.

1 SEC. 7. The expenses of the committee under this reso-
2 lution, from the date of its agreement through January 31,
3 1972, shall not exceed \$———, and shall be paid from
4 the contingent fund of the Senate upon vouchers approved
5 by the chairman of the committee.

The CHAIRMAN. Senate Resolution 45 would authorize the Interior Committee to undertake a comprehensive study of the Nation's energy resources and a review of the body of law and policy which influence the energy situation.

If this study is initiated as proposed, it will be one of the most monumental undertakings ever in the history of energy resource management. It will be the first time that the entire spectrum of energy production and its impact upon society have been viewed as a comprehensive policy question. Furthermore, it will be the first opportunity to reexamine all of our Federal energy policies with an appreciation of modern environmental concerns and the additional constraints they impose on American energy supply.

This study, if undertaken, will deserve the concentrated effort of every member of this committee as well as members of other committees. Energy is the most fundamental of resources. The industrial strength and the high standard of living enjoyed in the United States today could not have been achieved and clearly cannot be maintained in the future without tremendous inputs of energy from a variety of sources and in a variety of forms.

There have been numerous symptoms in recent years of failures in our energy system. A few examples of the energy crisis will serve to illustrate an ominous picture.

The number of summer blackouts in the United States has increased from eight in 1966 to 34 in 1969. In 1970 it rose to 54.

During the past winter, 39 of the Nation's 181 largest utilities were seriously short of power and had dangerously low reserves of generating capacity.

Until as recently as 1948 the United States was a net exporter of oil. Today, however, our domestic industry cannot produce sufficient amounts of oil to meet present levels of demand. In 1970 the United States imported 23 percent of its petroleum supply. In certain critical areas reliance on foreign oil imports was even more extreme, with the east coast importing 93 percent of the residual fuel needed to supply over one-half of its industrial energy requirements.

Over the past 50 years we have seen the proportion of our energy supplied by coal—our most abundant conventional source of energy—drop from a high of 75 percent in 1910 to its present contribution of barely 20 percent, while consumption of critically scarce oil, natural gas, and uranium resources have increased accordingly. Yet, only meager attention is being given to the factors which limit the desirability of coal as a modern energy source.

In New York City the licensing of a new electrical generating plant requires the approval of three Federal departments, two regulatory agencies, four departments of State government, and nine departments of city government. In addition, eight other departments and agencies exercise important jurisdictional responsibilities over plant construction and operation. Many contend that cumbersome procedures such as these result in delay and contribute to the electrical power crisis.

These are a few examples of the numerous problems throughout the energy system which have led to a widespread belief that we need a national energy policy. But it is inaccurate to suggest that no energy policy exists in the United States at the present time. We

have a broad body of specific policies founded upon law and regulation which extends over almost the entire range of the energy industries and which often encompasses matters of minute detail.

The de facto policy which does exist has largely evolved from a series of narrowly based decisions developed in response to isolated and often transitory situations over a long period of time. Taken collectively, these decisions have resulted in a structure of laws, regulations, and precedents which attempt to hold in balance the many conflicting interests associated with the production and consumption of energy.

We can no longer tolerate the burden of inefficiency and conflict which ad hoc policies impose upon us. The pressures upon our energy system now and the infinitely greater pressures of the future demand the most effective policy we can develop.

Our ability to produce a comprehensive and effective energy policy will be a vital factor in the future achievement of our most important national goals.

The members of this committee look forward to hearing the testimony and reviewing the statements from the distinguished list of witnesses appearing today.

Our first witness this morning is the distinguished Senator from West Virginia and chairman of the Public Works Committee. He has indeed been the real catalyst in getting this study underway. I want to compliment Senator Randolph for his great contribution to the effort that has gone into the pending resolution report, S. Res. 45. He has been a leader in this field for many years; he has taken the lead in connection with the pending matter. Those of us who will be serving on this committee effort will certainly be looking forward to working with him and very closely in connection with the study.

Before I present Senator Randolph to the committee, I believe Senator Hansen wanted to make a comment.

Senator HANSEN. Thank you very much, Mr. Chairman. I do indeed appreciate this opportunity. As a member of this committee and of the Finance Committee, I have been involved in several aspects of the fuels and energy situation during the past 2 years. I wrote you recently, as you may recall, to compliment you for the report you had prepared for members of this committee on the review of the energy issues in the United States. Your memorandum of transmittal is the best testimonial I have seen to the urgent and immediate need of a national energy policy. In my opinion, there is really no alternative to, as you put it, an assured abundance of energy achieved in consonance with prudent management of natural resources and environmental quality values.

In that letter, I also complimented you for your comments on environmental extremists as reported by the local news media. So I fully support this study on the basis you have proposed, and I would emphasized the sense of urgency you have conveyed and the magnitude of the task which faces the 92d Congress.

I would also hope, in view of this urgency and magnitude, that whatever outside staff is directed to conduct a physical study should be the best qualified obtainable should the study be approved, and I am sure it will be.

I say this because of what I consider a horrible example of what can result from the delegation of authority and responsibility in making such a study. I refer specifically to the study made by the President's Cabinet Task Force on Oil Import Controls. This study and report, almost a year in the making, was, in my opinion, an ill or poorly advised study, based on faulty assumptions and recommendations that would have left this country at the tender mercies of the foreign oil producing countries. The task force proposal was later rejected by those who had first approved it. It must have been printed in several languages, especially Arabic, if the recent and continuing negotiations for higher and higher oil prices and taxes by the organization of petroleum exporting countries is any indication.

I mention this because of some misgivings I have of the conclusions reached by theorist and academic types who have had little or no experience with an industry or the problem with which they are dealing and the "environmental extremists" you described so accurately, Mr. Chairman.

So I would hope that this study can be a truly fair and objective study, without any preconceived or prejudiced opinions one way or the other as far as the fuels and energy situation or those engaged in it are concerned. I would hope that this study can and will have the full support, confidence, and cooperation of the energy and fuels industries, as well as the other with whom it will need to consult.

There are still those in the White House and some Federal agencies who, in my opinion, do not understand the complexities of the energy situation or, if they do, are certainly making some poor decisions. Mr. Chairman, if this study is to accomplish the high purpose you have set forth in your memorandum of transmittal, it will need the most able and qualified director available, and I have the utmost confidence in your good judgment.

Just let me say in closing, Mr. Chairman, that I think the need for this study is demonstrated most effectively by two stories in this morning's Washington Post. On the one hand, on the front page, you have a story: "Algeria Takes Control of French Oil Firms." In that story are contained also some comments about the attitudes of people in Libya.

On page G-9 is another story headed "Pipeline Critics Have Work Cut Out." To me, the public generally does not fully understand, I think on the one hand the concern we all have for protecting this environment and taking all such reasonable steps as may be indicated; but on the other, an awareness that does reflect the very desperate situation that this country now faces, a situation that can become far more threatening to our security and to our economy than is the present situation. And unless we can have a study which will bring into focus these concerns and, from that background of observation, map an energy policy that will serve this country well, then we will not have done our job.

I compliment you for the leadership you have taken and our distinguished friend from West Virginia for his appearance here this morning.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Hansen.

If there are no further comments—Senator Randolph has to preside over his own committee in a few minutes.

Senator Bellmon.

Senator BELLMON. Mr. Chairman, in light of that situation, I will file my statement for the record.

The CHAIRMAN. Thank you, Senator Bellmon.

(The statement referred to follows:)

**STATEMENT OF HON. HENRY BELLMON, A U.S. SENATOR FROM THE
STATE OF OKLAHOMA**

Senator BELLMON. Mr. Chairman, I would like to take this opportunity to express my appreciation for the swift action that you and the staff of the committee have taken in arranging hearings on S. Res. 45, to authorize a study of national fuels and energy policy. The critical shortage of energy in our country is now generally apparent and is belatedly causing great concern among government officials, consumers, and energy suppliers.

Our country uses more energy totally and on a per capita basis than any other country in the world. The United States consumes approximately one-fourth of the world's coal, a third of the world's petroleum, and twice as much natural gas as all the rest of the world put together. The United States of America, with 6½ percent of the world's population, consumes 37 percent of all the energy used in the world. The demand for energy grows rapidly from year to year and our ability to meet this demand is declining rapidly. This paradox is developing in a nation richly endowed with energy resources, excellent technology, and a history of energy self-sufficiency.

Our Nation must have an increasing supply of energy fuels to allow it to continue to achieve industrial and social progress and to discharge our international responsibilities. The question is where and how can our Nation best acquire the needed energy. There are two possible answers. The energy will come either from secure domestic sources or from insecure foreign sources. It is my opinion that the only sane answer lies in the development of domestic energy resources rather than further reliance on outside supply. While this Nation safely can and should purchase a substantial portion of its energy needs from foreign sources, the maintenance of a strong, dependable domestic energy industry is essential for security, economic, and humanitarian reasons.

In a statement made on December 8, 1970, on the floor of the Senate, I pointed out the plentiful reserves of energy-bearing minerals, the abundance of talent and technology needed to extract those minerals, and the growing energy demand of this country. But it is evident that the proven reserves of oil and gas are rapidly declining and the domestic energy production is failing to keep up with the demand placed on it by energy users. In only 25 years the United States has gone from abundant supplies to meet the consumption needs to a widening gap between production and consumption.

The Oil Daily, February 24, 1971, had an interesting article which might be of interest to the committee. Mr. Chairman, the article points out that for the third time this year the domestic rotary drilling activity has registered a 28-year low. I shall not take time to read the

complete article but would like to request that it be made a part of the hearing record. Also you might point out that the petroleum industry is not alone in declining production.

Congress must determine what has happened to cause this decline. At this crucial time, the Nation needs a congressional forum where issues relating to energy problems can be publicly raised and debated. There are too many unfounded charges relating to the Nation's energy condition. There is too much uncertainty, too few facts, too little knowledge, too much political haymaking on both sides of the energy issue. It is my feeling that it is the responsibility of the Congress and the citizens of this country to decide whether the United States shall remain self-sufficient, in the production of energy fuels to meet its future needs. I again want to compliment the sponsor of this legislation for his help in bringing about a much-needed study, and will pledge to work to help solve the problems of energy shortages in this country.

(The article referred to follows:)

[From the Oil Daily, Feb. 24, 1971]

DOMESTIC ROTARY DRILLING RECORDS THIRD STRAIGHT 28-YEAR LOW MARK

HOUSTON.—Domestic rotary drilling activity, dropping for the tenth week in a row, has registered its third straight 28-year low. But Canadian operations have edged up after a brief downturn.

Hughes Tool Co reported Tuesday that the number of rotary rigs actually making hole in U.S. oil and gas areas fell to 857 on Feb 22 from 865 on Feb 15 in continued retreat from a year-end peak of 1,200 on Dec 14.

The Feb 15 figure was the smallest since an average of 847 active rotaries in May 1943.

U.S. rig counts a year ago were 1,020 active rotaries on Feb 16 and 1,034 on Feb 23, 1970, and counts for like 1969 dates were 1,213 on Feb 16 and 1,232 on Feb 23.

Active Canadian rotaries increased from 176 on both Feb 8 and Feb 15 to 179 on Feb 22. The Feb 22 figure compared with a 1971 high of 196 on Jan 11. Three units were counted in eastern Canada on each of the two latest dates with the remainder in western Canada.

Two-nation totals a year ago were 1,020 rotaries on Feb. 16 and 1,034 on Feb. 23, and totals for comparable 1969 dates were 1,094 on Feb. 17 and 1,051 on Feb. 24.

Biggest current changes in domestic areas were in Texas, which added 15 net rotaries in the week ended Feb. 22; Louisiana, down nine; Oklahoma, down eight, and New Mexico, down five.

State tabulations for Feb. 15 and Feb. 22:

Alabama 6 and 4; Alaska land 6 and 6, Alaska offshore 0 and 0, and total Alaska 6 and 6; Arkansas 9 and 11; Arizona 0 and 0; California land 30 and 32, California offshore 6 and 7, and total California 36 and 39; Colorado 31 and 31; Florida land 7 and 6, Florida offshore 0 and 0, and total Florida 7 and 6; Georgia 1 and 0; Idaho 0 and 0; Illinois 7 and 9; Indiana 1 and 0; Iowa 0 and 0; Kansas 32 and 30; Kentucky 3 and 3; North Louisiana 22 and 18, South Louisiana inland waters 48 and 43, South Louisiana land 53 and 50, South Louisiana offshore 81 and 82, and total Louisiana 204 and 193; Maryland 0 and 0; Michigan 8 and 12; Minnesota 0 and 0; and Mississippi 38 and 40.

Missouri 0 and 0; Montana 12 and 13; Nebraska 4 and 4; Nevada 2 and 2; New Mexico 37 and 32; New York 0 and 0; North Carolina 0 and 0; North Dakota 8 and 8; Ohio 15 and 13; Oklahoma 84 and 76; Pennsylvania 11 and 11; South Carolina 0 and 0; South Dakota 2 and 2; Tennessee 2 and 2; South Texas & Gulf Coast inland waters 8 and 7, South Texas 7 Gulf Coast land 61 and 65, South Texas & Gulf offshore 4 and 4, North Texas 12 and 13, Panhandle 12 and 13, East Texas 13 and 13, West Central Texas 60 and 65, West Texas 75 and 80, and total Texas 245 and 260; Utah 10 and 10; Virginia 1 and 1; Washington 0 and 0; West Virginia 9 and 8; and Wyoming 34 and 31.

The CHAIRMAN. I want to say how happy we are to have you this morning, Senator Randolph, and we will now welcome your statement.

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

Senator RANDOLPH. Mr. Chairman and fellow members of the Interior and Insular Affairs Committee, I appreciate the opportunity and I understand the responsibilities of appearing today to counsel with you and members of the committee in consideration of Senate Resolution 45.

Mr. Chairman, this Senate resolution to which you have made reference has the cosponsorship, as I appear this morning, of approximately 51 members of the Senate. I believe that there will be further cosponsorship. I mention this because it underscores what you have said this morning, Mr. Chairman, in reference to the importance of the study proposed in this resolution to be made by the Interior and Insular Affairs Committee.

You gentlemen of the committee will recall that, in the 91st Congress I presented a resolution which would have created a Fuels and Energy Commission. There were 60 cosponsors of that measure. I appeared September 10, 1970 before your group in support of it. The administration, in its judgment—I doubt that it could be said it was in its wisdom—believed that approach was not the best manner in which to undertake the study.

When introducing Senate Resolution 45 on February 4, this member addressed the subject of the administration attitude. I thought its disapproval of the 1970 measure (S. 4092) was a mistake. But I acknowledged that, mistake or not, it was the prerogative of the administration to disapprove our measure. The exercise of that prerogative kills the commission concept, and realism forces us to write off the Fuels and Energy Commission approach. It was my view then and continues to be that little usefulness would be served in projecting at this time a joint committee of Congress approach.

I noted that in the closing days of the 91st Congress, the two Houses of that Congress could not agree in conference on common ground for reaching agreement on a measure to create a Joint Committee on the Environment.

So, I emphasize today, as was said at the time of introducing Senate Resolution 45:

There is too much need for prompt and careful attention to the fuels and energy crisis within the legislative branch for that attention to be excessively delayed. Hence, with the cosponsorship of the Senator from Washington (Mr. Jackson), chairman of the Committee on Interior and Insular Affairs, and other Senators, I am espousing today a Senate resolution to authorize a study of national fuels and energy policy by the Interior Committee, with the cooperation and assistance of the bipartisan leadership of the Committees on Commerce, Public Works, and Atomic Energy. Its need, its purpose, and its resolve are carefully set forth in the resolution.

In my desire to cooperate with you, Mr. Chairman, and the members of your committee, because I of necessity must go to the Public Works

Committee, I shall refer to certain parts of my formal testimony and ask unanimous consent that the statement in full be included in the record.

The CHAIRMAN. It is so ordered.

Senator RANDOLPH. Under Senate Resolution 45, the charter of this committee would be essentially that of making a thorough investigation of the U.S. fuels and energy resources, requirements, and policies—and to recommend those actions necessary to insure fulfillment of future requirements for energy in a manner consistent with sound environmental quality policies and practices.

As a highly industrialized continental society of more than 200 million people, flanked on the east and the west by the two largest bodies of water on the globe, we have few higher priorities than that of preserving the energy base on which our complex economy rests.

The United States is unique among the countries of the world in its consumption of energy. Coal, oil, and gas—and a small amount of nuclear power—provide our energy base. Three-fourths of the Nation's energy supply is derived from oil and gas.

I do not overstate when I say that we are facing today—and will face tomorrow and many more tomorrows—a shortage of fuel and power to serve the industries and the homes of America.

The energy demands of the United States since World War II have been doubling every decade. Population growth and the increasing standard of living of the American people have created this incredible increase in the energy demand rate.

Our ability to meet the demand to date has clearly resided in the use of fossil fuels for their energy value. In recent years nuclear power has emerged, but it has lagged far below the potential expected of it.

This Nation and the world community of nations are embarked on a gigantic gamble that we can maintain energy supply reliability compatible with demand. Maintenance of this reliability is dependent on adequate sources of crude oil, natural gas, and coal. But these alone will not be enough. There must be other immense sources of energy, possibly the breeder reactor or fuel cell, to augment the fossil fuels. And there must be more use made of the fossil fuels, such as gasification of coal for on-site power production and for production of pipeline gas to augment the dwindling supply of natural gas. There must, of course, be more exploration for and discovery of both domestic petroleum and natural gas—and they should be encouraged, not impeded. We are too reliant on foreign sources of oil.

Yes, the gamble is gigantic. To lose it would be catastrophic for the American people and, indeed, for large inhabited portions of the earth.

Concurrently, and partly as a response to the side effects of this energy expansion and the accompanying growth in our economy, a broadening public concern has developed for environmental quality.

I know this concern is very real; and it is a concern not only of older persons but also of the youth of our country. In the Committee on Public Works, and through our Subcommittee on Air and Water Pollution, we have been attempting to keep moving forward with necessary but well-reasoned legislation to cope with the problems which must be solved in order to bring about an enhancement of the environment and a bettering of the quality of life in America.

I interpose, Mr Chairman, my remembrance of TV commentary where questions were asked of the astronauts who returned after Apollo 8's flight into space. The three responses were as one when they indicated what was the most significant part of all their journey. It was not the moon or space through which they hurtled; it was their views of the uniqueness and the beauty of the earth from which they had come. We are a living planet, insofar as we know, the only planet where that is true. So it was understandable that these men should remember the beauty and fruitfulness of this earth on which we are privileged to live.

Then, after Apollo 13, when the astronauts returned, there were only two of the three this time who could say what the three had said after Apollo 8, because one of the astronauts was in partial disagreement. Yes, he said, in effect, this is true; but I saw through the long look what we had done to the earth. We had marred and scarred it.

So I pause this morning in my testimony to indicate my intense interest as chairman of the Public Works Committee, with a responsible jurisdiction and, I hope, leadership in environmental matters, to say that we cannot take the environmental situation and place it, as it were, in a corner. This study, as it moves forward, must take into account the environmental effects as we study and evaluate the priorities on the fuels and energies that can be used in our country's production.

And I interpose further by saying that I never have felt that Earth Day or Earth Week was strictly emotional. I felt that it was undergirded with the deep stirrings of the American people to strengthen the quality of life in this country through improvement of the environment.

But I go back also to the November 3, 1970 elections. I do not discuss whether a candidate won or lost; I discuss the bond issues which were voted on throughout America in which the American people were to commit their dollars for the improvement of the environment. Practically every bond issue and commitment of finances voted on in the November 3 election, including \$650 million for water improvement in Illinois, was approved. So there is this stirring and we sense it and we understand it.

Senator Jackson and all of those who cosponsor this Senate Resolution 45 know that we must do the job and do it thoroughly, and we indicate in the language of the resolution that there are the environmental factors to be considered in whatever is determined.

The concern to which I refer has been expressed in the emergence of what might be termed an environmental ethic. This ethic is a response to the realization that the United States is faced with a crisis of our own making. No one else made it. It was made by us. It is an acknowledgment that we can no longer allow the continued degradation of our physical environment.

In reaching this awareness however, we have become uptight environmentally. As a nation we appear to be entering a new era of nature worship. There is talk of returning to a balance of nature. Those who propose this, however, imply, as economists used to consider the policy of *laissez faire*, that the natural balance is the only one and if man would just effect a hands-off policy, nature would adjust itself by natural processes to everyone's benefit.

This attitude fails to recognize that man is a part of the ecological system and by our presence we affect the balance of nature. Public policies must be tempered to a rational outlook toward environmental problems while at the same time retaining the necessary sense of urgency.

We are the custodians of nature. The environmental confrontations we are experiencing result from our failures to properly exercise this custodianship. We have failed prospectively to consider the effects of our modern technology on the environment, not only detrimentally but in terms of what can be done to improve our environment.

We live in a world that is considerably of our own making. As custodians of the environment we are faced with new responsibilities if the economic vitality of this Nation and the world are to be assured.

Mr. Chairman, at this point I express interest in a press report on your recent visit at Bal Harbour, Fla., with the AFL-CIO Executive Council. You are reported as having expressed concern that there are "environmental extremists who would sacrifice economic growth on the altar of ecology."

The report also credits you with having argued that "a balanced Federal policy can promote economic growth and better protection of the environment at the same time." This accurately reflects my view.

We are a complex society in a complex era sometimes described as the "jet age"—the "space age"—the "age of the computer"—and, quite accurately, "the industrial age."

It is absolutely incumbent on us as a viable society to devise a better blending of ecological considerations with economic factors. When our economic health is severely depressed, our public health is not good. Likewise, deficient fuels and energy supplies and escalating energy costs adversely affect living habits and deprive citizens of necessities. The public health suffers.

I believe in the urgency of and have worked for control of contamination of our environment and against the desecration of the ecology. Public health requirements do, indeed, argue eloquently against such contamination and desecration.

Yes, the public interest demands that there be a balanced Federal policy that not only can promote but, in fact, will promote economic growth and better protection of both the environment and the public health at the same time.

It is natural that concern is expressed with respect to the ability of the United States and the free world to meet future national energy requirements while, at the same time, assuring a high quality environment and optimal utilization of our natural resources.

No longer is it possible to look individually or separately at and plan solely for energy—or fuel resources—or environmental quality. They must be considered together, for the most part.

The Senate Interior Committee study that would be authorized by our resolution offers a unique opportunity to evaluate and coordinate fuels and energy policies so as to achieve better environmental quality standards. The task of providing cost effective solutions for this total system represents a major challenge to the Congress and the country.

Actually and factually, national environmental policies require by law the maintenance and enhancement of environmental quality so as to protect the health of the citizens of our Nation. Such policies

are enunciated clearly in the Clean Air Amendments of 1970 which, in effect, require the achievement of ambient air qualities that provide for the protection of public health with adequate margins of safety by 1975. These proposed primary or health standards were published by the Environmental Protection Agency on January 30, 1971 in the Federal Register for sulfur oxides, particulates, carbon monoxide, photochemical oxidants, hydrocarbons, and nitrogen dioxide. Also proposed are national secondary ambient air quality standards which provide for the protection of the public welfare at a later date.

Achievement of these standards is possible only through a coordinate and integrated national fuels-energy-environmental policy.

Mr. Chairman, not only must we meet the challenges and requirements of environmental law, but there must also be met the challenges and requisites of society as relate to escalating demands for ever-increasing supplies of fuels and energy.

There must be an updating of evaluations—a crash program for the strengthening and the acceleration of research and development—and a reordering of priorities on the fuels and energy front as well as in environmental endeavors.

Positive steps can now lead to both short-term and long-term solutions to this Nation's energy problems. I recall in the 91st Congress, Mr. Chairman, when the able Senator from Oklahoma, Mr. Bellmon, asked me during my testimony if I envisioned a short-term study or a longer term study in the resolution as presented, which in general is the subject of this testimony, and of course, the language is subject to the determination of the committee. You will note that on page 6 of Senate Resolution 45 the committee shall report its findings together with its recommendations for legislation as it deems advisable to the Senate by September 1, 1972.

I do not say that this is the time certain, or that this is an unalterable date. I only say that there is a working paper before us in the resolution as I am discussing it today.

Yes, positive steps now can lead to both short-term and long-term solutions to this Nation's energy problems. The efforts of the President's Domestic Council represent a first step. The next step is formation of a "national fuels and energy policy," a policy which should have been established a decade ago.

I anticipate that secure sources of energy may well involve increased costs and in turn higher prices for consumer products. Vast new capital investments will be required. These are costs we must expect and be prepared to meet for the fulfillment of the objective of secure energy sources and a cleaner environment.

Total national reserves of coal are estimated at 1.56 trillion tons, of which one-half is considered economically recoverable. Undiscovered reserves are estimated at 1.65 trillion tons. These reserves can be classified by geographic location and sulfur content. The most recent detailed survey was performed in 1964. The amounts and qualities are sufficient to insure long-term supplies of bituminous coal, even with projected increases in domestic consumption and production. The difficulty is that of placing these reserves in production.

For oil and natural gas the picture is far from optimistic, both for

the short-term and long-term. The alternative to domestic oil and natural gas supplies worthy of consideration are:

- Coal gasification.
- Synthetic petroleum from coal.
- Synthetic petroleum from shale deposits.
- Synthetic petroleum from tar sands.
- Crude oil from Alaskan sources.
- Natural gas liquids.
- Imports from foreign sources

I remember in the 1940's, as a Member of the House of Representatives, I had the opportunity of working with the then Senator O'Mahoney of Wyoming in the matter of synthetic liquid fuels. We were faced then with the possible stoppage of oil imports into this country because of the submarine menace from the German opposition. We were not then thinking in terms of could we do something eventually, but, rather if we could do it from the standpoint of quick productive processes to meet a situation which was imminent. So then we did not consider the feasibility or dollar value. Today, we take a different sort of look than was taken then. And I am sure that under the war emergency then and a different type of emergency now, costs must be considered more closely now.

Yes, the short-term alternatives are obvious. But the challenge is going to be in the development of our long-range sources and in developing the technology for what I call "scrubbing" sulfur oxides and other pollutants from powerplant and other industrial stacks. I think this must have a very high priority.

Yesterday afternoon, I was visited by Major de Seversky, whom you know as the exponent of airpower so long ago. He is now 75 years of age but he has been giving several years of his time to this subject which I have just now mentioned. He showed me motion pictures only a few hours ago of the progress that he has made in connection with controlling these pollutants in industrial stacks. Obviously, reliable long-term sources of energy must rely on developing unconventional replacement supplies. That is exactly what he is doing. He says this is unconventional. "I know it is; I will have to convince people, I will have to show them, I will have to demonstrate it," the famed inventor told me. So pilot projects are being placed in certain plants in the country. But he says at 75, as he said at 30: "It can be done." He did it then in airpower. I believe he has the possibility, with others, of doing it through control of the contaminants that pour from industrial stacks and other sources.

So, any viable national fuels and energy policy must include the consideration of research and development priorities.

Obviously, reliable long-term sources of energy must rely on developing unconventional replacement supplies. Therefore, any national fuels and energy policy must include consideration of research and development priorities.

I now quote former Commissioner Carl Bagge of the Federal Power Commission (see July 16, 1970 Congressional Record), who stated:

While all aspects of our National Energy Policy must now be reevaluated, I believe that the most significant area is that of energy R&D. It is fashionable today to attack technology. The electric utility industry is presently experiencing the pressure of the critics of its technology. But technology is not the evil which it is portrayed. It is our failure to direct it—to channel it into the areas that are

critical to contemporary needs—that is the real shortcoming of our existing technology. The success of this industry's effort to continue to meet essential power needs without environmental degradation hinges, in the final analysis, upon the success of its technology and this, in turn, rests in your hands—the engineers and the technicians of this industry who, with a sense of purpose and vision can direct technology, stimulated by a relevant National Energy-Environment Policy, to the achievement of this goal in this new decade.

Today, the United States especially faces an imminent shortage of secure energy for stationary sources, that is, for heat, power generation, and industrial use. Abundant supplies of coal and other fossil fuels are in the ground; our shortcoming is our capacity to extract these resources from the earth and convert them into usable energy and deliver the energy to the ultimate consumer.

The immediate need is to overcome a fossil-fuel shortage and to develop more effective, more efficient, and cleaner methods of power generation and transmission without doing excessive ecological violence. In this connection, there should be careful attention to the roles that helium could perform, both in generation and transmission. I truly believe our Government's current "helium policy" is improvident and imprudent. It needs restudy and, I believe, it needs rectification.

There is another short-term problem that I should emphasize. The immediate need is to tie proven reserves into distribution systems. Over many years, tax policies encouraged oil companies to develop sources of crude oil and natural gas and place them in reserve for future consumption. In effect, these national reserves are being held in trust. Therefore, in a fuels or energy crisis the public policy should dictate when these reserves are made available.

I am concerned with the apparent proliferation of Federal efforts in this time of crisis. Recent reports indicate energy studies are being undertaken by the President's Domestic Council, the Office of Science and Technology, the National Science Foundation, the Atomic Energy Commission, the Department of Commerce, the Federal Power Commission, and two studies by the Department of the Interior, to name a few. There is a pressing need for overall coordination if piecemeal examinations and competitive forces are to be minimized. Government agencies must be directed to lay aside jurisdictional disputes and short-term self-interests and recognize the long-term national interests involved.

Our off and on national fuels and energy policy, or lack of it, is the result of numerous specific national fuels policies without consideration of the whole. There is no basis for assuming that because national security and economics are considered in establishing policies for individual fuels that these policies are consistent with the objectives of a National Fuels and Energy Policy or with those of our National Policy on the Environment.

Mr. Chairman, I reemphasize my view that our success in meeting future national energy requirements, while, at the same time assuring the quality of the environment and the optimal utilization of our indigenous natural resources, will be possible only through a coordinated and integrated national fuels-energy-environmental policy.

The studies which would be conducted under Senate Resolution 45 and the activities currently underway in the executive branch on fuels and energy policy are important and urgent. However, fuels and energy study, research, and development must necessarily be continuing

endeavors. We cannot expect that the recommendations and action programs resulting from or to result from current and prospective studies will set national policy forever. There will be changes. One of the most essential elements in maintaining a current and effective policy in any area—particularly in a technical area—is coordinated and comprehensive study, research and development programs. In fact, the lack of such coordination today will make the work of the proposed congressional committee much more difficult. At the present time, energy research and development efforts of government, private enterprise, and educational institutions are fragmented and uncoordinated. There is no agency responsible for a coordinating effort in the fuels and energy area which affects so many elements of our society and our environment. I suggest consideration of the establishment of a National Institute on Fuels and Energy under the Office of Science and Technology of the Executive Office of the President. A valid mission of this Institute would be to bring together, analyze, and make recommendations on all public and private fuels and energy research and development programs, especially those which are interrelated with the development of technology for improvement of the quality of the environment.

My objective in introducing Senate Resolution 45 was to insure that crisis not repeat itself. The immediate goal of the President's Domestic Council is to formulate our energy goal for the 1970's. The charter of the study under Senate Resolution 45 is to define and provide a definitive national fuels and energy policy for the next 20 to 30 years, where none now exists.

In language, the resolution before you may have imperfections. I urge, Mr. Chairman and distinguished members, that the committee work its will on Senate Resolution 45 with all reasonable speed and make a report to the Senate as early as is compatible with well reasoned and prudent consideration of the critical problems which form the basis of need for this measure.

I have confidence in the leadership and the membership of our Senate Committee on Interior and Insular Affairs.

The CHAIRMAN. Thank you, Senator Randolph, for a very excellent statement, a most comprehensive one. I think we all realize, the more we probe in this area, that this is an enormous task. I want to say that as chairman of the committee, I certainly will enter into the study with no preconceived ideas except as to the size of the problem. I think my biggest problem will be to try to determine in my own mind how to confine this study in such a way as to not get too far afield and yet not to do what I think has happened in the past. That is that we have had a series of segmented studies without an opportunity to look at the full scope of the problem. Obviously, the first thing we will have to do is get the facts and even that is no mean task.

I want to compliment you again for your long-time interest in this and your thorough knowledge of the problems that we face. We will be looking forward to working with you and with the other committees who will be joining in this undertaking.

Senator RANDOLPH. Thank you.

The CHAIRMAN. Any questions of Senator Randolph?

Senator Jordan?

Senator JORDAN. I would just like to add my voice to yours, Mr. Chairman, in commending our distinguished colleague for a most eloquent and reasoned statement.

Your leadership in this area is long standing and you are highly welcome before this committee. I am pleased to hear you say that we are not a Nation deficient in energy fuels, but we do need to apply ourselves diligently and with a good deal of dedication to making those energy fuels available to meet the pending crisis, both on the short-term and long-term basis. I am pleased to join you in sponsoring Senate Resolution 45 because I think it has considerable merit. Thanks for your testimony.

Senator RANDOLPH. I thank you, Senator Jordan.

The CHAIRMAN. Senator Anderson?

Senator ANDERSON. I get a little worried about whether this is the regular Interior Committee work. I have been on it for more than 20 years and I am familiar with how it operates.

For instance, what did we do with Project Plowshare? A program for development of natural resources with nuclear explosives, such as gas-field stimulation and oil-shale development.

Senator RANDOLPH. Well, of course, the work of this committee is determined by its members and I am asking that the committee take on another task, because this is the committee that should be charged with the responsibility for making a fuels and energy study, as I see it. I do not think it would be incompatible with any other efforts which your committee or another committee has been making or will make. I think it is a determination, a recommendation which, in the judgment of the members of this committee, can be taken and needs to be taken, and for that reason, I have continued to press for this resolution in one form or another.

Senator ANDERSON. We have had some soul-searching comments about attitudes now on the Joint Committee on Atomic Energy about the development of Plowshare programs and moving Plowshare responsibility from the AEC to the Department of the Interior. The chairman of this full committee has done a very good job in that regard. Do you consider it a possibility of moving that away from the AEC where it now exists? Do you think the study should examine the application of Plowshare to natural gas and oil stimulation?

Senator RANDOLPH. No, sir. I have no desire nor an interest in moving any program from where it now resides. I have only the desire to see that we look into every form of energy, and I underscored that here in my statement. I have no grief for any of the types of energy except to say that they are all necessary and must be further developed. And I added that we must search for new ones. I indicated one or two possibilities in that regard.

I would say, Senator Anderson, that I appreciate, as do you, the importance of atomic energy.

Senator ANDERSON. Well, the very first charge in the Committee on Rules is public lands, including energy, and for grazing purposes. We had a very long discussion about fees for grazing lands. Would the energy study enter into examining this area again?

Senator RANDOLPH. No, I cannot envision that this would be subject matter for this type of study.

Senator ANDERSON. We have some power reactors that are being built, one of them near Detroit that has been delayed for a long time for various reasons, and hope it will get done finally. Would study do anything about that?

Senator RANDOLPH. No, I am not familiar with that subject or the particular case, Senator Anderson. But I do feel reassured that you and others are giving attention to it.

Senator ANDERSON. Water supply and energy generation comes in. We have been discussing a new dual purpose, water and power atomic energy installation to be built on the west coast. Would that be studied under the energy study proposed?

Senator RANDOLPH. I think anything that concerns itself with the sources of energy, with the fuels of numerous types that can go into the productive system can, and, I am sure, would be considered by the study that is proposed.

Senator ANDERSON. We have also had discussions about licensing these atomic energy installations. I am just wondering if you have had a chance to consider that? All I will say is it is a very difficult problem to work with these things at all. But after you have spent some 20 years or so in it you become interested very strongly in what should be the policy in it. I believe some of the things that might be done should be done quickly. We did a study of energy 10 or 12 years ago and it has not changed things very much. I just hope that as things go along, we will be very sure about this present existing policy which the Congress now has. I think the Interior Committee has had all kinds of instructions on what it might do—public lands, mineral lands, forest reserves, military parks—these are all ordinary subjects in the Interior Committee. I just do not see why it should be torn away from that.

Senator RANDOLPH. Thank you, Senator Anderson.

The CHAIRMAN. Thank you, Senator Anderson.

I might say that Senator Anderson and I are on the Joint Atomic Energy Committee, in addition. Of course, the Joint Atomic Energy Commission will participate on the Senate side in this study.

Senator RANDOLPH. Yes, we think in terms of coordinated efforts of other committees with the Interior Committee. There are areas in which the Commerce Committee can help in this effort, the Public Works Committee and the Joint Atomic Energy Committee. Perhaps other committees can assist, Mr. Chairman.

The CHAIRMAN. Senator Fannin?

Senator FANNIN. No; I have no questions.

The CHAIRMAN. Senator Burdick?

Senator BURDICK. I will read your statement with interest. Thank you for coming.

The CHAIRMAN. Senator Hansen?

Senator HANSEN. Thank you, Mr. Chairman.

I do not think I heard you mention the contribution that oil shale might make. I am sure you did not mean by your failure to mention it orally, if you did fail to, that it should not be considered. I am right in that, am I not?

Senator RANDOLPH. Senator Hansen, I would hesitate to ever say you were wrong. But you will find that I did specifically mention oil shale.

Senator HANSEN. In your prepared statement?

Senator RANDOLPH. Yes, and in my remarks.

Senator HANSEN. I am sorry. I missed it and I apologize.

The CHAIRMAN. While we are going down the check list, my recollection is that nothing has been said about geothermal. We have a long list, you know.

But I think the significant point here, as Senator Randolph had indicated earlier, is made on page 4 of the bill, bracket one, "Approved and predicted availability of our national fuels and energy resources in all forms"—all forms. When we mention a specific energy item, we are not, by such explicit reference, excluding those not mentioned. That is a pretty big order, "in all forms." I think that gets into Senator Anderson's long-time interest in Plowshare, the gas buggy project, which offers a lot of promise, a lot of opportunity to break up these large deposits and find a more economical way of releasing gas and energy.

I want to say the purpose of the study is to deal with all forms of energy. We want to try to come up with some new policies.

Senator RANDOLPH. Right.

Senator HANSEN. Mr. Chairman, let me say that I knew from previous visits I have had with the distinguished chairman of the Public Works Committee that he was well aware of all the sources of energy. I raised the question only that those present here might also not be unaware of his interest.

I am sorry, I did not have a chance to read your statement. I just failed to hear, I regret to say, when you mentioned petroleum sources from shale, which indeed is in your statement. It does appear, as you pointed out, on page 7.

I think you made a great statement. I underscore the point that the Senator from Idaho made, that you do not look upon our resources as dwindling and unable to produce the energy this country, this growing Nation, needs, but rather that what is required is a redirection and a formulation of a policy so as to make certain that we will have adequate amounts of energy at all times for this growing and great country of ours.

I compliment you for your extremely well reasoned and most perceptive statement.

Senator RANDOLPH. Thank you, Senator Hansen. I believe that all of us could be in agreement that where there is a real shortage of a type of fuel in this country, namely, natural gas—I do know that there is a shortage there—it is, I think, important that we husband that fuel, and, perhaps, turn to the alternatives that I have mentioned here in an effort to develop and strengthen other approaches.

I only add this and I do not want to take undue time. I recall in our earlier hearings, we were in Wyoming, we were in Colorado, we were in other of the Rocky Mountain States areas. We saw then the possibilities of greater uses of oil shale. I hope I am not going too much into nostalgia when I tell you that I truly believed we could do much in the field of synthetic fuels. The Germans, as you know, had been producing aviation fuel from coal during World War II. So, in our earlier study, we tried to produce aviation fuel from coal.

Of course, I wanted it to be West Virginia coal; there is nothing wrong with that. But it was developed in the Pittsburgh Research

Laboratories of the Bureau of Mines. I remember so well that we brought the two drums of that fuel to Morgantown, W. Va. I got into the cockpit with a young man, Arthur Hyde, and we flew a Fairchild single engine plane to the Washington National Airport. Well, you have to have some faith, you know. We just were not certain whether it would stay aloft, but it did. Of course, we put some tetra lead in and sort of helped it along in its early days.

But I think it is important that we realize that there are so many untapped and untouched sources that are here for us to develop. We will work to find them. But we need to husband, as I have used the word, and develop realistically these programs with the fuels we have and the fuels that may be in lesser supply. And in some instances, we should, perhaps, withdraw certain types of fuel in the interest of the environment. These are the factors that we—rather, your committee—will undertake.

I thank you, Senator Hansen. I appreciate your knowledge ability in this field.

Senator HANSEN. Thank you, Senator.

The CHAIRMAN. Senator Anderson has another question.

Senator ANDERSON. You were referring to several sources of energy. Only a few days ago in the Joint Committee on Atomic Energy, a comment was made about how much atomic energy contributed toward the programs and environmental improvements we all strive for. At that time the forecast for nuclear power, I think it was about 50 percent by year 2000 of national needs. That would be a very substantial contribution to our national electrical needs, and might change the energy picture entirely. We must watch carefully that the energy study proposed is not prejudicial to atomic energy, or for that matter, any energy source.

Senator RANDOLPH. Thank you, Senator.

The CHAIRMAN. Senator Hatfield?

Senator HATFIELD. Mr. Chairman, I would like to compliment Senator Randolph for a very outstanding statement today.

Needless to say, you have a very friendly listener in me because of the fact that the Pacific Northwest has been so vitally dependent upon hydropower. I think one of the additional factors to be served by such a commission, besides developing the data and the information upon which to establish a national policy, would be to focus public understanding upon this great subject, which I do not think is presently appreciated. Let me just give you one simple statistic. We in the Pacific Northwest are very impressed with our environment. We are very zealous in guarding our environment, almost to the extent where some people have adopted an attitude that industrial growth should be halted. That, somehow, we should build a fence around the Pacific Northwest to keep everyone else out and stop any in-migration. But, even if we could build a hypothetical wall around our Pacific Northwest, which includes Oregon, Washington, Idaho, and part of western Montana, in the next 20 years we will have to develop 800,000 new jobs just to take care of our young people who are coming into the labor market during that 20-year period. That does not consider at all any movement of population into our area, but is just to accommodate the growth of our own existing population. So obviously, we are going to have to have energy, we are going to have to have fuel, we are

going to have to have resources in order to provide just these jobs. Otherwise, we become nothing but a retirement home. All of our young people will flee. We will provide nothing but a national park for the wealthy to come and play and then leave.

Consequently, this is a very practical problem that we face. Yet I am convinced as I talk that within my own State of Oregon there is a sort of romanticism that has crept into our thinking that indicates let us turn off the power, let us go back to the kerosene lamp, let's cook the meat over the campfire, let's return to the primitive life that was so romantic that we read about. I am not saying this is broadly held as a concept, but it permeates many facets of our life today. I think this kind of a study, that would bring forth the facts and bring forth the projections of need, would certainly be very helpful in gaining a better understanding and comprehension of the job and perhaps to eliminate the trends toward the extremism to which you have referred and to which our chairman referred in a speech recently.

So I want to commend the Senator, not only for the substantive material he presented, but for the persuasive style in which he speaks. You are very eloquent in your presentation. I always enjoy listening to you.

Senator RANDOLPH. I thank the Senator. He has made a perceptive appraisal.

The CHAIRMAN. Senator Burdick?

Senator BURDICK. Senator Hansen is concerned about fuel. I am concerned about a process. This is a mouth-filler. Would your studies envision research and study into magnetohydrodynamics?

Senator RANDOLPH. Yes, certainly.

Senator BURDICK. Every hour of the day we should do something about pollution and this will generate electricity without pollution, it is said.

Senator RANDOLPH. I cannot say what will happen in that situation, but certainly I would not stop at any point the exploration that this committee would make in the study of these important matters. I remember that your Governor was before our Public Works Subcommittee on Economic Development yesterday. Governor Guy was speaking somewhat in the terminology of the able Senator from Oregon about the declining population in a State like North Dakota, in a sense. The same story was told to us by Governors of other States where there are real problems these days and likely to be in the future. All of this I see as a part of a strengthening in understanding of America and of our future. I do not think of it as something that is set aside. I think it is part of a whole. Our institutions change with changing times and the change of circumstances. These are all about us and we must consider them. I feel that everyone can profit by constructive study and the setting of realistic goals, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Randolph.

Senator Bellmon?

Senator BELLMON. Thank you, Mr. Chairman. I would like also to add my words of congratulation to Senator Randolph for the excellent and conclusive statement he has made this morning. I also congratulate him upon his knowledge of the energy conditions we are facing right now.

I think your knowledge should be more widespread through the Congress and through the Government to keep us from having to face the present crises we face.

I also am pleased to be one of your cosponsors to see that this legislation is properly considered and hopefully passed.

I want to ask a couple of questions. Assuming we go into the study and complete it along the line it is outlined, what do you see as a follow-on after we have actually gotten all the information we need? How do we make certain that we do not allow these crisis conditions to develop again in the future?

Senator RANDOLPH. Perhaps I could give an illustration. It may be apropos.

You will recall, Senator Bellmon, that in the past we have met, in various ways, the disasters, the catastrophes of one type or another in our country—like tornadoes, hurricanes, earthquakes—but we met them after the fact. We then went in and specified a certain number of dollars to be used in rehabilitation and in rebuilding. The Congress, in its wisdom, in 1970, passed the Disaster Assistance Act. For the first time, we are ready to move in when a disaster occurs such as occurred recently in California with the earthquake. I can tell you that there was approximately \$35 million of damage done to the highways alone within a small area of Los Angeles County. We were ready and we have a certain fund that now amounts to \$66 million, in which there can be quick attention given to the highway damage. Frankly, California could never do that job and Los Angeles County could never take up that job quickly on their own. But we were ready federally with substantial financial assistance.

It is so now, as we find in the recent Louisiana-Mississippi tornado aftermath. We are ready to move in because we have on the shelf, as it were, ready to pull down and to use, these tools. So I envision, first of all, the finding of the facts, as the chairman has said, what the situation is here and there in reference to our fuels and energy requirements and our supplies and how we can use these to the best advantage of all the people. I think that is a matter for the very careful study and determination of this committee.

Senator BELLMON. Well, Senator Randolph, it appears to me that at the present time, too many of the tremendously important decisions relating to our energy policy are being made in the executive branch without any opportunity for the public to know the facts and to be given an opportunity to understand the underlying rationale for the conclusions that are reached. Do you think it would be helpful if we had some public forum where these facts can be brought out on a continuing basis so our Government officials as well as our citizens can know what the financial conditions in the country are?

Senator RANDOLPH. I do, Senator Bellmon, and I so stated in my prepared testimony today. I even made a recommendation in reference to an institute that might possibly serve the purpose.

Senator BELLMON. What you mentioned, though, would be in the executive branch.

Senator RANDOLPH. That would be in the executive branch, I realize, but there would be the input that could stem from, as you have indicated, the general public.

I said this in my statement that these policies must be given the effect of a congressional mandate and not originate solely and not be carried forward solely in the executive branch of the Government. I think that is why now, perhaps, there is the great difficulty with the understanding of the present conflict in Southeast Asia. It is that people, and yes, the people's representatives in the Congress, apparently have not realized that we, the Congress, we the people have not fully developed our policies or our determinations. Rather, we seem to have let them come from the executive branch of the Government as the difficulties arose. I am not attempting now to discuss the Southeast Asian conflict except to say that we need an undergirding of the understanding by the American people of any of these problems that face us. We are so prone to act after the fact in America. A crisis comes and then we attempt to go in and plug the holes. Planning is not a bad word; it is a good word. It is one that I believe in. I think that is what you are saying here, that we must be prepared through programs that are broadbased and that are understood if we are to meet a crisis in our fuels and energy program.

Senator BELLMON. For instance, the Congress, in 1969, passed what we call a tax reform measure, which took about \$700 million a year out of the economic stream. I notice in the most recent economic report, despite the fact that our demand for proven gas is going up at a rapid rate and there is not an increase, the exploration account is the lowest it has been since 1943. So apparently, as a direct result of the congressional action of decreasing taxes, we are now causing an even greater crisis for future petroleum production by having siphoned off the money that the energy industry was using for developing these reserves. It seems to me if the Congress had some way of knowing continually what is happening in the energy business, we might not make these decisions.

Senator RANDOLPH. I agree with you that there is a lack of understanding, not only in these fields but, as I have indicated, in other fields. I think a constant review is necessary. We never talked too much in the past about the legislation that we brought into being only to see it administered badly by an agency or agencies. I use the word advisedly when I say that the very action of the Congress was subverted in the way the agency administered the law. I am not attempting to be definitive now except to say that we are now having what we call oversight or review hearings, where the Congress comes back and looks at what it passed and what is being carried forward by an agency or agencies in the administration of the law. I think we make many mistakes.

I think we are so prone to believe that because we have passed a certain law, we must stand upon what we wrote at that time. I think we should not be coming back lightly to amending a law. I am not amiss when I say that Congress needs constantly to take a look at every subject and to revise its thinking, if necessary.

Senator BELLMON. I think we are in agreement that there may be a need here for some continuing monitoring system to find out where we are going in this vital energy field.

I have one other brief question. Do you contemplate that this study will involve a review and study of the fuels transportation system in the country? I think, for instance, of the Penn Central

Railroad and what it means to coal, and the pipeline system and the movement of natural gas to possibly the New England area. Are you expecting to go into this field?

Senator RANDOLPH. I would think transportation would be a part of a study of this kind, a very vital part of such a study.

Senator BELLMON. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Bellmon, and Senator Randolph.

In behalf of the committee, we want to express to you our appreciation for coming here this morning and giving us you excellent views. I believe we have had a good discussion as a result of your appearance here, and I would hope it will continue with the witnesses to follow. Thank you very much. I know you are a little late to preside over another meeting, so you go right ahead.

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

The CHAIRMAN. I am delighted to call upon the distinguished Senator from Kentucky, Senator John Sherman Cooper.

Senator COOPER. Thank you Mr. Chairman.

STATEMENT OF HON. JOHN SHERMAN COOPER, A U.S. SENATOR FROM THE STATE OF KENTUCKY

Senator COOPER. I appreciate the opportunity to provide to this committee my position in support of Senate Resolution 45, which would authorize a national study concerning fuels and energy policy by this committee. I would point out at the outset that I am a cosponsor of this resolution.

The subjects of adequate fuel supplies, costs—and energy resources, in general—have concerned me during the period I have served in the Senate. I note that Kentucky is the second largest producer of bituminous coal in the country. Secondly, the TVA system, which is the world's largest purchaser of coal, includes certain sections of Kentucky in its service area. TVA also is in process of building plants fueled by atomic energy, the construction of which is far behind schedule.

I merely make reference to these facts as an indication of my own experience in Kentucky with some of the problems involving the production, supply, and delivery of these two important sources of energy.

In the last session of the Congress I introduced on August 25, Senate Resolution 457, authorizing this committee to conduct a study concerning the shortage of coal existing in the United States. My resolution was cosponsored by 11 Members of the Senate. It specifically required this committee "to make a full and complete study and investigation with respect to the existing critical coal shortage in the United States with a view to determining the extent to which, if any, each of the following has contributed, is contributing, or may contribute to the existing or in future coal shortage in the United States."

The resolution then set forward five areas of inquiry as they bore on the supply and delivery of coal: (1) The lack of an adequate number of freight cars; (2) the effect of the Coal Mine Health and Safety Act of 1969 on mine closings and loss of coal production and on the increased price of coal; (3) the increase in exportation of coal from the

United States to foreign markets and the effect of these exports on our domestic supply; (4) the existing shortage of manpower needed for operating the Nation's coal mines and the need for adequate training programs and facilities; (5) the growing concentration of ownership of the Nation's sources of coal supplies among operators who own and operate competing sources of energy (such as oil and gas) and the effect of this concentration of ownership on the production and supply of coal.

In examining the text of Senate Resolution 45, I note that the resolution gives this committee broad authority to make a full and complete investigation and study of the current and prospective fuel and energy resources and requirements of the United States and to make a full and complete investigation and study of the existing and prospective governmental policies and laws affecting the fuels' and energies' industries and what changes need to be made in these policies.

Senate Resolution 45 is much broader than my resolution which dealt primarily with one source of energy—coal and the coal shortage of last year. The shortage of coal, in my view, is not a temporary crisis of last year, but is a crisis that will continue in the coming years, unless some steps are taken to alleviate it.

I would hope that in its inquiry based on the authorization of Senate Resolution 45, this committee will also have an opportunity to investigate and examine in detail the various factors contributing to the coal shortage as outlined in my resolution and will be able to make recommendations to the Congress for dealing with these particular problems.

Mr. Chairman, I ask the committee's consent that my remarks made on the floor August 25, in introducing Senate Resolution 45, as well as colloquies with other Senators on the floor, be made part of this statement (exhibit I).

Mr. Chairman, I also ask the committee's consent that certain excerpts from the hearings of the Public Works Committee on August 14, 1970, concerning the bill to increase the statutory limitations of TVA to issue bonds be included in your record with my statement. In these hearings, I questioned Mr. A. J. Wagner, Chairman of the TVA, on various problems TVA faces concerning coal shortages, rail car shortages, and other matters bearing on the supply, demand, and price of fuel. I believe his testimony will be of interest to this committee in connection with Senate Resolution 45 (exhibit II).

(The exhibits referred to by Senator Cooper follow:)

[EXHIBIT I]

S14200

CONGRESSIONAL RECORD—SENATE

August 25, 1970

SENATE RESOLUTION 457—SUBMISSION OF A RESOLUTION AUTHORIZING THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS TO CONDUCT A STUDY CONCERNING THE SHORTAGE OF COAL EXISTING IN THE UNITED STATES

Mr. COOPER. Mr. President, I submit a resolution on behalf of myself and the senior Senator from West Virginia (Mr. RANDOLPH), the Senator from Tennessee (Mr. BAKER), the Senator from West Virginia (Mr. BYRD), the Senator from Kentucky (Mr. COOK), the Senator from Virginia (Mr. SPONG), the Senator from North Carolina (Mr. JORDAN), the Senator from Pennsylvania (Mr. SCOTT), the Senator from Alabama (Mr. SPARKMAN), the Senator from South Carolina (Mr. THURMOND), the Senator from Michigan (Mr. GRIFFIN), and the Senator from Washington (Mr. MAGNUSON), to authorize the Committee on Interior and Insular Affairs to conduct a study and investigation concerning the existing shortage of coal in the United States and the critical shortage projected in the coming months.

The PRESIDING OFFICER (Mr. FAYNE). The resolution will be received and appropriately referred; and, without objection, the material will be printed in the RECORD, as requested by the Senator from Kentucky.

The resolution (S. Res. 457), which reads as follows, was referred to the Committee on Interior and Insular Affairs:

S. RES. 457

Resolution authorizing the Committee on Interior and Insular Affairs to conduct a study and investigation concerning the shortage of coal existing in the United States.

Whereas, the nation's production of coal is a vital element in the ability of the nation to meet its national energy requirements;

Whereas, the nation's existing production of coal is not sufficient to meet the demands therefore;

Whereas, this existing shortage of coal is likely to worsen and impose a severe hardship on the consumer and the nation during the coming months unless immediate action is taken;

Whereas, the Council of Economic Advisors in its Inflation Alert Report of August 7 has found that the price of bituminous coal has increased 56 percent in the first six months of 1970; and

Whereas, the urgency of the situation requires that some action be taken immediately: Now, therefore, be it

Resolved, That the Committee on Interior and Insular Affairs, or any duly authorized subcommittee thereof, is authorized under sections 184(a) and 138 of the Legislative Reorganization Act of 1946, as amended, and in accordance with its jurisdiction specified by rule XXV of the Standing Rules of the Senate, to make a full and complete study and investigation with respect to the existing critical coal shortage in the United States with a view to determining the extent to which, if any, each of the following has contributed, is contributing, or may contribute

to the existing or any future coal shortage in the United States:

(1) the lack of an adequate number of freight cars of the nation's railroads for loading and transporting coal;

(2) the effect of the Federal Coal Mine Health and Safety Act of 1969—including the unavailability of coal mining equipment required for compliance with the Act—on mine closings and loss of coal production and on the increased costs of coal;

(3) the increasing exportation of coal from the United States to foreign markets;

(4) the existing shortage of manpower needed for operating the nation's coal mines and the lack of adequate training program for miners; and

(5) the growing concentration of ownership of the nation's sources of coal supplies among a few large operators who own and operate competing sources of energy, (such as oil and gas); and the effect of this concentration of ownership on the production of coal.

Sec. 2. The Committee shall report its findings upon the study and investigation authorized by this resolution, together with such recommendations as it deems advisable, to the Senate at the earliest practicable date, but not later than

Sec. 3. For the purpose of this resolution the Committee, through , is authorized (1) to make such expenditures as it deems advisable, and (2) to employ upon a temporary basis, technical, clerical, and other assistants and consultants.

Sec. 4. Expenses of the Committee, under this resolution, which shall not exceed \$, shall be paid from the contingent fund of the Senate upon vouchers approved by the chairman of the Committee.

Mr. SCOTT. Mr. President, I ask unanimous consent that my name be added as a cosponsor of the resolution.

Mr. COOPER. Mr. President, I ask unanimous consent that the name of the Senator from Pennsylvania (Mr. SCOTT) be added as a cosponsor of the resolution.

The PRESIDING OFFICER. Without objection, it is so ordered.

Mr. RANDOLPH. Mr. President, will the Senator yield?

Mr. COOPER. I yield.

Mr. RANDOLPH. Mr. President, I commend the distinguished senior Senator from Kentucky (Mr. COOPER) for having submitted a timely resolution which would authorize the Committee on Interior and Insular Affairs to conduct a study and investigation concerning the shortage of coal for marketing and consumption in the United States during this period of fuels and energy crisis. It is a privilege to be associated with the able Senator from Kentucky in cosponsorship of the measure.

Because it is a fact that coal, for so many years, has been the most widely used fuel for the development of electric energy and in the steelmaking process, we find it difficult to realize and understand the condition of scarcity of this essential commodity.

Being from the leading coal-producing State of West Virginia, perhaps I have a broader understanding of the factors which cause shortages to exist. My able colleague from West Virginia (Mr. BYRD), as well as our colleagues from other leading coal producing States—including the senior Senator from Kentucky—likewise possess special awareness of coal's production, transportation, and marketing problems. But I am sure

others feel as do I that these problems are so broad in their scope, application, and origins that their identification and solutions must have national cognizance and consideration.

The Committee on Interior and Insular Affairs can provide the proper forum and the apparatus for the hearings and investigative effort so necessary to identification of causes and effects, and so vital to the development of solutions.

The senior Senator from Kentucky and all of us associated with him as cosponsors of the measure he offers today likewise are joined as cosponsors of S. 4092. I introduced this bill on July 16, 1970, to establish a Commission on Fuels and Energy to recommend programs and policies intended to insure that U.S. requirements for low-cost energy will be met, and to reconcile environmental quality requirements with future energy needs.

Mr. President, I am informed that the distinguished Senator from Utah (Mr. MOSS), chairman of the Subcommittee on Minerals, Materials, and Fuels of the Committee on Interior and Insular Affairs, will chair the opening hearings on S. 4092 on September 10 and 11. The area of investigation indicated by the resolution submitted today by Senator COOPER is so vitally connected with the purposes of S. 4092 that I hope both measures can initially have concurrent consideration by the subcommittee chaired by Senator MOSS. I express this only as a personal hope, of course, and in no wise as an infringement on the jurisdiction of either the Interior Committee or its subcommittee.

The coal shortage and, indeed, the fuels crisis generally, should have priority and expeditious attention, and I commend the distinguished chairman of the Committee on Interior and Insular Affairs, the Senator from Washington (Mr. JACKSON), and the distinguished subcommittee chairman (Senator MOSS) for having made arrangements to begin consideration of S. 4092.

I again commend the senior Senator from Kentucky (Mr. COOPER) for his timely and important resolution.

Mr. MAGNUSON. Mr. President, will the Senator from Kentucky yield?

Mr. COOPER. I yield.

Mr. MAGNUSON. I come from an area that relies upon hydroelectric power and will, in the future, rely more heavily upon nuclear power but I want to commend the Senator from Kentucky and the Senator from West Virginia on their statements because if we do not do something about expanding the production of power in the next year or 18 months, we will not have a brownout in 1974 but a blackout. I do not want to be around—and I am sure that the Senator from West Virginia feel the same way—when my wife turns on that switch and nothing happens. I want to be out of town that day, because she will say, "What have you done about it?" This problem, a brownout or a blackout, will happen unless we begin expanding the ability to generate power.

We have been held up by many prob-

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S14201

lems but they are questions that we can solve. This has become a most serious problem in the United States. It could cripple the country. This is true in the Pacific Northwest which does not rely upon coal, but we know there that this is an important problem in the East. The Senator from West Virginia will recall, as will the Senator from Kentucky, that we put money in the appropriation bill for research into this matter, which must go parallel with this effort. I want to tell you, Mr. President, that this is a very serious problem facing this country.

The power needs of the United States doubles, conservatively, every 8½ years. We are way behind. I cannot see how we can catch up without some use of fossil fuels in a more efficient way in the future, and we can find that way in my opinion.

Mr. COOPER. I thank the Senator from Washington very much. He has stated very clearly the serious issues before us.

Mr. President, during the last few weeks, attention has been focused on this very serious problem of a shortage of coal and, indeed, of other fuels. Many comprehensive articles have been published in the press and statements have been made in the House and Senate. A few days ago, I read a graphic statement by the Senator from Vermont (Mr. Aiken), who pointed out very clearly that the matter of energy is a question of life or death to the economy of the country, its security, and the future needs of its people. He also stated that it was a situation in which a few companies, by gaining ownership of competitive fuels, could actually hold the future of the country in its hands, according to its own decisions.

We, who are sponsoring this resolution, are aware of the fact that the shortage of other sources of energy as well as coal is a problem that the Committee on the Interior may want to study but, as we represent States in which coal production is of great importance, it is natural that we should emphasize the problems of the coal industry.

Let me point out that the shortage of coal was graphically illustrated by the chief representative of the Tennessee Valley Authority, when he testified before the Public Works Committee on August 14, on H.R. 18104, a bill to increase the authorization of the TVA to issue revenue bonds—from \$1,750 billion to \$5 billion—for financing needed power facilities. Mr. Aubrey J. Wagner, Chairman of the TVA Board stated that TVA must raise its power rate by an average of 23 percent if the Authority is to meet the requirements of section 15(d) (f) of the TVA Self-Financing Act.

Mr. Wagner testified that one of the chief reasons for increasing rates is the increased price of coal, which has doubled over the last year. He pointed out that the increased price of coal has not stimulated sufficient production, that there is an immediate critical shortage of coal and TVA may not be able to obtain sufficient coal supplies to fuel its steam plants. Upon questioning by the committee, Mr. Wagner stated that the causes for coal shortages were:

First, the inadequate supply of freight cars for coal transportation; second, increased exports of coal; third, the growing concentration of ownership of the Nation's coal production and coal resources in companies producing competitive fuels; and fourth, the Federal Coal Mine Health and Safety Act of 1969, which has caused mine closures and loss of coal production.

As the Tennessee Valley Authority is the largest purchaser of coal not only in our country but in the world, the testimony of Mr. Wagner and his associates is of great importance.

Last year when the Senate was considering the Federal coal mine health and safety bill I pointed out, as did other Members of the Congress, that the bill, while providing many needed safety requirements, also included provisions unnecessary and economically not feasible for hundreds of safe nongassy mines and that, as a result, many nongassy mines with good safety records would be forced to close. This is occurring and will continue to occur and the unnecessary closing of nongassy mines has contributed to the existing shortage of coal. Ironically, the large gassy mines are open, but cannot replace the production of the closed mines. Another unfortunate consequence which I stated at that time would take place has been the shift of underground mining to strip mining with all its unhappy consequences.

Many news articles have commented on the ownership of coal mines and coal resources by oil and gas companies and other companies producing competitive fuels. I have been informed that the Antitrust and Monopoly Subcommittee of the Senate Committee on the Judiciary conducted preliminary hearings on this question early this year, and that the findings of the subcommittee were startling, indicating that many of the largest coal companies in the United States had been acquired by oil and gas companies. It is necessary that the effect of these acquisitions on competition and production be thoroughly investigated not only by the Congress but by the Department of Justice.

Mr. President, I know the investigation of coal and other energy shortages and their causes will be a task of large proportions, one requiring adequate provision of funds and staff. It is possible that the jurisdictions of several committees will overlap, such as that of the Committee on Public Works, to study the problems of the energy requirements of the Tennessee Valley Authority, as an illustration of the problem many industries face; the Committee on Labor and Public Welfare, to examine the effect of the Federal Coal Mine Health and Safety Act on causing unnecessarily the closing of safe mines; and the Subcommittees of Antitrust and Monopoly of the Senate Committee on the Judiciary to examine further the effect on competition of the acquisition of coal mines and resources by companies owning competitive fuels.

The distinguished senior Senator from West Virginia, Senator RANDOLPH, has introduced S. 4092, a bill "To establish a Commission on Fuels and Energy," and the bill has been referred to the Committee on Interior and Insular Affairs. I

understand that hearings will be held soon on this bill. I hope very much that the Committee on the Interior will conduct as quickly as possible a full investigation and study of the shortage of coals and other fuels and will make its recommendations to the Senate.

This is a matter of greatest importance and the recommendations of the committee will be of great service to our country.

Mr. ALLOTT. Mr. President, will the Senator from Kentucky yield?

Mr. COOPER. I am happy to yield to the ranking member on the Committee on Interior and Insular Affairs.

Mr. ALLOTT. Mr. President, I think that the resolution which the Senator from Kentucky has introduced is a valid and a very good one. The only thing that perturbs me about it is its scope, but I do not believe it should be disregarded because it is so large in scope.

What the Senator has actually offered here is an indepth study of all our energy requirements. It is something that is badly needed. I hope that when this is considered, if it is considered, that we undertake it seriously, because as the Senator said to me the other day when I raised the question with him, it is going to take a pretty large staff, and it will take a highly skilled and professional staff to come up with the kind of answers the Senator is calling for.

I hope that Congress, when this matter comes to the floor of the Senate for consideration, will realize its seriousness and will do the kind of job that is needed; otherwise, I do not believe that we should touch it unless we intend to do it thoroughly with good help—all the help we can get.

Mr. COOPER. I thank the Senator from Colorado very much. The problem is serious. I am glad he has pointed out it would require adequate funds and an adequate staff to take care of this.

Mr. President, I ask unanimous consent that a number of newspaper articles and other relevant statements that have appeared in the past 2 months concerning the current coal shortage, the increase in coal prices, the increase in stripmining, and the problems of the TVA in obtaining coal supplies, together with a copy of the Inflation Alert Report of August 7 by the President's Council of Economic Advisors which found that the price of bituminous coal has increased 56 percent in the first 6 months of 1970 be included in the Record at this point.

There being no objection, the material was ordered to be printed in the Record, as follows:

THE INFLATION ALERT REPORT OF THE COUNCIL OF ECONOMIC ADVISERS RELATING TO COAL—AUGUST 7, 1970

FUELS

Prices of industrial fuels have advanced with exceptional rapidity during the past year and especially during the first half of 1970 (see table). The sharpest increase has been for bituminous coal which rose at the annual rate of 18 percent in the last half of 1968 and spurted to a 56 percent rate in the first half of the current year. There have been several reasons for this development. In the first place, there has been a very substantial increase in foreign demand, especially for metallurgical coal used in steel making, while some domestic utilities have had to use more coal than anticipated because of de-

lays in their nuclear generation projects. Secondly, increasingly stringent pollution regulations have required many electric utilities to change their fuel specifications to low-sulfur coal. As it happens, most low-sulfur coal is also metallurgical grade, further augmenting the pressure on the type of fuel. Third, safety regulations are being tightened and, while these may not yet be fully effective, it appears that they have added substantially to mining costs. Labor unrest and wildcat strikes in some fields have put still further pressure on supplies. Finally it takes years to open the new mines that may be needed to cope with this unforeseen increase in demand.

The table referred to follows:

CHANGES IN WHOLESALE PRICES OF FUELS DURING
2D HALF OF 1969 AND 1ST HALF OF 1970
[Not seasonally adjusted, except as indicated]

Item	Percentage change per year during				
	1970				
	1969, 2d half	1st half	1st quarter	2d quarter	
Fuel and related products and power ¹	3.3	3.6	0.8	6.5	
Bituminous coal.....	6.2	34.4	34.4	81.1	
Residual fuels.....	6.2	47.6	36.0	60.1	
Natural gas.....	2.4	3.1	-1.1	5.1	

¹ Seasonally adjusted; includes some commodities not shown separately.

Source: Department of Labor.

The price of residual oil, most of which is imported, has also advanced very rapidly, at an annual rate of 46 percent in the first 6 months of 1970. Here, again, a number of factors have been involved. World demand has been rising sharply. As in the case of coal, many utilities have been required to shift to lower sulfur oils, adding to costs and limiting sources of supply. In addition, tanker rates have increased very rapidly in recent months, partly as a result of the closure of a pipeline through Syria and production cutbacks in Libya.

Prices of natural gas also rose somewhat more rapidly in the first half of 1970 than in the last part of 1969. The increase in natural gas prices, however, has not been nearly as rapid as for coal and residual fuels, averaging an annual rate of only 3.1 percent in the 6 months ended June 1970. It should be noted, however, that natural gas prices are subject to regulation and that the flow of natural gas to utilities and other major consumers is often "interruptible," subject to being cut off when supplies are inadequate to meet total demand.

[From the Louisville Courier-Journal,
July 3, 1970]

LACK OF COAL MAY FORCE ARMCO LAYOUTS AT ASHLAND

CINCINNATI.—Major coal users said yesterday that rising prices and shortages brought on by a strike by miners in four states were causing a critical situation in the United States.

Armco Steel Corp. predicted layoffs in four plants—including one at Ashland, Ky.—if no progress is made by Monday. Representatives of Ohio and Michigan utility companies, hospitals and Ohio manufacturing firms also said their situation is serious. They appeared at a joint news conference.

Meanwhile, a back-to-work trend began developing yesterday in the coal fields of Southern West Virginia and Eastern Kentucky. Only one mine remained closed in Pike County, Ky., while across the border in Mingo County, W. Va., officials reported 10

mines operating that had been shut down by the strike, sparked by disabled miners.

R. P. Hindman, administrative vice president of the Steel Group of Armco, said the company might have to begin laying off workers and curtailing operations at its plants at Middletown and Hamilton, Ohio; Houston, Tex., and Ashland.

Hindman said that Armco has only a 10-day supply of coal left. Normal supply for Armco is 30 to 45 days. Its Middletown plant alone uses 10,000 tons of coal daily.

As many as 17,000 persons at the Armco plants could be affected eventually, Hindman said.

PRICES HIGHER, QUALITY LOWER

Tom Andrews of the Dayton Power & Light Co. said that the price of coal has tripled in the past two years.

Stanley Longfellow, associate administrator of Cincinnati General Hospital, said that not only has the price of coal increased, but the quality is "inferior." Spokesmen for the Hamilton, Ohio, city utility division concurred.

A Cincinnati Gas & Electric Co. executive, Arthur Ehrnswender, said his company has experienced coal increases as high as 25 percent in the past year and the cost of coal on spot orders to supplement long term deliveries has doubled.

He said the reasons for the coal supply situation were the inability of the mining industry to keep up with the growing demand; increased exports to foreign nations; labor unrest in the mining industry, and the new Federal Mine Safety Law, which has put some mines out of business and has caused a price increase by those still able to operate.

Ehrnswender also said the quality of the coal his company receives "has deteriorated to a point where we are encountering additional problems in our normal process of handling it, burning it and disposing of the ashes."

[From the Louisville Courier-Journal,
July 17, 1970]

STATE IS HAVING TROUBLE FINDING COAL FOR WINTERS

(By William Bradford)

FRANKFORT, Ky.—In the heat of summer some state officials are concerned about buying coal to keep state facilities warm next winter.

Not only is the cost of coal shooting upward, but producers who are ready to commit themselves to sell to the state are downright scarce. A recent effort by the state to get bids for coal brought only six responses from 110 suppliers who were contacted.

And not a single offer was made to sell coal to Eastern Kentucky University. It is expected to need about 12,500 tons.

N. B. McCubbin, state purchasing director, and his chief buyer, J. A. Lulgart, are going to Southeast Kentucky next week to try to buy coal for the university on the spot from mine operators in Clay and Leslie counties.

The recent bid-opening revealed offers that ran 80 to 125 percent higher than last year for Eastern Kentucky coal and 25 to 44 percent higher for West Kentucky coal. And bids for deep-mined coal in West Kentucky were subject to 30-day notices of price change and any increase resulting from wage boosts.

LEGISLATION BLAMED

Lulgart attributed the high prices and scarcity of bids to "the tremendous confusion" over the federal Coal Mine Safety Act of 1969 and other legislation.

Finance Commissioner Albert Christen has urged state institutions to stockpile coal this summer to avoid a recurrence of what has been called "dangerously low" supplies last winter.

Another measure which might be taken in

some instances is to establish an alternate fuel supply, such as storing fuel oil for emergencies.

The situation is going to put considerable stress on several budgets, Christen said. Some allowance had been made for higher coal prices, he said, "but nothing like what we're going to experience."

McCubbin asserted that there is no coal shortage but that mine operators are unwilling to commit themselves to long-term contracts because of uncertainties over the cost of new federal requirements.

Indicative of that and other problems is a letter the Charles Budeke Coal Co., Louisville, attached to its bid to sell coal to several state institutions, including Central State Hospital.

REPORT DUE AUGUST 1

"Due to conditions within the coal industry," the letter said, "we are unable to guarantee delivery of the coal because of the inability of the mines to ship, and the railroads to make deliveries. We are unable to give a firm price beyond a 30-day period."

Lulgart is to make a study and report on the fuel situation by Aug. 1.

Bids for supplying each ton of coal to some of the major state institutions—with only one bid offered in each case—were: Kentucky State College, \$18.20, up from \$9.80; Morehead State University, \$14.92, up from \$8.42; Murray State University, \$12.40, up from \$9.35; Western Kentucky State University, \$10.50, up from \$8.50.

For the University of Kentucky's central heating plant, this year's sole bid was \$12.93 a ton, compared with last year's adjusted cost of \$9.93. For the UK Medical Center, this year's bid was \$14.93 a ton, compared with a 1969 cost of \$9.33, adjusted to \$11.43 in May 1970.

[From the Louisville Courier-Journal, July 26, 1970]

COAL RETAIL PRICES UP BY \$6 A TON, MAY GO HIGHER

Retail prices for home-delivered coal have leaped as much as \$6 a ton in the past year, Louisville area coal dealers report.

The price of coal "went up a couple times during the summer time, and I'm looking for it to go up again before Christmas," one coal retailer said.

Louisville prices for home-delivered coal, most of which comes from Eastern Kentucky, range up to \$24 a ton.

But Louisville Gas & Electric Co., which uses coal from Western Kentucky, reports that its coal costs have risen, too.

B. Hudson Milner, president of L&E, said the company uses 2.2 million tons of coal a year in its generating plants, explaining that he cannot make the cost of this coal public under the terms of the company's coal contract.

THIRD FACTOR IS NOTED

The cost is "considerably above" what it was five years ago, however, and he added that the new Mining Health and Safety Act alone probably increased the price of coal about 50 cents a ton.

A general shortage of coal also has raised the price, Milner said, "and a third factor in Eastern Kentucky is the competition in there for metallurgical coal, including people from as far away as Japan offering great big prices."

Metallurgical coal, or coking coal, is a purer grade of coal containing fewer noncombustibles. It is used in the steel industry.

The Associated Press reports that the Japanese are buying more coal in their attempts to double their steel production by 1980.

In 1968, Japan bought 14.3 million tons of U.S. coal, and in 1969 that figure jumped to 19.1 million tons.

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[From the Washington Star, Aug. 10, 1970]

THE ENERGY PUZZLE

(By Charles Bartlett)

PIKEVILLE, KY.—The prosperity in Pikeville is one piece of a puzzle which is making electric power more costly and less certain to meet the national goals.

The price being paid the mining companies which dig coal out of the mountains and sell it at the railroad here has doubled in less than a year. The miners are getting more wages and a boom spirit is causing small mountain towns like this one to shed their depressed look.

The hair-dressing shops open ahead of the banks these days in Pikeville and the clusters of people waiting to do business in the latter are cheerful and dressy. The three banks in this city of 5,800 are bulging with deposits of over \$80 million.

The coal miners are making money but they know they are also making problems for the future. The boom, they sense, will be short-lived because the costs of mining will quickly catch up with the prices. This is the "feast" phase of a "feast or famine" business but the mine operators are too wary of the conservationists, the mine safety law, and the shortage of hopper cars to relish it.

They lost a residential market for coal in the post-war boom and now they fear they may price themselves out of the utility market. Power generation kept the coal industry alive until the Japanese demand developed. But now big customers like TVA, unable to secure low sulphur coal at feasible prices, are starting to urge that foreign oil destined for steam plants be exempted from the import quotas.

The rush to get the coal out of the knobby Appalachians has aroused the conservationists, who know the boom could bring a scarred end to the special beauty of this rugged country. But the respect for ecology promises that it won't be as easy as it might have been five years ago.

In fact the surface miners, obliged to live with a stiff 1968 Kentucky law, know they are going to have to demonstrate that their reclamation practices will leave the mountain country no less attractive than they found it.

The conservationists insist that this will be impossible. Certainly the cliff-like scars in the forest mantle will be visible for generations, perhaps forever. The compensating factors, surface miners maintain, will be the roads and level spaces they create. They already point to a golf course, an airport, orchards, and homesites which have evolved from their penetrations of the steep slopes.

The real problem is that surface mining is expanding voraciously because the new mine safety law is causing small operators to close down their shafts. Less and less coal will come out of the mines as the new provisions take effect because they require investments which small operators can't afford and machinery which is not available. The law is a key factor in the rise of coal prices.

This seems, from the vantage point of east Kentucky, to have been an instance in which the legislators were more guided by emotion than by wisdom. The Farmington mine disaster swept all the arguments before it and the coal state senators, led by John Cooper of Kentucky, are now rallying their strength to try to amend the impracticalities in the act. They face a difficult task.

But the national policies on coal and other energy sources cannot remain impractical for very long. All the factors, including safety and conservation, need to be closely correlated. The pieces of the puzzle are going to have to be put together, perhaps in Washington, or the nation cannot count with assurance on its future supply of power.

[From the National Observer, July 20, 1970]

NEW MINES CREATE A BOOM—AND A BANE

(By Mark R. Arnold)

A strange, disquieting thing is happening to the hills and hollows of Eastern Kentucky. They are being stripped for coal at a rate that alarms local residents and puzzles authorities.

Higher coal prices and an aversion to comply with last year's Federal mine-safety law have resulted in a rash of new strip mines in the region, their existence reflected in a sudden increase in denuded mountainsides and bad roads.

While conservationists fume, and state officials profess disbelief, strip mining—ripping off the earth's face to extract the coal—is becoming Appalachia's most visible growth industry, filling railroad cars with coal and workers' pockets with money even as it defaces the hills and threatens to pollute streams.

A week's investigation in Eastern Kentucky, coupled with talks with officials of the Kentucky Department of Reclamation themselves, reveal that:

New strip mines are sprouting at a record rate. Figures compiled for this newspaper by the Kentucky Department of Reclamation indicate stripping activity has jumped 49 per cent this year alone, compared with a usual 10 per cent to 12 per cent annual increase in the amount of land approved for stripping. Officials in neighboring Virginia and West Virginia say coal strip-mine permits are up 20 per cent to 25 per cent over a year ago.

Unquestionably, part of the reason for the boom in strip mining is last year's Federal mine-safety law, which was aimed at improving conditions in "deep" or underground mines. Instead of investing in the new machinery needed to comply with the statute, many operators are selling out their shares in deep mines and investing in new strip operations. "They can get in and recover the coal far faster that way," explains Ben Greene, West Virginia's director of reclamation.

The sudden boom in strip mining is stiffening the resistance of conservationists and citizens groups, transforming a question of ecology into a hot political issue in many mountain communities. Three Kentucky counties have taken action to ban or curb strip-mining practices in recent months, though the constitutionality of their actions is in doubt. The state's attorney general, John B. Breckinridge, a Democrat in the administration of Republican Gov. Louis Nunn, is in the middle of a three-week personal inspection tour of strip-mining sites. He intends to run for lieutenant governor in the fall.

Strip mining long has been controversial, particularly in the mountains of Appalachia, where reforestation is difficult if not impossible, and people draw sustenance and security from the mountains.

Unlike deep mining, stripping, by definition, defaces the countryside. Huge earth shovels scoop deep wedges out of the mountains, then claw out the coal or bore it out with mammoth drills or augers. Until the mid-1960s, the land removed in the search for coal was often pushed over the edge of the mountains. The subsoil and sediment filled up the creeks, flooding the houses in the hollows below under the pressure of heavy rains. When the coal had been extracted, the operators moved on, leaving the land scarred and battered.

These days, apparently, are over for good: Citizens groups who faced down belkisers with shotguns eventually created enough pressure to assure passage of strip-mine legislation at the state level that curbed many of the worst abuses of the industry. Yet the toll of years of thoughtless exploitation of the land can still be read in the dried-

up creeks that line the roads, and in the ugly patches of naked bluffs that break the curtain of lush mountain greenery on any drive through the back roads of eastern Kentucky.

Just how serious the damage from uncontrolled surface mining is in Appalachia was summarized in a study by the Interior Department a few years ago. It found that 3,200,000 acres of land had been disturbed by stripping, of which two-thirds had not been adequately reclaimed. Included in the total are 20,000 miles of clifflike highwalls gouged out of the mountains. "In some cases," says the report, "the walls completely isolate entire mountaintops." In addition, acid drainage from the mines was pinpointed as the major contributor to water pollution. Almost 6,000 miles of streams and 29,000 acres of impoundments and reservoirs have been "seriously affected" by surface mining.

Such conclusions help explain the alarm being felt over the resurgence of strip mining throughout the region today. Warns Harry Casdill, a Whitesburg attorney and one of Appalachia's most outspoken conservationists: "At the rate they're eating up the countryside, there won't be any Eastern Kentucky in four or five years."

To get an idea of how much strip mining has been started in recent months I visited the regional office of the Kentucky Division of Strip Mine and Reclamation in Hazard, center of a four-county coal-mining area that produces 30 per cent of the coal in Eastern Kentucky. The office, which serves Knott, Letcher, Breathitt, and Perry counties, is doing a brisk business these days, issuing permits.

"We have 61 active companies so far this year, compared to 40 as of last September," reports clerk Carol Green, smoothing a crease in her maternity dress. "Seems like we never had so many new outfits stripping for the first time."

I made appointments with several of the strip miners on her list in Letcher County and set out to see them. There are 25 active strip miners in the county, 8 of them new this spring. Why? "Because this is the best business there is in this area," answers Lawrence Sumpter, a good-looking, 35-year-old former policeman who went to work for another strip miner last year, then branched out on his own in March. Today he's working 13 acres of a 79-acre tract of hillside he owns off King's Creek, not far from Whitesburg.

"All there is is coal," adds Mr. Sumpter, gesturing to the surrounding tree-covered mountains. "Someone's gonna mine it. It might as well be me."

Mr. Sumpter is a small operator, with seven workers, two bulldozers, a front-end loader, a truck, and a 32-inch auger. With a capital investment of \$300,000, which he figures he can pay off in three years or less, he is mining 300 tons of coal a day, and selling it to a broker for \$6.50 a ton.

A LITTLE MORE TIME

"Give me another 18 months," Mr. Sumpter says, shielding his eyes from the sun with his baseball-type work cap. "And I'll be able to get a triple-head auger. Then I'll be able to pull a lot more coal out of these hills."

Like most strippers, Mr. Sumpter argues the callous practices of the past gave the business a bad name. The current strip-mine law assures that the mountains, however defaced by strip mining, will be restored to productive use. "Of course, we can't put the side back on the mountain," he concedes. "But we can reclaim it through proper seeding."

A few miles away on King's Creek lives Michael Deen, youngest of nine children of a family that came to King's Creek more than 200 years ago. He's barely 23, the kind of eager young mountain man who a few years ago might have been a matter of course—has deserted Eastern Kentucky after high

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school for better opportunities in the factories of Ohio or Indiana.

But Michael's not sorry he stayed. A year ago he and his older brother, Richard, converted a fleet of trucks they owned into a \$30,000 down payment on a double-headed auger. "The salesman, he knewed we didn't have much money so he threw in a bulldozer for no down payment," Michael recalled last week. Today the two brothers and a partner have turned that initial investment into a striping operation that turns out 800 tons of coal a day, at \$6.50 a ton.

"My brother's building himself a \$30,000 house, and he's got a new Buick. I paid cash for this 1970 pickup truck, and that 1968 Torino hardtop's mine too. Last week end, I did something I always wanted to do." He gestures toward a bleaching new Honda motorcycle parked on the front lawn of the simple white-frame house his grandfather built. "It was \$175 but what the hell." He paused, then added: "We're not just filling our pockets in this thing. Why, we've loaned money up and down this creek to people who wanted to buy a truck to run coal or a 'doser to mine their own. It's keeping the young people from leaving."

A NEW LEASE

Roy Stewart has been in the mining business—deep mining—since the end of World War II, first in Michigan and Illinois and for the past 8 years in Eastern Kentucky. But last summer he and his partner, Jim Hogg, sold out their deep mine, took out a lease on some prime strip land, and went at it in earnest. "It's the new law that made us switch, all the crazy stuff we'd have to put up with, having big brother snooping over our shoulder. Besides that, there's a lot of coal in these hills that can't be taken out by deep mining. You need to strip to get it. We decided to go after it."

Mr. Stewart also runs a tippie, a storage point and loading platform where the coal is funneled into railroad cars for shipment to market. "A year ago, almost all the coal in these hills was being deep mined," he says. "Now we're filling a 20-car coal train every day and 95 per cent of the coal comes from the strip mines. Everyone and his brother is getting into the act to make a dollar."

The reason they can all make a dollar is that the price of coal has skyrocketed in the past six or eight months. "We're getting \$9.50 a ton for common utility-quality coal," says Mr. Stewart. "That's exactly twice what we were getting from our customers last December."

Soaring coal prices, stemming from increased foreign orders on top of a sharp rise in domestic energy needs (for electric power, steel production), seem to be encouraging some mountain people to return to Appalachia. Jobs as heavy-equipment operators or coal-truck drivers for the strip mines pay \$4.00 to \$4.75 an hour, and young men are said to be coming back.

Most of the newcomers to strip mining are small companies, but the prospects of a low-overhead, high-yield alternative to deep mining is also luring some giants. Beth-Elkhorn Corp., a subsidiary of Bethlehem Steel, in the past has prided itself on its refusal to strip mine any of the 40,000 acres it owns in Eastern Kentucky. Now the company is the largest strip miner in Letcher County.

Opponents of strip mining view the new boom with considerable misgivings. Three months ago, Henderson County, an area of rolling terrain in Western Kentucky, approved a resolution prohibiting the reopening of surface mines that were abandoned years ago there. In Eastern Kentucky, a grass-roots organization called Appalachian Group to Save the Land and the People pre-

valled upon the fiscal court (county council) in coal-rich Knott County to ban strip-mining entirely.

Argued Paul Ashley, a vocational school teacher who heads the Appalachian Group: "We've got to call a halt to all this destruction that's closing in on us."

A third county, Leslie, has chosen another tack. It has set up a new planning commission to try to zone the stripminers into submission to local authority. "The idea's to control 'em, not to ban 'em," says County Judge George Wooten. While the constitutionality of these moves is yet to be determined, they point to a rising concern in Appalachia.

Two weeks ago, Mr. Ashley and other strip-mine opponents led Kentucky Attorney General John Breckinridge on a strip-mine tour of Knott County. The trip turned up several instances in which apparent compliance with the state's 1966 strip-mine law did not prevent acid drainage from polluting streams, or huge mudslides.

One stop was at the home of 88-year-old Granville Napier, whose tar-paper shack backs onto a creek turned brown with mine runoff. A state fisheries expert dipped a water-tester into the creek, took a reading, and shook his head. "Isn't anything could live in water like that," he said grimly. Later, Mr. Napier demonstrated how he must walk to get to his outhouse in the rear of the shack. He has had to lay wood planks to get over the mud that has covered over his back yard because of slides from a strip mine above him.

AN APOCALYPTIC VISION

Strip-mining foes insist that the new striping boom will ravage the countryside like nothing that has gone before. Whitesburg's Harry Caudill, author of *Night Comes to the Cumberland*, a classic study of Appalachia's people and problems, holds out an apocalyptic vision of the region's strip-mined future:

"With the advances of technology that are upon us," he says, "they'll shear the tops off all the mountains and run the overburden into all the valleys. They'll obliterate all life if they have to, to get at the coal, and turn the land into a vast ugly spoil bank stretching from one end of Appalachia to the other."

The Kentucky Conservation Council wants to prohibit all strip mining in Eastern Kentucky, where flooding and steep slopes have, in some places, all but made a joke of the law's requirement for reforestation. The land in many places simply cannot be restored.

At one of Beth-Elkhorn's prize reclamation projects, at Millstone Creek, Ky., grassy vegetation and small trees dot the site of an old strip mine. But the ground is interlaced with cracks and gulleys that might in time become landfills. And the steep, denuded highwalls, plainly visible from the road, can never be hidden.

The problem is that, in the short run at least, strip mining provides jobs—fewer jobs than deep mining, to be sure, but jobs nonetheless.

Mrs. Polly Ison, who rocks her days away on the porch of the house her grandfather built on King's Creek, knows what that means. She has three sons strip mining now, 23-year-old Michael Ison, and two of his older brothers. Several other children—she has nine altogether—had to leave the state to find work.

"They say it's destructive to do all this strip mining," she says, shaking her head slowly. "All I know is that some young ones are finding jobs right here in these mountains, and we have a little money coming in regular now. I figure that's something to be grateful for."

[From the Louisville Courier-Journal, July 26, 1970]

STRIP-MINE PIONEER DEFENSE METHOD—AND RESULTS
(By Kyle Vance)

HAZARD, KY.—Henry Wombles, the man who started strip and auger mining in the Kentucky mountains, would do it again in similar circumstances.

At the same time, Wombles said he "never dreamed" 18 years ago that the industry would grow as it has or become "as cursed as it has."

"All we were trying to do back then in 1952, I think it was, was to find a way to mine some coal close enough to the railroads till we could ship it out," Wombles said.

"All of the coal under the mountains had been mined out for five to 10 miles around Hazard, just too far away to bring it in when all you could get for it was \$1.68 a ton."

Wombles, who said he would take either credit or blame for his part in surface mining history, said the idea for pulling coal out of the mountainsides with augers came to him from an experiment in Leslie County.

"A man over there by the name of Degan was getting to the outcrop some way," he said. "It wasn't augering, but he was getting some coal."

"I heard about an auger that was for sale up in Pennsylvania and I went up and got it. We put it over in Blue Grass Hollow and we got something started, I guess."

A WAY TO MINE MORE COAL

The good-natured Wombles quit the coal business for awhile as the bigger operations took over. Now he's back directing one of the more ambitious jobs at the Perry-Breathitt County line.

He defends strip mining as "a way out for some desperate people."

"It had got to this place where you couldn't pay a man good enough wages to mine 10 or 12 tons of coal a day," he said. "We found a way where, with machinery, he could mine 60 tons a day, and that saved us."

"We didn't think the first thing about hurting anybody or damaging the scenery, and I still think that we have helped an awful sight more than we've hurt."

"I'd like to see all of the money that surface mining has brought in here to our people piled up in one pile. I'd even say I'd like to own it."

Wombles believes too much has been written about strip mining's damages to the mountains and too little about its benefits to mountain people.

"Stripping looks ugly while you're doing it," he said, "but the way they're doing it now it comes back pretty and green and leaves us some flat ground that I am absolutely sure will be put to some use one of these days."

"Even that stuff we did 'way back there at the start, without putting down a grass seed or a bush, has grown up now till you can't see it from the road unless you are looking for it. And when you get up where it is, there is enough flat land to put a farm or a factory."

"SOME FELLOWS A LITTLE CARELESS"

Wombles took the reporter down KY 15 between Hazard and Jackson to demonstrate his claim. He pointed up hollows covered with green foliage.

"What do you see up there?" he challenged. "You see trees. Well, we stripped all the way around that hill and the bench is still up there. Now, if you'll look real close down here, you will see where the bench comes out in the open..."

"What you see up there is the old KY 28 and not striping, but on down here a place you'll see where we were at again..."

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"Now look at that house over there. I'll bet it's worth every bit of \$30,000 to \$35,000. Look what it's sitting on. That's where we dug a little coal. . . ."

Womble said he believed the strip mining laws became necessary when the industry started growing to giant size.

"Some of the fellows have been a little careless," he said, "but I think almost everybody now knows what he is supposed to do and is doing it."

"If strip mining is done right and the land put back in good shape, it won't hurt many people, but it will help a lot of people. Take it away and you won't have anything left but welfare."

[From the Louisville Courier-Journal,
July 26, 1970]

COAL IS AGAIN KING IN EASTERN KENTUCKY (By Kyle Vance)

HAZARD, KY.—All of sudden, coal is king again in Eastern Kentucky, and the region is beginning to warm up to prospects of a long-awaited prosperity.

"The top has popped right off of the coal market," one operator said. "I never saw the best of it. Coal is the best it's ever been, and it's going right on up."

The price rise started about two years ago, when prices generally were in the \$2.25 to \$4 a ton range. The "popping of the top" has occurred in the last few months, carrying the prices on up to \$9 and \$12 a ton, paid at the rail head.

"It's so good it scares me," said Bruce Stephens Jr., an executive of Kentucky River Coal Corp. "There's not a doubt that for a time at least the trend will continue upward."

"Personally, I'd like to see the prices level off somewhere, because coal has been known to price itself out of the fuel market. The history of coal has been sharply up and sharply down."

Stephens said all persons connected with the coal business are sharing the new wealth—the operators especially, but also the miners, truckers, mineral owners and others. Merchants in such trading centers as Hazard, Pikeville, Harlan, Whitesburg and Prestonsburg reported a corresponding upswing in business.

"I've been in business more years than I like to remember," said Don Fouts, Hazard restaurant operator, "and I've never seen business as good as it is right now."

Willie Dawahare, a clothier with stores in Hazard, Corbin, Whitesburg, Neon and Pikeville, agreed.

"You don't have to look in the cash register to see it," he said. "Just walk down the street and you can see it on peoples' faces and in the clothes they're wearing and the cars they're driving."

Stephens and others credit the price spurt to a combination of factors, mainly the new Mining Health and Safety Act, which requires expensive new equipment in underground mines.

A shortage of railroad hoppers and low estimates of coal needs by some utilities helped with the trend. And strikes in four mining states, including Kentucky, have taken their bite out of production.

"The safety law hasn't done anything for safety, but it sure has hit the consumer in the eye," said Cloyd McDowell, secretary of the Harlan County Coal Operators Assn. "The consumer is paying for something foolish that Congress did last winter."

"The prosperity you hear about isn't as big as it might seem," he said, "because you don't put \$1 million worth of equipment that you don't need in a mine without hurting in the pocketbook."

McDowell said Harlan operators nevertheless are raising miners' pay \$2 to \$4 a day to hold their workers.

Blue Diamond Coal Co. at Leatherwood, Perry County, recently raised miners' pay voluntarily by 90 cents an hour even though

it had a contract in force with the Southern Labor Union.

The demand for coal and the resulting industry-wide price rise have created some problems, too, especially for mountain operators. Reports were heard in most of the coal counties that recruiters from high-paying Western Kentucky operations have succeeded in hiring men in Eastern Kentucky. Of all problems, however, operators are growling loudest over a continuing shortage of rail hoppers to ship their coal.

"If we could get the hoppers, you'd see some real prosperity," McDowell said. "We could ship 30 per cent more coal. The operators would make more, and I'd say the miners could make 40 per cent more than they're making now."

EXPORTS PART OF THE PROBLEM

Today there are fewer hopper cars than there were in 1960, according to the Association of American Railroads.

The continued rise in exports is adding to the problem. A spokesman for the Louisville & Nashville Railroad said exports tie up hopper cars twice as long as do domestic shipments.

And while coal is in short supply now, new technical developments are expected to push demand even higher.

One development is pollution control systems that will make it possible to burn coal and still meet low sulphur emission restrictions.

A part of the new coal picture is the influx of large numbers of outsiders who want to get into the coal business, with its promise of wealth.

"Anybody with just a little know-how can become an operator," Stephens, the Hazard coal executive, said. "All he has to do is promote his coal to a useful user and he can get the money to buy machinery and start operating."

The big gainer in the over-all picture, those in the industry agree, is the stripmine operator. He enjoys advantages of the higher prices without having to buy the costly spark-free machinery required for so-called "gassy" underground mines by the Health and Safety Act.

SOME EARN \$300 A WEEK

Even so, the strip operators insist, they share the manpower problem and are paying top wages to skilled workers.

"I can show you payroll records where some of our folks are making \$300 a week and more," Henry Womble, a Hazard operator said. "Any man who wants to work around here now can work, and it's up to him how much he makes."

Roy Mullins, a specialist in reclamation of stripped land for Kentucky River Coal Sales, Inc., Hazard, sees some disadvantages to rushed efforts on mountaintop auger jobs.

"Some of the new people who don't know too much about auger mining are gouging coal out as fast as they can without concern for the reserves," he said.

"They want to mine as much as they can as fast as they can and get the big money, but they are leaving too much mineable coal under the mountain."

"Some of them are getting no more than a 35 per cent recovery, and they are leaving coal that never can be mined again."

Auger mining involves the uncovering of outcrop coal seams by bulldozers, which lets the augers drill into the mountaintops and pull the coal out.

SELL A PAINTED ROCK

Surface mining of the outcrop seams usually produces coal inferior to that of the underground method, but that doesn't matter in the new market.

"You can paint a white rock black and sell it in this market," one operator said.

Mullins said that more than the high

prices is causing some of the frenzied strip and auger mining.

"The people are scared to death that strip mining will be prohibited on the mountain slopes," he said. "The people who own the coal and those mining it, too, want to get it out as fast as they can any way that they can."

And McDowell, of Harlan, said the manpower shortage can be blamed on more than Western Kentucky recruiters, and in spite of the higher-pay opportunities.

"You'd be surprised at what the black-lung law has done to the mine work force," he said. "It makes it easy for a man to say he has black lung and draw \$150 a month. The black lung law has reduced mine employment 15 per cent, those who'd rather draw \$150 a month for nothing than make several times that much by working."

PRESS RELEASE AND MEMORANDUM RELEASED BY TVA JULY 17, 1970, ANNOUNCING PROPOSED POWER RATE INCREASES

An estimated \$115 million increase in TVA power revenues during the fiscal year that began this month will be necessary to meet requirements of federal law, the agency said today.

New rate schedules now under consideration would increase rates to the region's consumers by about 23 percent over present levels, effective October 1. Details of the rate increase are now being discussed with representatives of the electric systems distributing TVA power.

Electric rates for TVA power will continue to be well below national averages. For residential use the average rate is expected to rise to about 1.25 cents a kilowatt-hour, from just over one cent last year. The national average is about 2.1 cents. Widespread rate increases in record amounts are under consideration across the country.

These figures include a small automatic rise in TVA rates that will take place August 1 under escalation provisions already included in its rate schedules.

Most of this needed increase is due to rapidly rising costs for the coal burned in TVA steam-electric plants. The August rate escalation takes into account last year's fuel expense, but total fuel cost this year is expected to be about \$60 million higher. TVA said factors involved in this increase include the rising demand for coal and "seller's market" price trends, the coal industry's costs of meeting mine safety and strip mine reclamation requirements, increased transportation costs and coal shortages, and delay in nuclear unit operation which will have to be made up by more expensive coal-fired generation.

In addition, short coal deliveries from suppliers and the resulting decline in reserve stockpiles at steam plants are making it necessary for TVA to buy expensive supplemental power from other electric systems to protect its remaining stockpiles.

TVA is required by law to charge rates which will produce gross power revenues sufficient to cover specified obligations: operation and maintenance expense, payments in lieu of taxes, payments to the U.S. Treasury, debt service on bonds, and a margin. The new rates are designed to produce the minimum revenue estimated to be necessary for these requirements, TVA said.

The average residential electric rate in this region dropped from about five cents a kilowatt-hour when TVA was established in 1933 to .89 of a cent in 1967—when rising costs required the agency's first general rate increase. The average has risen to 1.08 cents a kWh after two general rate hikes and last year's automatic escalation.

PROPOSED RATE INCREASE

Additional TVA power revenue is essential to meet rising costs, and this revenue must come through an increase in electric rates. TVA is required, under the TVA Act, to

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charge rates that will produce gross power revenues sufficient to cover obligations specified in the Act. The new rates are designed to produce the minimum revenue estimated to be necessary to meet these requirements.

The rate increase will provide about \$115 million of added revenue during fiscal year 1971. It will result in an increase of 30 to 25 percent in residential rates, and 25 to 30 percent in rates to large industries. Discussions are now under way between TVA and the local electric systems which distribute TVA power, and final details of the new rates should be ready for announcement soon.

The rate increase will be in two stages—on August 1 and October 1. Existing rate schedules provide that rates automatically will rise (or decline) in response to rises (or declines) in the cost of fuel and money. Because the cost of fuel and the cost of money rose during the past year, higher rates will take effect automatically the first of August. The adjustment will provide \$15.5 million of revenue to TVA during the remaining months of fiscal year 1971.

Unfortunately, the costs of the things which TVA must buy have been rising so rapidly that the automatic escalators in the present rate schedules are not adequate. These escalators are based on prior year costs, which means that any increase in rates and revenue lags rising costs by a year. If costs rise moderately, the lag would not cause a major problem. But in times like these, when major costs are spiraling upward so rapidly, this lag of a year becomes crucial. Forecasts of operating expenses and the escalators designed to meet changing costs could not anticipate the inflationary spiral that recently has been taking place, nor could they anticipate the series of events causing the cost of coal to skyrocket. Current estimates of operating costs for fiscal year 1971, which started July 1, are more than \$100 million higher than the estimates made barely 18 months ago.

About \$60 million of the increase in expenses is in the cost of coal, due primarily to the higher prices TVA must pay for the coal itself. The increase also is due to the rising cost of coal transportation, and the additional amounts of coal that must be bought to supply power that otherwise would have come from the nuclear capacity that had been scheduled to go in service this fall. This nuclear capacity has been delayed a year and a half.

TVA's cost of money this fiscal year will be \$18 million higher than was estimated only 18 months ago, because interest rates have continued to rise. The effective interest rate on a \$50 million issue of long-term TVA bonds sold in June was 9.8 percent. Interest charges on outstanding debt will be \$9 million higher than originally anticipated. Also, the dividend which TVA pays each year to the U.S. Treasury on the appropriations invested many years ago in power facilities will be \$9 million higher in fiscal year 1971 than originally estimated. The dividend rate is based each year on the average cost of money to the U.S. Treasury at the beginning of that year. That cost has risen now to nearly 6 percent and TVA's 1971 dividend on the \$1.1 billion of appropriations invested in power facilities will total \$65 million instead of the earlier estimate of \$57 million.

TVA has extensive arrangements for the exchange of power with neighboring electric systems. Under normal circumstances it delivers more power to neighbors than it receives from them and the exchanges normally produce a modest income for TVA. This year, because of delays in the completion of the Browns Ferry nuclear plant and because of the tight coal situation, TVA will receive more power than it delivers. The net effect of this shift will cost TVA about \$25 million more than had been anticipated.

There are other cost increases as well, including higher salaries and wages, and they add up to about \$9 million.

In addition to the \$15 million of revenue which TVA will receive from the automatic escalators in its existing rates beginning on August 1, it will need another \$100 million during the current fiscal year to comply with the TVA Act and to meet bond requirements. To provide it, rates will be increased effective October 1.

The proposed rates are substantial increases, and no one knows it better than TVA. However, after they take effect, rates will continue to be low in comparison with most other regions. TVA is not alone in needing additional revenue. Other systems also are raising, or planning to raise their rates.

A variety of factors are causing fuel costs to rise much more rapidly than the cost of most items. For one thing, there is a seller's market for coal and there is little or no price competition among coal producers. Through acquisitions and consolidations, most of the nation's coal reserves are owned by a relatively large number of companies. Most of the parent companies are major oil companies which also control much of the nation's gas, oil, and uranium reserves. The new owners are demanding a higher profit on their investment than was traditional among independent coal producers.

Transportation costs for coal are rising as the railroads take action to meet their rising costs. TVA supports mine safety requirements and laws requiring the reclamation of strip mined lands, but these requirements are adding substantially to its cost of coal. In some cases, these requirements are forcing mines to close because the owners lack the capital or lack enough coal reserves to justify the added investment, and this makes it all the more difficult to find a supply of coal.

The Browns Ferry nuclear plant, which TVA expected to have in operation this coming fall has been delayed a year and a half, requiring TVA to buy a great deal more coal. Other systems also have faced delays in placing nuclear capacity in service, and this has increased the demand for what little coal is available. For a variety of reasons, many coal contractors are failing to deliver coal at contract prices but are insisting on price adjustments, even to long-term contracts.

Finally, there is a shortage of rail cars which continues to delay the shipment of coal and makes it necessary to seek alternate modes of transportation and alternate sources of coal, always at higher cost than originally was planned.

From the nature of the expenses which are rising more rapidly—coal and money—it is apparent that the rising costs are largely beyond the control of TVA. TVA can neither absorb these enormously higher costs nor defer a rate increase, because only if it continues to meet its financial obligations can it continue to provide an adequate supply of power to the region's electric customers. TVA has done and will continue to do all that it can to hold its costs and its rates down.

[From the Wall Street Journal, Aug. 20, 1970]
TVA Says Coal Supply May Run Out, Cautions A Shortage of Power

KNOXVILLE, TENN.—The Tennessee Valley Authority confirmed that it may face power shortages later this year, because it might run out of coal.

A spokesman said that TVA's coal reserves have dropped to under two million tons from about 6.5 million tons only two years ago. The two million tons now in stockpile represent "a dangerously low level," the spokesman said. That much coal represents a reserve of only about 10 to 12 days, he added. "That's an uncomfortably low level to have in reserve, because of all the possible things that could happen to cut off regular coal deliveries," the spokesman said. As examples, he cited coal strikes, rail strikes and poor weather.

OVERHUNG PROBLEM

"Our overriding problem is fuel," the spokesman said. "In that sense, our problem is different from the problem in the New York area, where the difficulty is a capacity shortage."

Reasons why TVA's coal supplies have dwindled sharply include a shortage of rail cars and the impact of the Mine Safety Law "which, in effect, forced some smaller underground mines to close down," the spokesman said. "The basic problem, to sum it up, is that coal production isn't being expanded enough in relation to demand."

The biggest suppliers of coal to TVA in the past year were Peabody Coal Co., a subsidiary of Kennecott Copper Corp., and Island Creek Coal Co., a subsidiary of Occidental Petroleum Corp.

"Those two companies supplied TVA with a little over one-third of TVA's total used coal last year," the spokesman said.

Due to rising price of coal and interest, TVA recently announced its plans to increase its power rates generally by about 28 1/2 percent effective Oct. 1 and which would bring in about \$15 million a year.

AUTOMATIC RISE

TVA said that the overall rate increase includes a boost of about \$15 million resulting from an automatic rise that took place Aug. 1 under escalation provisions already included in its rate schedules.

About two million consumers in seven states now use TVA power. The agency has said that the new rate schedule would increase the average rate per kilowatt-hour for residential use to about 1.25 cents from just over one cent last year. The national average, according to a TVA spokesman, is 2.1 cents.

TVA has estimated that total fuel costs in the fiscal year that started July 1 will "be about \$60 million higher" than in fiscal 1970.

TVA is required to charge rates that will provide power revenue sufficient to operate and maintain the system, make payments in lieu of taxes to state and local governments, make payments to the U.S. Treasury as repayment on investment in the system, meet debt service on bonds, and provide a financial margin for additions and contingencies.

[From the Knoxville News-Sentinel, Aug. 4, 1970]

Coal Lack Could Cut TVA Power Output
(By Powell Lindsay)

WASHINGTON, August 4.—TVA will be faced with the prospect of shutting down four or five of its coal-fired steam plants this winter unless the coal shortage becomes less acute, says the manager of the TVA power system.

"Frankly, I'm scared," said TVA Power Manager James Watson, after testifying yesterday before a Senate Government operations subcommittee on electric power problems.

He charged that a growing energy monopoly is threatening to restrict coal supplies, plunging the nation into a power crisis.

ONLY A 12-DAY SUPPLY

Watson said TVA will have to shut off power to some customers if it has to shut down some steam plants for lack of coal.

"We have two million tons of coal stockpiled, but that's only a 12-day supply," the TVA official said. "Some of our plants have only a four-day supply on hand."

Watson said he did not want to speak for the nation's other power systems, but it is known that a shortage of coal to fuel electric generating stations is worrying utilities across the nation.

A group of utility executives, led by William B. McGuire, president of Duke Power Co., will meet Thursday with Interstate Commerce Commission (ICC) officials to discuss the most pressing aspect of the power shortage—a scarcity of railway coal cars.

But the long-range outlook for coal supplies is just as bleak, Watson said.

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"THEY DON'T CARE"

"Eight of the 10 major coal companies in the nation are owned by oil or metal companies," he said. "The oil companies say they don't really care whether they sell coal or keep it in reserve and later convert it to gas or chemicals. They say they won't open any new mines until they get the kind of return (on investment) they can get on gasoline."

AEO WOULD GO FIRST

TVA recently asked bids on a long-term coal contract for 140,000 tons of coal a week for a steam plant it has under construction near Cumberland City, Tenn. Only one company submitted a bid, for 20,000 tons of coal a week.

"What will TVA do if it cannot get the coal?" asked Sen. Edmund S. Muskie (D-Maine).

"We'd have to curtail our load," Watson replied. "The industrial loads first." Watson said the first customers to go would be two Atomic Energy Commission facilities at Oak Ridge, Tenn., and Paducah, Ky.

"We've discussed this with the IEC, the Federal Power Commission and with the President's office," Watson said. "We don't know anyone else to go to."

MUSKIE "SURPRISE"

Watson said TVA has considered switching over to oil-fired plants, but this has proven futile.

"We contacted every major oil company and every broker in the United States, but we haven't been able to find any oil. Most of the companies won't even come talk to us."

"You can't get oil from domestic or foreign sources, is that right?" asked Muskie.

"Yes, sir," Watson answered.

Muskie, eyebrows raised in mock surprise, remarked that the nation's oil companies are complaining that they need protection from low-priced foreign oil.

OTHER AREAS FEARFUL

Watson said he thought TVA would be able to survive the winter without cutting service by wheeling in power from neighboring power companies, but the operation would be costly.

He said he hoped the railroad coal car shortage would ease soon, thereby alleviating the short-term problem. But he said TVA might soon have to purchase its own hopper cars—at \$22,000 per car—to insure ontime deliveries.

Earlier, former FPC Chairman Joseph Swidler said that many coal cars were sitting at U.S. ports waiting to have their cargoes loaded on board ships for export.

Swidler echoed Watson's warnings about coal shortages in the East and Southeast. He said the Northeast also faces another winter of fuel oil shortages.

[From the New York Times, Aug. 25, 1970]

TVA WILL BUILD 3d NUCLEAR PLANT

KNOXVILLE, TENN., August 24—The Tennessee Valley Authority disclosed today that it planned to build a third large nuclear power plant. The disclosure indicated that, with troubles over coal supplies, T.V.A. was giving more thought to nuclear power production.

The plant would bring the authority's total nuclear power investment to over \$1-billion.

The Federal agency announced that the tentative site for the newest nuclear power plant was in Rhea County, one and a half miles downstream from Watts Bar Dam on the Tennessee River, between Chattanooga and Knoxville. It is 10 miles south of Spring City.

Bids from manufacturers for nuclear steam supply systems and fuel for the new plant are being evaluated, T.V.A. said. A new coal-burning power plant had been considered as an alternative, but an invitation

from the authority to the coal industry to offer fuel supplies for a large coal-fired plant produced no bids.

Coal piles are now low at T.V.A. steam plants and prices are up. There have also been fewer bidders for coal supplies. The authority said the cost of coal this fiscal year would be up about \$60-million and that prices nearly doubled in the last year. The rising cost of coal transportation has also been a concern.

Site preparation for the new plant will begin within 12 to 18 months, T.V.A. said. Construction must await a permit from the Atomic Energy Commission.

The plant is to have two generating units with a combined capacity of about 2.2 million kilowatts, making it similar in size to the Sequoyah nuclear plant now under construction northeast of Chattanooga. The two units are planned for commercial operation in 1976 and 1977.

The cost of the Sequoyah plant is expected to be nearly \$400-million. The latest plant proposed would cost at least that much.

The first nuclear power plant, under construction at Brown's Ferry in northwest Alabama, is to cost \$500-million. That 3.5 million kilowatt power plant, with 2,750 men at work on it, is the authority's largest current project.

In its announcement, the power authority said it supported mine safety requirements in the seven states that it serves in coordinating plans for the new plant with Federal, state, and local officials. This coordination includes environmental measures to protect water quality, air quality and aquatic life and consideration of other ecological factors of the project.

In its announcement, the power authority said it supported mine safety requirements and laws requiring the reclamation of strip-mined lands but added that these requirements were adding substantially to its cost of coal. In some cases, the authority said, these requirements were forcing mines to close because the owners lacked the capital or enough coal reserves to justify the added investment.

T.V.A.'s buying practices "have not and are not limiting them in any way, but the situation makes it all the more difficult to find a supply of coal," it said.

The authority had expected that the Brown's Ferry nuclear plant would be in operation this fall, but with a delay there, more coal has to be bought, it added.

[From the New York Times, Aug. 20, 1970]
U.S. OFFICIAL PREDICTS INCREASES IN THE NATION'S UTILITY RATES

WASHINGTON, August 19. — World-wide shortages and skyrocketing prices for fuel oil have hit American utility companies so hard that the result could be across-the-board utility rate increases for the nation's consumers, a high Nixon Administration official has said. The crisis involves residual fuel oil, used principally by heavy industry and utility companies. Since the first of the year, the price of foreign-produced residual fuel oil has doubled, and American fuel oil prices have increased by about 40 per cent. Nearly two-thirds of the residual oil used in this country is imported.

UTILITIES HIT HARD

"Utility companies are being hit hard," George A. Lincoln, director of the Office of Emergency Preparedness, said in an interview.

Asked if this meant a possible rise in electricity rates, Mr. Lincoln said, "It certainly does."

"In most places, there's a rate adjustment tied to the cost of fuel, so that when a utility company's fuel costs go up, electricity rates go up, too," Mr. Lincoln said. "It's the old story. When a company's operating costs go up, those costs are borne by the consumer."

"Some states have provisions that limit

such rate increases to industry users of power, but this is the exception. In most places increases are provided right across the board."

Mr. Lincoln would not predict when and by how much utility rates might be affected, but he held out little hope that much could be done to alleviate the crisis any time soon.

He was interviewed yesterday following a news briefing at which he discussed the Administration's decision earlier this week to scrap a proposed revision in the nation's oil import control program.

The revision would have substituted a system of tariffs on foreign petroleum products for the 11-year-old quota system. In abandoning the tariff proposal, the Administration decided to concentrate on improving the quota system.

Residual fuel oil, however, is not affected by the import controls. Because the nation's needs could never be met from domestic supplies, all limitations on importing foreign residual fuel oils were lifted in 1966.

CRISIS IS GROWING

But the crisis in fuel oil supply has continued to grow.

Since the first of the year, the cost of foreign residual oil has risen from about \$2 a barrel to a \$4 barrel, and American residual oil has gone from \$2.50 a barrel to \$3.60.

Coupled with the dramatic price rise, there has been a drastic increase in demand, Mr. Lincoln said.

Last year, he said, Americans used 1.9 million barrels of fuel oil a day and the projected average for 1970 is 2.3 million barrels a day.

As a result, the daily cost of fuel oil in this country today is more than twice what it was at the end of last year.

The shortages in fuel oil are attributed to a number of factors, including the Middle East political situation and growing demand worldwide.

One major cause for the increased demand, Mr. Lincoln said, was that residual fuel oil can be refined to a low-sulfur content, a major requirement in many air-pollution-control programs.

"Whatever cost we're paying," he said "should be chalked up to the cost of cleaning up our environment. If you're for clean air, then this is one of the prices you're going to pay. Nobody ever said it would be cheap to clean up our world, and we're just now finding out how really expensive it can and is going to be."

And Mr. Lincoln was unable to give assurances that fuel oil prices would not rise even higher.

"Frankly," he said, "I would think in the current situation, we'd be doing well just to hold them."

[From the Washington Post, Aug. 22, 1970]
ELECTRICITY FOR THE FUTURE—I: Big Oil Companies Acquire Grip On Competing Fuels

(By Morton Mintz and Robert K. Warner)

Since 1965 the nation's largest oil company has become one of the two largest holders of coal reserves. The same corporation, Standard Oil of New Jersey, has also become a principal operator in the newest competitor to coal and oil—uranium, the source of nuclear power.

In the last five years, most of the country's major oil companies have acquired significant holdings in every fuel, a trend that could end effective competition between oil, gas, coal and uranium and result in large increases in the future cost of electricity.

The trend is especially ominous in the uranium industry because nuclear fuel is expected to produce more than half of all electricity by about 1990.

Sen. George D. Aiken (R-Vt.) says:

"There is some group determined to get control of electrical energy in this nation."

At least 18 oil companies have invested in producing and processing uranium; one key step is entirely controlled by two oil firms. Although the petroleum industry now accounts for only one-sixth of uranium production, it holds 45 per cent of all known uranium reserves and makes more than half the new discoveries.

All of the 25 largest oil companies have natural gas interests, which may be inevitable since gas is usually found with petroleum. At least 11 of the 25 have significant interests in coal reserves. The two largest owners of coal reserves are both oil companies, and the petroleum industry as a whole accounts for at least 25 per cent of the nation's total production.

Six of the ten largest oil companies have interests in every other fuel.

The Justice Department's deputy assistant attorney general for antitrust warned last May against the growing concentration.

"While few forms of energy supply are not subject to some type of governmental regulation," Walker B. Comegys told the Senate antitrust subcommittee, "we cannot lightly forgo interfuel competition as the most effective long-term force for consumer protection in the energy field."

National Economic Research Association (NERA), a private consulting firm, compiled data for the Senate antitrust subcommittee showing the penetration of the 25 largest oil companies into other fuel industries.

Nine of the oil companies, some of them already corporate giants, had interests in all the other fuel sources—coal, gas, uranium and shale. They are Standard of New Jersey, second in sales volume among all American industrial corporations; Texaco, eighth in sales; Gulf, tenth; Ensh, 16th; Atlantic Richfield, 29th; Continental, 35th; Sun, 47th; Standard of Ohio, 97th; and Ashland, 101st. Not only are such firms buying competitive fuels, but because of their size they are in a strong position to subvert other kinds of industries that wish to venture into the energy field.

"The acquisitions by the oil companies across the energy market spectrum... may be viewed as classic horizontal integration on a scale comparable to the formation of the trusts in the latter decades of the nineteenth century," NERA said.

"In short, the oil companies, themselves portraying their activities as efforts at diversification, are in fact systematically acquiring their competition."

This economic concentration is occurring at a time when the Country is entering an era of unprecedented demand for electric power and growing difficulty in satisfying the demand.

Over the next five years, the national demand for electricity is expected to increase by at least nine per cent annually, or more than a 50 per cent increase by 1975. In the 10 Northeastern states and Maryland, power needs are expected to grow even more rapidly.

Should these increases continue beyond 1975, and the Federal Power Commission believes they will, the Nation's utilities must more than quadruple their power capacity in the next 20 years.

Opponents of the oil industry's involvement in other fuels say that the increased demand for electricity will give the petroleum industry a strange hold on utilities and on their corporations that depend on energy.

The oil industry has always dominated natural gas, but its penetration of other competing fuels was thin until the mid-1960s.

In September, 1963 Gulf Oil acquired Pittsburgh and Midway, a coal company that accounts for about 2 per cent of national production.

Then, on Oct. 13, 1965 Continental Oil Co. announced a break through: An agreement in principle to buy Consolidation Coal, the largest producer, which alone accounts for

about 12 per cent of total coal production.

The Justice Department did not challenge this first giant step by the oil industry into the territory of a rival fuel. The merger was formally completed in October, 1966.

Other acquisitions followed. In January 1968, Occidental Petroleum acquired Island Creek, the third-ranked coal producer with about 7 per cent of annual output. In August 1968 Standard Oil of Ohio acquired Old Ben, for another two per cent. Today, eight of the ten largest coal companies are owned by oil, mineral or large industrial concerns with interests in the energy field.

In addition, oil companies such as Humble, Jersey Standard's major domestic affiliate, have been spending millions of dollars each year to acquire thousands of acres of coal reserves which they do not mine despite the fact that utilities have been complaining of a serious coal shortage.

The oil companies say that current prices do not provide enough incentive for them to produce coal, and that their coal reserves are long-range investments for the time when they are forced by dwindling oil supplies to artificially convert coal into natural gas and oil.

Oil opponents say that petroleum companies are creating an artificial shortage of coal that will lead simply to higher prices.

The same acquisition trend exists in the nuclear fuel industry. Until 1966, only two oil companies were significant uranium producers. But in 1966, oil companies did 44 per cent of the drilling for uranium exploration and development. In 1969, they did 37 per cent.

David Freeman, of the White House Office of Science and Technology, told the Senate antitrust subcommittee last May that as of Jan. 1, 1970, petroleum companies controlled 45 per cent of the known uranium reserves.

NERA described the position of oil companies in the uranium industry as "truly dominant."

Kerr-McGee, an oil company, owns 23 per cent of total uranium milling capacity directly and another 4 per cent through a half ownership. This capacity exceeds that of any other firm.

Only two companies are in the business of converting "yellow cake," the uranium concentrate that results from milling, into UFG, a compound used in uranium enrichment. One is Kerr-McGee, which has building plans for half the national capacity. The other is Atlantic Richfield.

In the reprocessing field, which involves taking spent nuclear fuel and preparing it for further use, five plants are in existence or under construction. Oil companies own four of them.

There is one crucial step in atomic power that neither oil companies nor any other private enterprise controls. This is the enrichment of uranium by increasing its content of the fissionable isotope U-235. The complicated process is done only by government plants, at a fixed fee. The Nixon administration wishes to raise this fee by about ten per cent.

Members of the Joint Committee on Atomic Energy are resisting this increase but not because they disagree with the need for a specific price change. They object that the administration plan would be part of a new set of pricing guidelines that would be based not on the actual costs of running the plants, but on projections of 1980 costs of running a hypothetical new plant as "a commercial operation."

The Council of Economic Advisors defends the new guidelines, partly because it wants to make sure that the government is not unfairly subsidizing the uranium industry at the expense of competing fuels.

A Council staff member said that the real costs of enrichment are obscured by the advantages of using risk-free government

money, official bans on imports of foreign uranium and federal support of nuclear research.

A recent report by the General Accounting Office may have settled the issue, however, in saying that the proposed guidelines are of doubtful legality. The Joint Committee has reported out a bill that retains the existing criteria. But even if Congress passes it, the President could veto it, leaving the whole matter unsettled—along with the question of the increase's ultimate impact on the cost of electricity.

Today, an even more basic, long-range issue is unsettled.

At present, a crucial step in converting uranium into usable fuel is accomplished at three gigantic government plants in Oak Ridge, Tenn., Paducah, Ky., and Portsmouth, Ohio.

These gaseous diffusion plants were built by the government for \$2.3 billion. The government still owns them, although they are operated by private companies, Union Carbide and Goodyear. As a crucial link in the economic chain that establishes the price of nuclear power, these plants and their product have a profound effect on the competitive sources of electricity—coal, oil and gas.

Originally the plants were built to make material for nuclear bombs and they still do. But defense needs have begun to diminish and demands for the same kinds of materials for peaceful nuclear fuel has begun to increase. This demand for nuclear fuel is still relatively small.

The Federal Power Commission estimates that this year nuclear power will provide only 4 per cent of all electricity. Commission figures show that in 1969, coal generated 49 per cent of electricity; natural gas, 23 per cent; and oil, 9 per cent.

Hydro-electric power accounted for 17 per cent, but it is expected to decrease, since most profitable sites of falling water have already been exploited.

But most authorities agree that we are on the threshold of a rapid expansion of the role of uranium in generation of electricity. While in 1970 nuclear reactors produced only 4 per cent of electricity, by 1980 they are expected to produce 29 per cent and by 1990 about 52 per cent.

There are clear reasons for the expected rise of nuclear power. The demand for power is rising rapidly, both from an expanding population and the dependence on ever-larger numbers of devices run by electricity. If nuclear power does not contribute substantially to these new demands, then the projected use of electricity will have to be reduced and the price of electricity greatly increased.

Another reason to expect more nuclear electricity is the rapid rise in the last two years of the cost of coal and oil.

Rep. Chet Holifield (D-Calif.), chairman of the Joint Committee on Atomic Energy, points out that in 1969, power companies paid 28 cents for the quantity of coal needed to produce one million British Thermal Units (BTUs).

In 1969 they paid 30 cents. But last March they had to pay 35 cents and in April 38 cents. A survey by The Washington Post found that some utilities in non-mining areas are now paying about 40 cents per million BTUs, and they expect the price to climb higher.

Before year's end, Holifield warns, the price of coal may be 50 per cent higher than in 1968. And the requirements of many areas for low-sulfur coal, because of air pollution, pushes the fuel's price still higher.

Thus, whatever changes the status of nuclear fuels will have an important influence on the competitive position of coal and oil.

In the view of some, government involvement in the nuclear industry represents a dilution of private enterprise and unfair competition for coal and oil.

For others who fear a growing monopoly

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on fuels, the nuclear plants represent the only major fuel installations beyond the control of the present energy entrepreneurs.

President Nixon has announced that he intends to sell the government enrichment plants to private industry "at such time as various national interests will best be served."

The possibility of selling the plants was suggested long before the Nixon administration took office. Four years ago the Atomic Industrial Forum, a nuclear trade association, appointed a committee to study the future of the plants.

The committee was chaired by Kenneth D. Nichols, an AEC general manager during President Eisenhower's first term who has worked in recent years for Gulf Oil, the Mellon family and other concerns.

The group concluded, in June 1968, "It is desirable and feasible for the AEC to transfer its enrichment plants promptly to the private sector."

One of the committee's seven members was not so sure. William M. Caplan, then an economist at the Brookings Institution, attached a footnote to the committee's report, expressing doubt that "if these plants are sold, the private market thereby created would operate in a sufficiently competitive manner so as to adequately protect the public's interest."

The efficiency of the three gaseous diffusion plants has never been questioned. They are among the largest industrial operations in the world, with a floor space of 640 acres and energy requirements of their own that in 1964 used 4 per cent of the Nation's electricity. If the plants are doing so well, why does the administration want to sell them?

"Sale of these plants could free federal resources for more pressing national uses," the President said last November. "In addition, \$2 billion or more is expected to be needed over the next 10-15 years to expand plant capacity to meet increased commercial demand."

If nuclear generating plants are built as expected, current enrichment capacity will be adequate only until 1978 or shortly thereafter, when new plants, major additions or new technology become mandatory.

Because new facilities take at least six years to build, new projects will have to be started soon to meet needs at the end of the decade. Some officials, such as Atomic Energy Commissioner James T. Ramey, say the new projects should have begun some time ago.

At this point private enterprise has shown little interest in buying the plants.

For some time, the plants have been operating at only 40 percent of capacity or less, and even at this low level, they have built up a stockpile of enriched uranium that would last the nation's nuclear generators for some 18 months. A purchaser would have to tie up a huge investment for years before the plants would operate near full capacity.

Yet long before the plants approach capacity it will be necessary to start expanding them to meet future needs—a costly venture but a necessary one if the nation's power demands are to be met.

For the past three years, the AEC has been seeking funds for a \$407 million "Cascade Improvement Program" that would increase enrichment capacity by about 25 percent over a six-year period, at the same time, reduce the average cost of enrichment by about ten percent.

Until this year, the project has been given low priority by the Bureau of the Budget, leading to charges from Sen. Albert Gore (D-Tenn.), a member of the joint committee, that the administration is trying to weaken the plants to help justify their sale.

"What they want to do is turn our nuclear fuel facilities into a shambles by refusing to make improvements," Gore said. "Then they'll say that private enterprise must be brought in to improve things."

A high Budget Bureau official said that the Bureau of the Budget found it "imprudent to build to capacity on estimates alone." He said, however, that the needs for nuclear power are such that a decision probably should be made on support of the Cascade program for the year beginning next July 1.

Even if implemented, the improvement program will add only enough capacity to meet needs for two more years, by current estimates. By 1980, a new \$1 billion diffusion plant will be needed—and a decision on whether to build that plant must come by 1974 to insure operation by 1980.

Several members of the Joint Committee have been looking for alternative ways to cut back on the demands for enrichment in order to avoid making such overwhelming expenditures. Among the possibilities:

Licensing a foreign nation or consortium to build and operate its own enrichment plant. Nearly half the work now done in the three U.S. plants is for foreign countries.

Increasing the efficiency with which nuclear fuel is used. For some years the AEC has been doing research on a "fast breeder reactor" that might create great quantities of plutonium—a valuable nuclear fuel not yet feasible for electricity—while burning U-235.

Developing a new "centrifuge process" for enriching uranium that would end total reliance on the gaseous diffusion plants. The centrifuge would entail much smaller capital costs than the diffusion process.

While the huge size of the three diffusion plants limits potential buyers to the very richest corporations, the centrifuge might be purchased and operated by a number of smaller companies. But it, like the fast breeder reactor, is still far from commercial feasibility.

A bipartisan alliance of legislators, many of them members of the Joint Committee on Atomic Energy, fears that if the plants are sold, only the giant oil companies—fortified by such financial advantages as the depletion allowance and import quotas—will have the resources to buy them.

Committee member George L. Aiken, a Vermont Republican, believes that the proposed sale of the plants is a political favor to the petroleum industry.

"The President probably feels indebted to those who helped elect him," Aiken told The Washington Post.

The economic stakes for consumers are huge. Testifying last year before the Joint Committee, Philip Sporn, retired president of the American Electric Power Co., the nation's largest utility holding company, estimated that private ownership of the plants would cause an increase of as much as 50 per cent in the total cost of nuclear fuel.

The National Rural Electric Cooperative Association said that by the 1980s, when nuclear fuel may account for more than one-third of generated electricity, such an increase would cost the American public \$1 billion a year in higher electric bills, and perhaps more. If the fossil fuels raise their prices to take advantage of the reduced competition from nuclear fuel.

Sen. Aiken said that sale of the plants would be "the most advanced step toward private control of the Nation that has ever occurred."

"When you control energy—and oil interests now control coal and are on their way to controlling nuclear fuel—then you control the Nation," Aiken said. "I see this as a very serious threat to political democracy."

Today there are several sources of energy, although their control is quickly consolidating. Some power plants are even designed to switch from coal to oil or natural gas depending on which bids lower on fuel contracts. But many utility companies fear that in the near future, when they shop around for fuel they will find only one store.

Twenty years from now nuclear power—today only an infant in electrical generation—will be a powerful force, providing

more than half of all American electricity and therefore creating the competitive yardstick by which other fuels will be sold.

Decisions made in Congress and the White House in the next few years will determine whether it will be a vigorous competitor or a silent partner to the present fuels.

[From the Washington Post, Aug. 24, 1970]
ELECTRICITY FOR THE FUTURE—II: UTILITIES TURN TO THE ATOM AS COST OF FOSSIL FUEL SOARS

(By Thomas O'Toole)

When it comes to generating electricity, King Coal is losing power: the heir apparent is uranium.

The evidence is nowhere more convincing than at the Tennessee Valley Authority. That mammoth electric utility is located in the heart of the nation's coal country, but it is building three of the world's largest atomic power plants.

The country's private utilities figured that if TVA thought the atom could compete with coal, White House energy adviser David Freeman said recently "then by God there must be something to nuclear power after all."

The turn to atomic power comes at a crucial time. In many cities there is already a power shortage and in the next 50 years the national demand is expected to double. At the same time the conventional fuels—coal, oil and gas—are rapidly increasing in cost. Measures against pollution will make them more costly still.

There are only 16 atomic plants generating electricity in the United States now, but 98 additional nuclear power plants are being built or are in the active design stage.

What's more, 80 per cent of these new atomic plants are what utility men call "big," plants able to deliver more than 750,000 kilowatts apiece. Scattered about 27 states and Puerto Rico, these 98 plants represent an investment of almost \$23 billion and an electrical output of almost 90 million kilowatts, which is as much electricity as the entire country generated 15 years ago.

While TVA's decision to go atomic may have triggered it, there is far more to the sudden boom in nuclear power.

First is the fruition of postwar atomic research. The Atomic Energy Commission and the Navy have spent almost \$5 billion in the past 20 years to develop nuclear power, and these expenditures have begun to pay off in terms of accumulated experience and understanding.

"We've put nuclear reactors into 98 submarines and we have 17 years experience operating four commercial atomic power plants," said John Simpson, president of Westinghouse Power Systems Co., which has won more than a third of the new atomic orders. "Believe me, it's helped us."

Something that has helped at least as much is the steady rise in the prices of coal and oil, the atom's two toughest foes in the struggle for electric power dollars.

While the cost of enriched uranium has barely budged, oil (used in nine per cent of today's U.S. power plants) has risen 50 per cent in price the last five years to about 40 cents per million BTU's of energy, twice that of uranium's.

Many cities have also passed anti-pollution laws requiring utilities to burn only low-sulphur oil, which costs more than conventional heating oils that contaminate the air with sulphur dioxide.

"We burn oil in seven of our plants," says John Kemper manager of engineering for Philadelphia Electric Co. "Turning to low-sulphur oil in these plants increases our fuel bill by \$10 million a year."

More important is what happened to coal, which heats steam for 68 per cent of the electric power plants in the U.S.

Coal is now scarce, partly because of labor troubles, partly because of productivity declines and partly because of rail car shortages. A survey taken last spring by the Fed-

eral Power Commission found coal shortages at more than half the power companies surveyed, including Virginia Electric and Power Co., Chicago's Commonwealth Edison Co., and the Tennessee Valley Authority.

Coal's price is climbing even faster than oil's. Duke Power Co. President W. B. McGuire said recently the utility's coal cost rose from 28 cents per million BTU in 1968 to 30 cents in 1969, to 35 cents last March, to 38 cents a month later and will reach 42 cents before the end of 1970.

"We're in an era of high fuel costs," McGuire told the North Carolina Utilities Commission two months ago, "and we will be until this company can convert to atom-powered fuel."

Despite such strong endorsements, the new atomic power industry is having exasperating growing pains.

One reason is that atomic power has special costs that are getting more expensive every day. It's true that uranium, the nuclear fuel, costs less than coal and oil. But the costs of constructing atomic power plants are almost 50 per cent higher than fossil fuel plant costs.

While general construction costs were climbing 60 per cent in the past five years, atomic power plants were doubling in price, to \$220 a kilowatt compared to \$160 for plants using coal.

A striking example of escalating atomic costs is the pair of million kilowatt nuclear plants being built at Peach Bottom, Pa., by Philadelphia Electric Co. They will cost \$400 million apiece, an unthinkable price 10 years ago.

"There are many reasons for this, including the fact that we spend twice as much time engineering atomic power plants," said Howard M. Winterson, vice president of Combustion Engineering Co., one of the nation's four major atomic equipment suppliers. "Why, we spend \$1 million a year on rent for a computer that does nothing but compute specifications for nuclear reactor vessels."

Strikes and shortages of skilled labor aggravate the normal trial-and-error of any new industry. These were made worse by poor planning by electric companies. In one recent 30-month period, utilities overwhelmed the four major suppliers with 60 new orders for nuclear plants. This sudden burden was a major cause of construction delays of atomic power plants, now averaging 11 months.

Exotic materials, precise design requirements, and a new technology sometimes make nightmares of construction plans. Take the case of the Oyster Creek plant of the Jersey Central Power & Light Co. at Tom's River, N.J. Last September it began generating electricity more than two years behind schedule.

To begin with, the plant's 600-ton reactor vessel, or container, was shipped to the Oyster Creek site sooner than expected.

"They stored it in the open salt air like it was a lawn mower," recalls one AEC official. "It's no wonder what happened."

The AEC man claims that the workmen uncrating the reactor vessel bent its intake and exhaust nozzles. This took weeks to correct.

A second delay came about when inspectors found cracks in the welding of all but nine of 137 steel sleeves located where the drive mechanism for the control rods penetrates the pressure vessel. The AEC is convinced the cracks came from the corrosion of sea air. In any case, it took a year to coat the tubes with a more protective alloy.

Next came what one observer called the "case of the vanishing records."

Houston's Alloy Tube & Pipe Corp. had supplied stainless steel pipe for the Oyster Creek plant just before the Texas firm merged with Ohio's Armo Steel Co. In the course of the merger, the records of the pipe's production and testing were either lost or mislaid.

Since the AEC demands rigid testing of all atomic plant parts and documentary proof of the testing, it insisted on records for the pipe. This meant new tests. By this time the piping was already installed at Oyster Creek. So the stainless steel pipe had to be removed and retested, delaying Oyster Creek's start-up another 10 weeks.

The results of delays like these are not soothing for utility men to contemplate. Jersey Central Power & Light, while waiting for Oyster Creek to start producing cheap nuclear power, had to spend \$60,000 a day buying power from its neighbors at twice what Oyster Creek power was supposed to cost.

Watching debacles like Oyster Creek from afar, many utilities have either held off on buying atomic plants or have canceled plans to build them. The AEC admits that as far this year its electric power companies dropped plans for atomic power. The commission expects one or two more to follow suit before the year is out.

Other firms hedged their bets by installing excess fossil fuel capacity while waiting for their nuclear plants to be built.

"We decided we couldn't count on the nuclear plants coming in on time," said Donald C. Cook, president of American Electric Power Co. "None ever had, so we're building enough fossil capacity so that even if they never come in we'll have enough energy. All we want our customers to know is that when they press the switch they'll have enough power."

What worries power experts the most about nuclear plants is their complexity and the overwhelming need to keep them completely safe. These two requirements have forced numerous shutdowns of atomic plants in the last few years.

A typical complex incident occurred a few years ago when nickel-plated silver-cadmium control rods in a reactor corroded, flooding the reactor core with contaminating silver from the insides of the rods.

"The plant operator had to scrap \$750,000 of core parts," said A. Nelson Tardiff of the AEC's Division of Reactor Development. "The plant was contaminated with silver and the accumulated downtime to effect clean-up amounted to two months."

In 1968, all of the 11 atomic power plants then operating were shut down from time to time for minor repairs. Five of them were closed for a total of 27 months because of major break-downs. The 23,000 kilowatt plant at Elk River, Minn. was shut down in February 1968 because of reactor leakage and was never started up again.

A year ago, 12 plants were in operation and enough troubles were encountered to shut down eight of the plants for a total of more than 80 months. The 50,000 kilowatt LaCrosse Boiling Water Reactor at Genoa, Wis., had to be closed five times for seven months due to breakdowns.

This year, there are 16 plants in operation and so far there have been three major shutdowns.

Jersey Central's Oyster Creek plant was closed from Apr. 19 to May 22 when the hydraulic seals in the drive mechanisms of six control rods failed. Niagara Mohawk's Nine Mile Point plant was closed Mar. 30 by three cracked parts in a furnace and not reopened until July 12.

Most recently, Consolidated Edison's Indian Point plant was closed May 20 by a broken thermal sleeve in a nozzle connection in the primary cooling system and by cracks in a nearby pipe. At the earliest, Con Ed hopes to have the plant back generating power sometime in September.

"We're dealing with an infant technology," says Milton Shaw, director of the AEC's Division of Reactor Development. "I know the utilities assumed that nuclear power brought with it inherent imperfection, but this business is a tough one."

It's been very tough on the companies in

the business of nuclear supply, the firms that make and deliver the reactor vessels, the nuclear fuel elements, the valves, pipes and turbines that make up an atomic steam supply system.

Fewer than half the firms that started out in the atomic power business are still in. The dropouts include such well-to-do giants as Foster Wheeler Corp., American Machine & Foundry Co., and Allis-Chalmers Mfg. Co. The main reason such firms have dropped out of nuclear power is the red ink that has bathed the entire industry for the last 15 years.

One firm, Combustion Engineering, figures it has spent \$60 million on nuclear research and development, none of which it has recovered through profits. Westinghouse's John Simpson says his firm has spent over \$100 million on atomic R & D, but thinks Westinghouse might turn a profit this year for the first time.

"We'll be the only ones to do so," he says. General Electric has probably lost the most money on atomic power, but part of its losses might have come from the deals it struck in the early 1960's attempting to launch the atomic industry. By one account, GE lost more than \$100 million on the Dresden atomic plants it built for Commonwealth Edison and an estimated \$50 million on the Oyster Creek plant it put up for Jersey Central.

The company that has suffered the most in atomic power has been Babcock & Wilcox Co., which a year ago admitted that it was behind schedule on every one of the 28 nuclear pressure vessels it was putting together in its Mount Vernon, Ind. works. The resulting losses sank profits to low last year to cover the dividend. A vice president of the company committed suicide.

Despite the losses and the suffering, the companies that make up the atomic industry see a bright future for nuclear power.

"I think we all feel the future is nuclear," says Combustion Engineering's Howard Winterson. "We've had some discouraging years, but our costs should begin to level off and when that happens atomic power will be in a better over all competitive position than coal and oil."

Westinghouse's John Simpson said a recently completed study of fuel prices has led his company to predict a steady decline in atomic fuel costs to about 17 cents per million BTU by 1980 and a rise in the cost of coal to about 45 cents per million BTU.

Utility experts are also convinced that pollution laws will drive more power companies away from coal and oil, even the relatively clean low-sulphur forms of both. Only last month, Los Angeles County Judge Bernard S. Jefferson turned down a utility's appeal of a Los Angeles County ban on a new oil-fired plant it wanted to build at Playa del Rey.

"We're converting energy and no matter how you do it there's an impact on the environment," says Philadelphia Electric's John Kemper. "We feel the nuclear plant is the cleanest way to do it."

Though it electrifies only about 4 per cent of the power lines in the U.S. today, atomic power is destined to take on an ever larger role in power generation.

The Atomic Energy Commission expects that by 1980 atomic power plants will be generating 180 million kilowatts of electricity in the U.S. Most experts don't think it will get that high, but most of them agree that at least 130 million kilowatts will be nuclear by 1980, which will still be more than 20 per cent of the U.S. total in 10 years.

The AEC now believes that half the new electric power plants being ordered by utilities in 1980 will be nuclear, that 75 per cent of the orders in 1990 will be nuclear and that by the year 2000 nuclear's share of new orders will be 90 per cent.

If this happens, half the electric generating capacity of the country will be nuclear by 1990 and almost 60 per cent by 2000. There

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will be 450 atomic power plants in the country by 1990 and 950 by the year 2000, generating more than 1.1 billion kilowatts of electricity.

"I don't see how it can turn out any other way," says the AEC's Milton Shaw. "Coal and oil prices are going to keep going up, and there seems no way of getting the sulphur out of them to anybody's satisfaction. Atomic power is the only answer."

Mr. AIKEN. Mr. President, will the Senator from Kentucky yield?

Mr. COOPER. I yield.

Mr. AIKEN. Mr. President, I am very glad that the Senator from Kentucky and his associates have introduced this resolution calling for an investigation of the coal business. I would hope that it would also include all forms of energy in order to be successful.

I read, I believe this morning, that the price of coal at the mine might increase 50 percent in a year. It has already increased more than that up in the northeastern part of the country. The coal that cost \$5.50 a ton at the mine in January is now \$8.50 per ton. When we add to that the increased cost of transportation, it is nearer 75 percent, in the past 6 months.

I was quite disturbed a few years ago, when witnesses appeared before the Joint Committee on Atomic Energy and frankly stated that 12 to 14 companies could well take care of all the energy required in the United States.

That was, of course, the first indication we had that a monopoly was being planned. But they have gone on from there. It is true that oil companies have gone into other sources of energy in a big way. I think that the latest announcement was the announcement of Jersey Nuclear, a subsidiary of Standard Oil of New Jersey, that it had entered into a \$70 million contract to furnish energy fuel for a nuclear powerplant. Of course, they are not off on a wild goose chase. They know that nuclear powerplants are practical, that they are a necessity, and they intend to control them.

The head of one of the largest distributing systems in the country came before our committee one day and stated that he was very much opposed to the sale of three Government-owned gaseous diffusion plants which now produce fuel for the nuclear energy plants in this country. He said, "If they control our fuel, they will control us." This was the head of one of the biggest electrical distribution systems in the United States.

What disturbs me most is the extreme vigor and energy that these people put into any effort to put them under the antitrust laws of the United States. They apparently are determined to make every possible effort to avoid coming under the antitrust laws.

I hope, as has been stated by the Senator from Colorado (Mr. ALLOTT), that the study will include other energy sources. There is without doubt a determined effort made by this group which would seek control of the energy supply of the United States. That indeed means control over the economy and over the security and over other operations of a democracy.

I think we have to face it and see to it that these people do not accomplish

what they apparently hope to do. They have the money to develop power. We need to have power developed, but it should be developed under rules and regulations. Particularly, the antitrust laws should apply.

I have no objection to big business or big oil companies going into the nuclear power business but I am decidedly opposed to giving them advantages, legislative or otherwise, which could lead to a monopoly over the bloodstream of our country.

Mr. THURMOND. Mr. President, will the distinguished Senator from Kentucky yield?

Mr. COOPER. Mr. President, I yield to the Senator from South Carolina.

Mr. THURMOND. Mr. President, I commend the able and distinguished Senator from Kentucky for his leadership in this matter.

The shortage of coal is becoming an acute problem in the southeastern section of the United States. Institutions, industries, and utilities are quite seriously affected.

There is a shortage, I recall, in one utility that serves a large portion of my State. They are deeply concerned.

It is my thinking that this investigation will be most helpful. I sincerely hope that it will result in more coal being made available to the utilities, industries, and institutions throughout the country. I am convinced that a larger portion of our coal is now going to Japan. The facts show this. I have been told that the Japanese have offered a larger price than is paid locally. Therefore, the coal is being shipped abroad.

It is possible that the provisions of the Export-Import Act might be invoked. At any rate, this investigation should be made. I feel that it will result in a great betterment of the situation.

I am very pleased to join with the distinguished Senator from Kentucky on the resolution.

Mr. COOPER. Mr. President, I thank the Senator from South Carolina. I know that the Senator has expressed before his concern about the shortages that exist in his own State.

In introducing this resolution, I recognize that there will be much study and investigation. The results may not show up immediately or quickly. But I hope that, by introducing the resolution and bringing it before the Senate again, we can have a discussion in the Senate and search out ways that would be helpful in the present situation.

I think we should use our influence, such as it is, to see if it is not possible to secure better procedures in the release and routing of cars which could be of immediate help.

I think that some action by the Antimonopoly Subcommittee of the Committee on the Judiciary to resume its hearings—and I understand that they will do so—could have some effect upon the concentration of power over competitive fuels.

I think that many things could be done. I intend to press this matter and urge at least a right-of-way from the Department of Transportation and any other means to secure better use and

routings of the available coal cars which we used to call gondolas.

Mr. SPARKMAN. Mr. President, will the Senator yield?

Mr. COOPER. I yield.

Mr. SPARKMAN. Mr. President, I was very much interested in the matter the Senator brought up. I commend him for this. I was not on the floor when he commenced his remarks, and I have not heard all of them. I do understand, though, that the Senator is introducing a resolution.

Mr. COOPER. The Senator is correct.

Mr. SPARKMAN. Mr. President, I would be very happy if the Senator would permit me to join in cosponsorship of the resolution.

I might state that we are very much interested in this matter in Alabama because of the importance of power in the State of Alabama. Furthermore, as the Senator knows, the Tennessee Valley Authority which serves our area, is, if I am not mistaken, the biggest producer and user of coal in the world.

Mr. COOPER. Mr. President, I might say that that was the testimony of Mr. Wagner about 3 weeks ago before the Committee on Public Works. He claimed it was the reason for the increase in their power and also explained why it was necessary for their self-authorization financing to be increased. That caused me to introduce the resolution.

He told me and told the committee their reserve of coal was about 3 months. And there was less than a week's supply. They can hardly contract for coal, even though coal is selling for \$10 and \$15 a ton at the mouth of the mine.

Mr. SPARKMAN. Mr. President, not only is the reserve dangerously low, and it is, but they simply cannot find the coal. They cannot get it.

I have been very much interested in this for some time, and I have made remarks on the Senate floor several times with reference to the threat of a power shortage in many parts of the country, and particularly in the Eastern Seaboard.

I had felt for a long time that down our way we were rather secure because of the Tennessee Valley Authority. Then we had this impossible situation involving the getting of coal. I think it is a matter of great concern.

The Senator knows that the Tennessee Valley Authority started a couple of years ago to build the world's largest nuclear powerplant not very far from my home. Originally it was their plan that the generator would go into operation on October 1 of this year.

Now it has to be postponed and it seems it will be 1972 before that plant can come in and produce the power they had looked forward to so much for supplementing the power they get from the dams and steamplants throughout the whole area.

I serve as chairman of the Joint Committee on Defense Production. This matter of power shortage came to my attention 6 or 8 months ago and I have commented on it several times.

I understand it is entirely possible that to some extent we will have a power shortage here in the Nation's Capital, probably not more than a brownout or a lowering of voltage, but it will be a short-

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age of power that otherwise we would want, we would need, and that we would use. I understand there is plenty of coal in the ground.

Mr. COOPER. Plenty.

Mr. SPARKMAN. It is a matter of getting it out. It is a matter of getting the smaller mines back into operation.

Mr. COOPER. The Senate and the House of Representatives passed a bill and I predicted what would happen if we closed them. They are now stripping coal, with all the awful effects of that.

Mr. SPARKMAN. I joined the Senator in that protest made on the floor of the Senate about the effect it would have on small mines. But we must do something to get the coal coming out of the ground.

I thank the Senator for taking this step.

Mr. COOPER. I thank the Senator from Alabama.

Mr. COOK. Mr. President, will the Senator yield?

Mr. COOPER. I yield.

Mr. COOK. Mr. President, as a co-sponsor of this measure, I want to point out that the Senator from Washington (Mr. Magnuson) said something should be done in the next year or 15 months, if the record will bear me out. The only point I really make, and I know my distinguished colleague agrees in regard to this resolution, is that time is truly of the essence. There can be no question about this at all.

I met with a group of people not long ago in western Kentucky. They had just secured a major industry. They wanted to know what they could do to develop more. The first thing I said was that a complete survey should be made of their potential for electric power in the immediate future because they might find themselves making a tremendous community investment for more industrial development and then find they could not have it because the source of energy is not there.

It was not too long ago in another facility in western Kentucky we had to make arrangements to cross grid and bring in electricity from southern Indiana so we could keep a plant in existence until a present facility is enlarged enough to produce adequate power.

As we develop this resolution and debate on it on the floor of the Senate, the one thing we should make absolutely sure of is that time is absolutely of the essence for the people of this country in regard to this matter.

Mr. COOPER. The Senator is correct. I think we can do something about this matter.

I yield the floor.

[EXHIBIT II]

Excerpts from hearing before the Subcommittee on Flood Control—Rivers and Harbors, Bills to amend Section 15d of The Tennessee Valley Authority Act August 14, 1970

* * * * *

Senator COOPER. Yes, Mr. Chairman.

Senator BAKER has mentioned that \$5 billion was authorized by the House, and that his bill, S. 3967, would call for \$5 billion instead of the present authorization level of \$1,750 million. Is that correct?

Mr. WAGNER. Yes, sir, that is correct.

Senator COOPER. Do you still hold to that position? I understand that \$5 billion is the amount you require?

Mr. WAGNER. Senator Cooper, our position is that \$3.5 billion will permit us to continue for 2 to 4½ years, depending on the way some of the loads grow.

As long as we have authorization when we need it, this is the important thing to us. As I indicated in my statement, the administration has felt that the doubling of the present authorization of \$1,750 million to \$3.5 billion is sufficient for this time, and we support that position.

Senator COOPER. The last increase was for \$1 billion; is that correct?

Mr. WAGNER. That is correct; yes.

Senator COOPER. Has all of that amount been obligated?

Mr. WAGNER. It has been obligated to the extent that to complete the capacity which we now have started and under construction will take all of this authorization to do that, so that if we wanted to start, or we want to place a firm contract, as we must have soon, for some additional generating capacity, we would need to have the additional authorization available, so that we would know we could sell the bonds needed to complete that capacity.

Senator COOPER. You mentioned certain facilities that are now being constructed—nuclear plants, and, I believe, one coal-fired plant. Do you have an authorization sufficient to borrow the money, to complete the construction of these facilities?

Mr. WAGNER. Yes; the authorization that we have now would enable us to complete the construction of facilities that are now under construction. It would not permit us to start construction of additional facilities.

Senator COOPER. I note that Mr. Shultz, in his letter, states:

Now because of the tenuous nature of projecting the growth of peak demand, coupled with the uncertainty of AEC's future power needs which are served by TVA, we believe that an increase as large as 2.35 billion should not be made at that point.

Do you consider that your estimate of future TVA power needs may be of a tenuous nature?

Mr. WAGNER. Well, Senator Cooper, any estimate is an estimate. You can't be sure that it is going to come out the way you anticipate, but we make these estimates based on fairly firm data. We have the trends of the past, and we know something about the plans of our existing customers for their expansions in the future, and the estimates are as good as we can make them.

Our experience in the past has been more often that we have underestimated than overestimated, I believe. It goes both ways, but in general, our estimating has been pretty good.

One of the criticisms being leveled nationally at the electric utilities industry now is that it is not doing or has not done its advance planning. We have tried to do that in TVA, and so far, quite successfully.

And this is where our estimates fit in. It is why we have the capacity now that we need; it is why we need the additional bonding authority, so that we can start the capacity now that we are going to need in 1976 and the years beyond.

The question of the amount of leadtime that is required is a little hard to estimate. At the present time, we think it will be 6 years. Not very long ago, 4 years was enough but this is a problem that affects the estimates.

Another problem that affects them is what will happen to interest rates, and that affects not only us but consumers in the region.

Senator COOPER. Well, your statement noted that TVA is providing power for 11 Federal plants. I assume that the largest would be the AEC plants at Oak Ridge and at Paducah?

Mr. WAGNER. That is correct.

Senator COOPER. Do you have a term contract to provide those installations with power for a number of years ahead?

Mr. WAGNER. Yes; we have contracts with them, and we start capacity to serve them only when we have firm contracts at hand.

Now, they do indicate to us what their planning is for the future, and when I said that the \$3.5 billion would last us from 2 to 4½ years, a part of that range is accounted for by this situation. If AEC continues to take power only under the present contracts, the longer period of time would be applicable, somewhere in the neighborhood of 4.5 years.

If, however, they should require power to meet the largest planning programs that they have discussed with us, we could run out of bonding authority in 2 years or a little more.

Senator COOPER. I have information that you are currently providing 1,340 megawatts to Oak Ridge and Paducah, and that this load will increase by the spring of 1976 to 3,165 megawatts. Is that correct?

Mr. WAGNER. Yes; that is correct.

Senator COOPER. Well, there is a steady increasing demand for power from those two plants.

Mr. WAGNER. That is correct. And the capacity that we now have under construction will enable us to meet that demand.

Senator COOPER. Will the facilities you intend to construct to meet your future power requirements be all atomic plants?

Mr. WAGNER. No, sir; we have under construction two large atomic plants, a large coal-burning plant, and we are beginning construction of a pump storage facility. Those are the large ones that are now under construction.

Senator COOPER. From here on out, do you expect to build only nuclear plants?

Mr. WAGNER. I didn't get the question, sir.

Senator COOPER. Looking ahead, with respect to new facilities that must be built to supply power, will they be only nuclear plants?

Mr. WAGNER. I don't think we would say that at this point, Senator. It depends on what the relative competitive position is. We will build whatever kind of plant that will provide energy for the consumers at the lowest cost.

When we undertook our first large nuclear plant at Brown's Ferry, we took alternate bids on a coal-burning plant and its fuel supply and a nuclear plant and its fuel supply, and in that instance, the nuclear plant came out cheaper, and so we went nuclear.

Subsequently, when we looked at our next nuclear plant, the costs were about a standoff, and in view of our capacity need, we started to build both a nuclear plant and a coal-burning plant.

We now have bids before us for two more nuclear units, with options for additional units. At the time we took those bids, we also invited bids on a coal supply, to see if we could make a comparison again. We got no bids for the coal.

So the direction we go in the future will depend on the availability of alternate sources of fuel, and the relative cost. I think it is generally believed that nuclear technology, being relatively new, will improve, can be improved to a greater extent than fossil fuel technology, and that consequently, a substantial part of the additions in the future will be nuclear plants, but at this point in time, and looking at the figures that come to us, I don't think you can say positively it is going one way or the other.

Senator COOPER. Congress has passed strict legislation dealing with water pollution.

Mr. WAGNER. Yes, sir.

Senator COOPER. And soon will pass a bill much stricter than any we have had thus far.

Mr. WAGNER. Yes.

Senator COOPER. Let me turn to thermal pollution. Are you taking any steps now to refit or reequip your existing facilities so that they will meet these standards?

Mr. WAGNER. On thermal pollution, did you say?

Senator COOPER. Yes.

Mr. WAGNER. Or on general pollution?

Senator BAKER. Thermal.

Mr. WAGNER. On the question of thermal pollution, our existing plants have not created any problem. We did have some difficulty at the Paradise plant in western Kentucky, and there we added cooling towers, so that the water temperatures in the river would not be raised to a harmful degree. With our new plants, we are going to great lengths to deal with warm water, and we believe that these will take care of the problem adequately.

If they don't, we will do whatever it takes to take care of it.

Senator COOPER. Concerning the expenditures required to reequip the old plants, do the funds come from operating revenues or from the sale of bonds?

Mr. WAGNER. Well, the money to equip our old plants, and there we are doing some reequipping by putting in electrostatic precipitators to clean the air out, and we will ultimately, I am sure, develop some equipment to take the sulfur oxides out. That equipment will be paid for partly from power revenues and partly from borrowed funds both, but the bulk of our funds for capital improvements of that kind now must come from borrowings, Senator Cooper, so that as we run into these added costs for environmental protection, both atmospheric and water, it will add substantially to our needs for borrowing authority.

Senator COOPER. I have some questions concerning coal.

Normally, what reserves of coal stock does TVA have on hand?

Mr. WAGNER. Well, we would like to have a 60-day supply in our stockpiles, so that if we run into difficulties of any kind, we can keep going.

Senator COOPER. What is your current supply?

Mr. WAGNER. The supply now is down to 10 days, if we had it uniformly distributed between our plants, but at some plants we are down to 4 days.

Mr. WATSON. The lowest one is 3.1.

Mr. WAGNER. Mr. Watson reminds me that as of this morning we are down to 3.1 days at one plant, 4.1, 5.1, 4.7, and 5.5 days at others.

Senator COOPER. Do you have any assurances that you will be able to get enough coal to keep these plants running?

Mr. WAGNER. Well, this is where you hope and pray, I think, Senator.

Senator COOPER. You mean you haven't contracted for all your requirements?

Mr. WAGNER. We have contracts, but let me tell you, when we get word that a rail strike is threatened, or that there is trouble in any of our coalfields, our blood pressure goes up considerably. We are in a very tenuous position in this regard.

Senator COOPER. Would you say, then, you do not have contracts to provide you with sufficient coal?

Mr. WAGNER. Oh, yes, sir, we have the contracts, but we are currently getting about 70 percent—is it, Mr. Watson?—of the coal that we have under contract.

One of the problems is that the railcars are not available to deliver it, and another problem is that it just doesn't come out of the mines, for one reason or another.

Senator COOPER. Didn't the TVA bring a suit against one coal company to require them to live up to their term contract and provide the coal?

Mr. WAGNER. Yes, sir, we did.

Senator COOPER. What does it state?

Mr. WAGNER. Let me ask Mr. Marquis.

Mr. MARQUIS. That case was settled, Senator, and we are now getting coal deliveries from that company, after they first stopped. But we are not getting as much coal from them as we once did.

Senator COOPER. I believe that the TVA is the largest purchaser of coal in the United States; is that correct?

Mr. WAGNER. I think that is correct, yes, sir.

Senator COOPER. Your testimony will be very helpful in giving us information on what you consider are the reasons for this short supply of coal. Now we have had problems in securing adequate numbers of coal cars ever since World War II. Every time there has been a coal shortage, we talk about insufficient cars.

Do you consider that as one element contributing to the coal shortage?

Mr. WAGNER. Yes, sir; and in the immediate picture, a very important element.

Senator COOPER. Does the TVA own any cars?

Mr. WAGNER. No, sir; we do not own any coal cars.

Senator COOPER. You do own coal reserves?

Mr. WAGNER. Yes, sir.

Senator COOPER. I recall the last time that you came before the committee when you testified that the TVA owned about 129,000 acres of coal reserves. Have you added to the reserves since then?

Mr. WAGNER. We have only two large reserves, Senator, one in east Tennessee and one in western Kentucky, and——

Senator COOPER. The old Camp Breckenridge?

Mr. WAGNER. Yes, sir; we bought those reserves on a competitive bidding basis when the General Services Administration sold them, and we are moving now to get those reserves mined.

Senator COOPER. The last time you testified, you stated that TVA owns about 129,000 acres of coal reserves. You state you are getting ready to have this coal mined on the old Camp Breckenridge site?

Mr. WAGNER. That is correct, we have a contract for it with the Peabody Coal Co., and they will open the mines and mine the coal.

We also are mining some of the coal in east Tennessee, on the former Koppers property, and I should add that we are continuing to look for coal reserves. They are extremely hard to find. And this gets to another one of the long-term problems in the coal supply.

Senator COOPER. Is the Paradise steam plant operating in Muhlenburg County?

Mr. WAGNER. Yes, sir, the Paradise steam plant is operating, and we have there a very good coal supply.

Senator COOPER. Would this coal from the Camp Breckenridge site be transported to the Paradise steam plant?

Mr. WAGNER. No, the Camp Breckenridge coal will essentially go to the new plant that we are building at Cumberland City. This is the one that is now under construction.

Senator COOPER. Where is that?

Mr. WAGNER. It is on the Cumberland River, in Tennessee, near the town of——

Mr. WATSON. Fifty miles west of Nashville.

Senator COOPER. Are there any other reasons why you can't get coal?

Mr. WAGNER. Yes.

Senator COOPER. Have a number of small mines closed down in eastern Tennessee?

Mr. WAGNER. Some of the small mines have closed down because they were unable to meet the requirements of the mine safety legislation. The larger mines are meeting it. It is adding to their cost, and also, it is reducing the rate at which they can produce coal for us.

There is another important factor, we think; when we used to buy coal, we would invite bids, and if we were going to buy a hundred thousand tons a week, we would get offerings of maybe two, three, four, or five times that amount, and we would take the low bids, and go on.

We have reached a point now, though, as in the case I indicated where we were trying to buy coal to assess the competitive position of nuclear and coal for these new units we are weighing, we invite bids and we don't get any bids, or we get just a very small amount offered. One of the problems that we think is contributing to this is that the coal companies, the large ones, are being bought up by oil companies and a couple of large metal companies. Eight of the 10 largest coal-producing companies in the country now are owned by either oil companies or large metal companies.

And we are told by some of their management that they are not interested in selling coal at profit margins that were considered satisfactory by the old coal companies, that they want profit margins that

are more comparable with what they are making on their other products. As a consequence of that, coal which was costing us, a year ago, maybe \$4.50 a ton, is now offered to us on a negotiated basis at \$7 or \$8 or \$9 a ton, and with our stockpiles as low as they are, you can see that we have no alternative but to buy it.

In other terms, Senator Cooper, we operated for years at coal costs of about 18 to 19 cents per million B.t.u. We buy our coal on a heat content basis. This gradually crept up through normal price rises and inflationary pressures to about 21.5 cents last year. Now for coal we recently had to buy we paid 35 cents a million B.t.u. for some of it, and 38 cents for some more of it.

We bought some yesterday at 40 cents, and we even had one offer, which we are not going to accept, at 68 cents.

Now we have some general ideas about what has happened to the cost of producing coal. We have them because of our work on mining the reserves that we own ourselves, and also because under a gross-iniquities provision in some of our long-term contracts, we have had to go back and renegotiate prices. The companies in these cases have to demonstrate to us what their increased costs are.

Now, excluding the mine safety costs, those costs have gone up, and we have had to add maybe 50 or 75 cents a ton, but not \$3 or \$4 or \$5 a ton. Mine safety costs will add more money; we don't know at the moment how much. We are getting demands anywhere from 75 cents to \$1.40.

We have not yet been able to examine those claims to see how much fat there may be in them, but even those, added to the 50 or 75 cents a ton that we have renegotiated, do not justify, in our minds, the kind of prices that we are being asked to pay now.

We think this is extremely important, not only to TVA but to the whole Nation, because this country lives and breathes on electric energy. We have looked at alternate sources of fuel—oil, gas, uranium. The oil companies, of course, own the oil and gas reserves now, and they are buying into uranium reserves and uranium fuel processing. This is a situation which can become very difficult, and which concerns us, Senator.

Senator COOPER. I beg the indulgence of the committee, in taking up this subject of coal supplies. I know Senator Baker is, very interested in this matter. Your testimony will give us a good chance to find out what some of the causes are for the present of coal shortage.

Now, first you have noted the old question of shortage of coal cars. Secondly, some mines are shut down, because of the Mine Safety law. I know that has happened in my State.

Third—and I am very glad you brought this out—I have heard comments about this, too—that a great number of the big coal companies are now owned by oil companies, and there is a serious question, whether those companies want to increase their production of coal, or whether they want to limit production because of their oil business.

I think it is a subject that will have to be investigated, and should and should be investigated by the Congress.

Concerning the effects of the Mine Safety Act on coal production I must state that what we predicted has come true, particularly in Kentucky and Tennessee, where we have what we call nongassy mines. Many of these small mines have closed down, because it

wouldn't be economically possible for them to re-equip the mine as required by the new law. And now many of them have gone into strip mining which is what I predicted would happen.

Senator Baker questioned you about the provisions you place in your contracts with mining companies from whom you purchase coal requiring them to reclaim the land. This policy has been in effect since 1965, hasn't it?

Mr. WAGNER. That is correct.

Senator COOPER. I know that you require that the supplier reclaim the land within a period of 24 months after the contract is completed.

Mr. WAGNER. Yes, sir.

Senator COOPER. Now, what means do you have of enforcing that contract?

Mr. WAGNER. Well, all I can say is that so far we have been able to get compliance. It is written into the contract. Generally, these contracts require the contractor to provide a performance bond. No doubt this would provide TVA considerable leverage in obtaining compliance with the reclamation provisions. Moreover, the State strip mine reclamation laws require the operator to post a bond as a condition of obtaining a mining permit.

We could refuse to take subsequent bids from operators who violate the reclamation clauses in future instances. I would say, Senator, that fortunately, we have not had to resort to those methods. I think that we have found that the coal producers, if they realize they are going to be paid for it, are willing to do the job.

Senator COOPER. Can you state to the committee that the coal companies have carried out these provisions of their contracts and have reclaimed the land?

Mr. WAGNER. I asked the man who inspects reclamation. He is a very able individual who is not in our office of power, but is a conservationist in our forestry organization, so that we have a sort of an independent check on this thing.

He says that the reclamation results so far vary all the way from poor to excellent, but the ones that are poor, we are working on, and even there, we are getting, by what is normally understood to be reclamation, pretty good results. This is adding to the cost of coal.

Senator COOPER. It ought to.

Mr. WAGNER. Yes, sir; that is right.

Senator COOPER. Under the Kentucky law, which is considered to be one of the best in the country, the State authorities carry on a continuing inspection of these operations.

Does the TVA carry on a continuing inspection to see that the companies are living up to the contract?

Mr. WAGNER. Yes, we do. Yes, sir.

Senator COOPER. And they close them down in Kentucky, if they are not. Do you ever cancel a supplier's contract if he isn't living up to his contract?

Mr. WAGNER. We have not yet canceled any because of reclamation violations. I should point out that these are long-term contracts, and a contractor usually gets equipment committed for the life of the contract. If we look at the mined area and say, "Look, you have got to do some more work here," he generally does it.

Senator COOPER. Does he reclaim the land as he proceeds with his stripping operations?

Mr. WAGNER. As closely following it as can be done; yes, sir, and a part of it, you realize, is done almost as a part of the mining operations. For instance, one of the requirements is that the strip bench be graded so that the water that falls on it will flow toward the high wall, and is then carried to the natural drains, down the mountainside.

He is required to cover the iron pyrites promptly so that sulfuric acid isn't formed, and you don't get acid drainage. The extent to which material can be dumped over the outside bank is controlled, and then he is required to revegetate this area quite promptly.

Senator COOPER. In 1966, you testified and provided the committee with a statement describing the requirements for reclamation included in your contracts. Would you furnish the committee with this information together with a list of companies the contracts of which contain this information?

Mr. WAGNER. Yes, sir; I will be glad to.

Senator COOPER. What I am saying is that if you do not enforce these provisions day by day, or at least period by period, over the life of your contracts—which are long-term contracts—then the damage will be done. It will certainly be done as far as the water levels are concerned.

Mr. WAGNER. We will be glad to provide you with a copy of the requirement in the contract, and I would want to add that we do make continuing inspections, Senator, and we work also with the States on this, very closely.

(The information subsequently furnished follows:)

RECLAMATION PROVISION IN TVA COAL PURCHASE CONTRACT

Strip Land Reclamation. Contractor agrees to perform in accordance with the following standards and to the satisfaction of TVA reclamation and conservation work upon all the lands which are affected by the strip mining (including surface auger) of any coal supplied under this contract.

a. Contractor shall, as closely as practicable following the mining operation, cover coal faces and bury all toxic materials including coal wastes and strongly acid shales.

b. Contractor shall seal off any breakthrough to former underground mines.

c. Contractor shall conduct the mining in such a manner as to keep the drainage free of spoil.

d. Contractor shall control water from the mines and haul roads by:

(1) Channeling runoff into drainages either naturally non-eroding or made that way through construction of checks, or

(2) By impoundments, or

(3) A combination of (1) and (2).

e. Contractor shall cover all holes at the face that have been made by augers.

f. Contractor shall grade the spoil banks as necessary to provide for the re-establishment of vegetation.

g. Contractor shall conduct mining and reclamation so that any spoil placed on the slope below the bench will be handled with the objective of preventing landslides. This provision will generally control the bench width of the first cut in relation to the steepness of slope, the total volume of overburden which may be cast downslope, and the natural and proposed drainage pattern.

h. Contractor shall revegetate the disturbed area with trees (but with TVA's approval grasses, legumes, and shrubs may be substituted) so as to ensure that the disturbed area will be covered by vegetation well distributed throughout the entire area.

i. To the maximum extent practicable, the foregoing work shall be performed at the same time the mining operation is taking place, and all the above work shall be completed no later than 24 months after the delivery of all the coal supplied under this contract unless TVA agrees to a longer period of time.

TVA shall have the right to inspect the Contractor's mining operation and the lands involved from time to time to determine the Contractor's compliance with

the foregoing standards. TVA shall at all times be the sole judge as to whether Contractor is complying with the standards above set out. TVA, in its discretion, may accept as fulfillment of the requirements of this contract compliance by the Contractor with applicable reclamation laws having standards comparable to the foregoing.

Terms and Conditions. The attached Terms and Conditions and Conditions of Bid constitute parts of this contract.

COAL SUPPLIERS COVERED BY TVA RECLAMATION REQUIREMENTS

Contractor	County	Mine
Tennessee, Southeast:		
Allen Bros. Coal Co.	Van Buren, Sequatchie, Bledsoe	No. 7, No. 9.
Arnold Coal Co.	Van Buren	Arnold, Van Buren.
C. R. & B. Coal Co.	do	No. 11.
L. P. Phipps & Son	Grundy	Commando.
Walden Ridge Coal Co.	Van Buren, Bledsoe, Sequatchie	No. 1, No. 2.
Waters Coal and Construction Co.	Van Buren	R-8.
Tennessee, East:		
Blue Diamond Coal Co.	Campbell	Sou, Imperial, Emerald.
Abe Cofer Coal Co.	do	Abe Cofer.
Crass Coal Co.	Anderson	Crass.
Dean Coal Co.	Campbell	Red Ash.
Farco Co., Inc.	do	Farrell.
G. & F. Coal Co., Inc.	Morgan	G. & F.
Kew Mining Co.	do	Kew.
H. & B. Construction Co.	do	H. & B.
H. & B. and Lueking Coal Co.	Morgan, Anderson	Lueking.
Jackson Mining Co.	Anderson	Jackson.
Lueking Coal Co.	Anderson, Morgan	Lueking No. 2.
Mountain Mining Co.	Anderson	Mountain.
Price Coal Co.	Morgan, Campbell	Price.
Radar Coal Co.	Anderson	Radar.
W. B. Spradlin	Campbell	W. B. Spradlin
Tedder Coal Co.	Morgan, Cumberland	Tedder.
Tennco, Inc.	Anderson	Tennco.
Tennessee Auger	do	New River.
Fred Walt Coal Co.	Morgan	Fred Walt Nos. 3, 4.
Wolf Ridge Coal Co.	Anderson	W. & S.
W. R. Coal Co.	Anderson, Morgan	W. R.
Premium Coal Co., Inc.	Anderson	Premium.
Alabama:		
Ramsey Coal Co., Inc.	Jackson	No. 1.
Farco Co., Inc.	do	Fies No. 1.
Arch Mineral Co., Inc.	do	Do.
Kentucky:		
Adventure Coal Co.	Bell	No. 1, No. 2.
Carbon Coal Co., Inc.	Bell, Ohio	Carbon.
Kentucky Oak Mining Co.	Perry, Letcher, Breathitt, Knott, Leslie.	Various.
Pioneer Fuel Sales	Bell	Do.
Scotia Coal Co.	Letcher	Sou. Imperial.
PeeWee Mining Co.	McCreary	West.
West Coal Corp.	do	Do.
West Kentucky:		
Arel Coal Sales, Inc.	Hopkins	Arel.
Burge Coal Co.	Ohio	Burge.
Cherokee Coal Co.	do	Do.
Hazel Creek Coal Co.	Muhlenberg	Hazel Creek.
Island Creek Coal Sales Co.	Hopkins	Boone, Pleasant View, Sham- rock.
Cimarron Coal Co.	do	Volunteer.
Kirkpatrick Coal Co.	Muhlenberg	Wright, Caney Creek.
Pittsburg & Midway	Hopkins, Muhlenberg	Colonial, Paradise.
Peabody Coal Co.	Muhlenberg, Ohio	Sinclair, River Queen, Ken, Homestead, Gibraltar.
O'Keefe Bros. Coal Co.	Ohio	Salem.
Randall Fuel Corp.	do	Williams Creek.
Royal Fuel Corp.	Hopkins, Christian	Arel.
Russell Badgett, Jr. Coal Co.	Hopkins	Little Jose.
Walker & Sons	Ohio	Walker.
Weskol Mining Co.	Hopkins	Weskol No. 2.
American Metal Climax	Muhlenberg	Ayrgem.
Illinois:		
Peabody Coal Co.	Gallatin	Eagle.
Eads Coal Co.	Jefferson	Eads.
Virginia:		
Blair Fork Coal Co.	Wise	Sou. Imperial.
Kentucky-Virginia Coal Co.	Lee	No. 1.
Wright Mining Co.	do	Wright No. 1.
Victory Coal Co.	Wise	No. 2.
Dean Jones Coal Co.	Lee	No. 5.

Senator COOPER. Is the Paradise plant on the Green River, considered to be the largest of its type in the world?

Mr. WAGNER. The generating station, you mean?

Senator COOPER. The Peabody Coal Co. stripped acres and acres of land there before your conservation requirements came into effect in 1965.

Mr. WAGNER. That is correct.

Senator COOPER. I don't know that I can say that it is your fault, but one of the purposes, as I understand it, of the TVA is that it deals with conservation and tries to make a better environment. Yet in Muhlenberg County and Ohio County, where Peabody Coal strip mines—I think it is the second-largest coal company in the United States—those counties look like what we once thought the surface of the moon would look like—terrible. And the TVA did take that coal, and did nothing about reclamation or conservation.

Is there any way you can help now to repair the damage that was done in those two counties?

Mr. WAGNER. Senator, let me take just a few minutes on that point.

We did not buy all of that coal. We bought some of it. One of the reasons that we did not require reclamation in our contracts until 1965 was because in the States where we bought coal—at the time we were buying only about 17 percent of the total strip-mined coal, and we felt that what was required was State legislation that would go to all of the coal that was stripped for all consumers. We felt that if TVA required it, people would say the problem was solved, and it wouldn't be, so we worked very hard to try to get State regulations to require reclamation.

Now some of it was strip mined for us, that's correct. All I can say is that at the present time we do require reclamation there and everywhere else. We have made some proposals, and will continue to make proposals, for reclamation of the strip-mined areas.

Our current proposal does not go to west Kentucky, but certainly work should be done there, and we agree that that land ought to be reclaimed, and ways must be found to do it.

Senator COOPER. One other subject: TVA is announcing an increase in its rates.

Mr. SMITH. Senator, if I may interrupt at that point, one of the reasons that the reclamation clause is in the TVA contract is because of some discussions that you had with some of the members of the TVA Board.

Mr. COOPER. Well, I would hope the clause has had some effect. I am going to look at it again.

Mr. WAGNER. I hope we got into it what you wanted, Senator.

Senator COOPER. I will repeat what I said, when you set up your requirement procedures, then—and I do want to study them—is there any way we can protect these areas and be sure that reclamation has been performed as required by the contract? I think we ought to do it. I am talking about my own State. I know that you don't get all your coal from Kentucky. I also know there is going to be a lot of coal mined at the site of Camp Breckenridge. I recall the long dispute among the residents there as to who owned the coal rights.

Mr. WAGNER. Camp Breckenridge coal will be produced by underground mining, Senator. It is not going to be strip mining.

Senator COOPER. Now TVA has recently announced an increase in its power rates, quite a large increase, as I recall.

Mr. WAGNER. That is true.

Senator COOPER. Is it about 26 percent?

Mr. WAGNER. It is about a 23-percent average increase, Senator. This increase is not as large in comparison with other figures as one first might think. The percentage is as large as it is because our base rates are so low now.

Electricity in the Tennessee Valley costs the average residential consumer about a cent a kilowatt-hour. In the Nation as a whole, it costs about 2 cents, or a little better, for a kilowatt-hour, so if we were applying the TVA increase to the national average electric bill, it would be an 11½-percent increase instead of a 23-percent increase.

Senator COOPER. How do your rates compare with the privately owned companies in the area?

Mr. WAGNER. The average cost to the residential consumer for electricity before this increase has been about 1 cent per kilowatt-hour in TVA, about 2.1 cents in the Nation. So our rates are about half, and they will still be substantially below, even after this increase goes into effect.

Senator COOPER. Will you supply to the committee a statement comparing your rates with the rates of other utilities in the area?

Mr. WAGNER. Yes, we will be glad to do that, Senator.

(The information later supplied follows:)

COMPARABILITY OF TVA RATES WITH THOSE OF UTILITIES IN SURROUNDING AREA

The three attached tables contain a summary comparison of TVA's rates for residential and general power consumers with those applied by neighboring utilities.

RESIDENTIAL RATE COMPARISON

Table 1 shows a comparison of residential consumer costs for selected monthly and annual energy uses. Costs under the TVA middle schedule (R-4) after the August and October 1970 increases are compared with those under the rates now being applied by neighboring utilities. Over half of the residential consumers in the Tennessee Valley are being served on this or a lower rate schedule.

INDUSTRIAL POWER RATE COMPARISON

Table 2 compares the unit power costs to industrial customers using a range of load sizes and load factors. For the Tennessee Valley costs were determined under the basic TVA general power rate (C-2) after the August and October 1970 increases. This schedule was selected for comparison purposes because all TVA schedules are identical for loads in excess of 5,000 kw and this schedule also applies to directly served customers with prevailing rate contracts. The currently effective rates of neighboring utilities were used and information is included on the amount of fuel adjustments that were included in the unit price calculations.

INCREASES PROPOSED BY NEIGHBORING UTILITIES

Table 3 contains detailed data concerning proposed rate increases by neighboring utilities during fiscal year 1970. The last line indicates comparable data for TVA.

TABLE 1.—COMPARISON OF RESIDENTIAL POWER COSTS—TVA AND NEIGHBORING UTILITIES—BASED ON RATES PUBLISHED IN FPC NATIONAL ELECTRIC RATE BOOK OR LATER RATES OBTAINED FROM STATE UTILITY COMMISSIONS

Use kilowatt-hour Designated rate schedule.....	Tennessee Valley Authority		Alabama Power Co.	Appalachian Power Co.	Carolina Power & Light Co.	Georgia Power Co.	Kentucky Utilities Co.	Mississippi Power Co.	Mississippi Power & Light Co.
	Feb. 1969	Sept. 1970 ^a	FD	RS. ¹	R-4B ¹	A-12 ¹	RS-1	R-2	RS-18C ¹
Effective date of schedule.....	R-4		Sept. 1968	Nov. 1966	Dec. 1965	Dec. 1968	July 1967	Jan. 1970	Feb. 1970
A. Monthly bills:									
50.....	\$1.38	\$1.65	\$2.15	\$2.31	\$1.95	\$2.03	\$2.70	\$2.45	\$2.44
100.....	2.56	3.04	3.25	3.84	3.40	3.58	4.20	4.17	4.24
250.....	5.18	6.16	6.25	7.01	6.50	6.16	7.40	7.66	6.97
500.....	7.71	9.21	9.65	10.80	9.00	8.76	11.90	10.69	9.50
750.....	9.60	11.46	12.65	12.79	12.00	11.37	15.65	13.50	12.05
1,000.....	11.48	13.71	15.65	16.08	15.38	14.48	19.40	16.28	14.58
1,500.....	15.25	18.21	21.65	22.16	22.13	21.74	26.90	21.89	19.66
2,000.....	19.02	22.71	27.65	28.04	28.88	28.48	34.40	27.48	24.74
3,000.....	26.56	31.71	39.65	38.19	42.38	41.96	49.40	38.67	34.89
4,000.....	34.10	40.71	51.65	48.35	55.88	55.44	64.40	49.87	45.04
Designated rate schedule.....	R-4		FDE	RS. ¹	R-2E	TE-2	FERS-1	RA-2	RS-17E
Effective Date of schedule.....	February 1969	September 1970	June 1969	November 1966	December 1965	December 1968	July 1967	January 1970	February 1970
B. Annual bills (All-electric home): 24,000.....	\$228.21	\$272.52	\$329	\$328.21	\$304.30	\$326.75	\$376.80	\$298.72	\$269.02
Fuel and money cost adjustments used:									
Cents per kilowatt-hour.....	0.074			0.01575		0.02		0.0664	0.00625
Date of adjustment.....	(^c)			(^c)		(^c)		(^c)	(^c)
Other adjustments used.....									

¹ Includes water heater and/or high use discounts.

² Modifies rates effective Oct. 2, 1970.

³ August 1970.

⁴ December 1969.

¹ April 1970; rate 2.172 percent (Dec. 18).

² August 1970; tax 0.262 percent (August 1970).

³ August 1970; tax 0.9 percent (August 1970).

TABLE 2.—COMPARISON OF INDUSTRIAL POWER COSTS—TVA AND NEIGHBORING UTILITIES, BASED ON RATES PUBLISHED IN FPC NATIONAL ELECTRIC RATE BOOK OR LATER RATES OBTAINED FROM STATE UTILITY COMMISSIONS¹

(In mills per kilowatt-hour)

PEAK DEMAND 1,000 KILOWATTS AND 1,176 KILOVOLT-AMPERES										
	Tennessee Valley Authority	Alabama Power Co.	Appalachian Power Co.	Carolina Power & Light Co.	Georgia Power Co.	Kentucky Utilities Co.	Mississippi Power Co.	Mississippi Power & Light Co.		
Designated rate schedule	C-2	C-2	LPL	LCP	G-2D	C-9	LP-2	C-11		
Effective date of schedule	February 1969	September 1970	Sept. 1, 1968	Nov. 1, 1966	Feb. 4, 1965	Dec. 16, 1968	Jan. 1, 1967	Jan. 20, 1970	Feb. 1, 1970	
Percent load factor	100	5.62	6.78	7.86	7.60	8.47	7.91	9.72	8.15	
Do.	90	5.87	7.12	8.20	7.89	8.73	8.37	10.02	8.52	
Do.	80	6.18	7.54	8.61	8.25	9.04	8.92	10.40	8.98	
Do.	70	6.58	8.07	9.15	8.72	9.45	9.58	10.89	9.58	
Do.	60	7.09	8.75	9.86	9.31	9.99	10.46	11.54	10.40	
Do.	50	7.79	9.07	10.15	9.97	10.75	11.65	12.46	11.08	
Do.	40	8.84	11.13	11.63	10.97	11.88	13.36	13.80	12.12	
Fuel cost adjustment used	0.29		0.02	0.21		0.27	0.30	0.664	0.0625	
Money cost adjustment used	\$0.15									
Effective date of adjustments	August 1970	April 1970	April 1970	December 1969	July 1969	April 1970	April 1970	August 1970	August 1970	
PEAK DEMAND 5,000 KILOWATT AND 5,790 KILOVOLT-AMPERES										
	Tennessee Valley Authority	Alabama Power Co.	Appalachian Power Co.	Carolina Power & Light Co.	Georgia Power Co.	Kentucky Utilities Co.	Mississippi Power Co.	Mississippi Power & Light Co.		
Designated rate schedule	C-2	C-2	LPL	LCP	HLF-ID	C-10	LP-2	C-11		
Effective date of schedule	February 1969	September 1970	Sept. 1, 1966	Nov. 1, 1966	Feb. 4, 1965	Dec. 16, 1968	Jan. 1, 1967	Jan. 20, 1970	Feb. 1, 1970	
Percent load factor	100	5.26	6.42	7.18	6.81	7.13	7.66	8.91	7.13	
Do.	90	5.47	6.71	7.44	7.12	7.40	8.09	9.13	7.53	
Do.	80	5.73	7.08	7.76	7.51	7.74	8.62	9.40	8.02	
Do.	70	6.06	7.55	8.17	8.01	8.18	9.23	9.74	8.65	
Do.	60	6.51	8.18	8.72	8.68	8.76	10.05	10.20	9.40	
Do.	50	7.13	9.05	9.58	9.62	9.44	11.16	10.84	10.23	
Do.	40	8.07	10.36	10.98	11.02	10.24	12.75	11.81	11.33	
Fuel cost adjustment used	0.29		0.02	0.21		0.27	0.30	0.664	0.0625	
Money cost adjustment used	\$0.15									
Effective date of adjustments	August 1970	April 1970	April 1970	December 1969	July 1969	April 1970	April 1970	August 1970	August 1970	

PEAK DEMAND 20,000 KILOWATTS AND 21,579 KILOVOLT-AMPERES

Designated rate schedule	C-2	C-2	LPL	LCP	HLF-ID	C-10	HLF	LP-2	C-11
Effective date of schedule	February 1969	September 1970	Sept. 1, 1968	Nov. 1, 1966	Feb. 4, 1965	Dec. 16, 1968	Jan. 1, 1967	Jan. 20, 1970	Feb. 1, 1970
Percent load factor	100	4.92	6.22	6.66	6.71	6.63	7.23	8.75	6.95
Do	90	5.12	6.37	6.86	7.01	6.85	7.61	8.95	7.24
Do	80	5.37	6.73	7.11	7.38	7.13	8.08	9.19	7.78
Do	70	6.68	7.17	7.43	7.86	7.48	8.62	9.51	8.38
Do	60	6.11	7.56	7.86	8.51	7.94	9.33	9.93	9.24
Do	50	6.70	8.23	8.46	9.41	8.60	10.29	10.52	10.03
Do	40	7.59	9.23	9.67	10.76	9.58	11.67	11.40	11.65
Fuel cost adjustment used	0.29	9.87	0.02	0.21	10.76	0.27	0.30	0.664	0.0625
Money cost adjustment used	\$0.15								
Effective date of adjustments	August 1970	April 1970	December 1969	July 1969	April 1970	April 1970	August 1970	August 1970	August 1970

¹ The above rates were computed on the basis of a 730-hour month, and minimum power factors permitted under TVA's C-2 rate without penalty so as to be more comparable to TVA's rate. The lowest rate was used for comparison in cases where 2 or more rates might apply to industries of the same size load.

² Kilowatts.

TABLE 3.—RATE INCREASES PROPOSED BY NEIGHBORING UTILITIES DURING FISCAL YEAR 1970

Utility	Date announced	Reported amounts (millions)	Percent increase	Installed capacity (mega-watts)	Sales billions (kilowatt-hours)	Cus-tomers (thou-sands)	Increase mills/kilo-watt-hours (sales)
Mississippi Power Co.....	Jan. 19, 1970	1.9	3.70	887	3.0	132	0.6
Duke Power Co.....	May 26, 1970	55.64	18.00	5,053	24.6	1,005	2.3
Georgia Power ¹	June 4, 1970	12.2	34.00	3,510	4.8		2.5
Carolina Power & Light.....	June 4, 1970	23.5	14.00	2,671	11.3	525	2.1
Virginia Electric & Power.....	June 11, 1970	22.4	9.00	4,039	17.0	946	1.3
Cincinnati Gas & Electric.....	June 5, 1970	6.7	14.00	1,560	7.2	398	.9
Missouri Public Service Co.....	July 28, 1969	5.3	20.00	177	1.1	92	4.8
Kansas City Power & Light.....	Aug. 4, 1969	7.3	7.20	1,108	3.2	207	2.3
Union Electric.....	Nov. 10, 1969	10.2	4.90	2,986	13.2	682	.8
Tennessee Valley Authority.....	July 17, 1970	² 99.4	24.3	19,395	98.0	2,100	1.3

¹ Applicable to wholesale customers only.² Increase effective October 1970—reported amount is for 9 months ending June 1971.

Sources: Electrical World, FPC News Digest, Wall Street Journal, Congressional Record, Utility Reports, other trade and news publications. Statistics from FPC reports and McGraw-Hill Directory of Electric Utilities.

Senator COOPER. I understand that the TVA Act itself requires that your rates shall be sufficient to cover operations and maintenance, payments in lieu of taxes, debt service, payments to U.S. Treasury, and a certain margin. Was this rate required to meet the provisions of section 15d(f)?

Mr. WAGNER. Yes, sir; this rate increase is precisely required to meet that requirement of the TVA Act.

Senator COOPER. The second requirement of section 15d(f) provides that a 5-year aggregate net power income at least equal the total of your Treasury dividend payments during the same 5 years.

Mr. WAGNER. If this rate increase is granted, we will be able to meet both requirements.

Senator COOPER. While not a part of the law, I understand that you have a covenant in the bonds themselves which requires before you can issue additional bonds that your net power income over the preceding 5 years must at least equal \$200 million, plus \$15 million for each one-quarter percent that the U.S. Treasury interest costs averages in excess of $3\frac{1}{4}$ percent?

Mr. WAGNER. That is correct.

Senator COOPER. Now will you be able to meet this requirement?

Mr. WAGNER. Senator Cooper, preliminary figures that we have for 1970, the year just back of us, indicate that we apparently failed to meet that test by a very narrow margin.

Senator COOPER. Having failed you would not be able to sell bonds in fiscal 1971?

Mr. WAGNER. Yes, sir. But if the final audited figures confirm that, they will indicate that we did fail on that test, in the past year. And this again is one of the matters that concerns us very greatly.

Senator COOPER. I will ask that you submit for the record the past results and your estimates concerning these three tests or requirements together with the applicable provision of the statute or bond covenant.

Mr. WAGNER. Yes, sir; we will be glad to do that.

(The information requested follows:)

RATE TEST (SECTION 15d(f) TVA ACT AND SECTION 3.2 OF BOND RESOLUTION)

The Corporation shall charge rates for power which will produce gross revenues sufficient to provide funds for operation, maintenance, and administration of its power system; payments to States and counties in lieu of taxes; debt service on outstanding bonds, including provision and maintenance of reserve funds and other funds established in connection therewith; payments to the Treasury as a return on the appropriation investment pursuant to subsection (e) hereof; payment to the Treasury of the repayment sums specified in subsection (e) hereof; and such additional margin as the Board may consider desirable for investment in power system assets, retirement of outstanding bonds in advance of maturity, additional reduction of appropriation investment, and other purposes connected with the Corporation's power business, having due regard for the primary objectives of the Act, including the objective that power shall be sold at rates as low as are feasible. (16 U.S.C. sec. 831n-4.)

	1965	1966	1967	1968	1969	1970	1971
Revenues.....	\$296.0	\$326.8	\$351.1	\$383.7	\$403.4	\$479.6	\$523.5
Less:							
Operation and maintenance excluding depreciation..	165.7	197.2	216.8	222.5	243.7	282.7	352.2
Payments in lieu of taxes.....	9.1	10.4	11.9	13.1	14.5	16.1	20.0
Debt service.....	14.6	17.8	23.5	30.2	41.2	60.7	118.4
Treasury payments:							
Dividend.....	42.6	43.9	47.1	46.8	53.1	57.7	66.1
Repayment.....	10.0	15.0	15.0	15.0	15.0	15.0	20.0
Margin.....	54.1	42.5	36.8	56.1	35.9	47.4	(53.2)

1 1971 estimates are without rate increase scheduled for Oct. 1, 1970.

PROTECTION OF BONDHOLDER INVESTMENT TEST (SECTION 15d(f) TVA ACT AND SECTION 3.3 OF BOND RESOLUTION)

In order to protect the investment of holders of the Corporation's securities and the appropriation investment as defined in subsection (e) hereof, the Corporation, during each successive five-year period beginning with the five-year period which commences on July 1 of the first full fiscal year after the effective date of this section, shall apply net power proceeds either in reduction (directly or through payments into reserve or sinking funds) of its capital obligations, including bonds and the appropriation investment, or to reinvestment in power assets, at least to the extent of the combined amount of the aggregate of the depreciation accruals and other charges representing the amortization of capital expenditures applicable to its power properties plus the net proceeds realized from any disposition of power facilities in said period. (16 U.S.C. sec. 831n-4.)

In effect this requires that successive (beginning with FY 1961) five-year aggregate of net power income be at least equal to the total of Treasury dividend payments during the same five-year period.

1. This test applies in successive five-year periods. Following is a table showing the results of the five-year block ending in 1970. The next time this test will be controlling will be in 1975.

[In millions of dollars]

Fiscal year	Return on appropriation investment	Net power income
1966.....	\$43.9	\$47.9
1967.....	47.1	40.7
1968.....	46.9	59.1
1969.....	53.1	50.7
1970.....	57.6	74.6
Total.....	248.6	273.0

In the five-year period ending in 1970 the margin under this test was \$24.4 million.

2. Although the test will not be applied until 1975, following is the estimated result of the first year (Fiscal 1971) of that five-year block. The estimate does not include income from the rate increase proposed for October 1, 1970.

	<i>Millions</i>
Net power income.....	\$16.3
Less return on appropriation investment.....	—66.1
Margin.....	—49.8

Thus without the rate increase TVA would start the next five-year period under this test with a minus balance.

LIMITATION ON ISSUANCE OF ADDITIONAL BONDS

(Section 3.4 of Bond Resolution)

"The amount of Bonds outstanding may not be increased at any time unless, as evidenced by a certificate of the Comptroller of the Corporation filed with the Trustee, net power income (after interest expense and depreciation charges but before payments as a return on or in reduction of the Appropriation Investment) for the latest five fiscal years has aggregated at least \$200,000,000, plus \$15,000,000 for each $\frac{1}{4}$ percent or major fraction thereof by which the average for those five years of the computed average interest rate payable by the United States Treasury upon its total marketable public obligations as of the beginning of each of such years has exceeded $3\frac{1}{4}$ percent." ("Bonds" as used in this test means bonds of equal rank to those issued under authority of this resolution.)

I. Application: FY 1969 (governs ability to sell bonds in FY 1970):

1. 5-year average U.S. interest:	<i>Percent</i>
Cost.....	4.103
Less.....	3.250

Excess of average interest cost over $3\frac{1}{4}$ percent..... .853

$0.853 \div \frac{1}{4}$ percent = 3.4; 3 increments.

\$200 million + 3×15 = \$245 million net power income required.

2. 5-year net income (millions of dollars):

Fiscal year:	<i>Net power income</i>
1965.....	55.0
1966.....	47.9
1967.....	40.7
1968.....	¹ 59.1
1969.....	50.7
Total.....	253.4 ¹

¹ Adjusted to exclude Hales Bar Writeoff.

3. Margin: \$253.4 million — \$245 million = \$8.4 million.

II. Application: FY 1970 (governs ability to sell bonds in FY 1971):

1. 5-year average U.S. interest:	<i>Percent</i>
Cost.....	4.418
Less.....	3.250

Excess of average interest cost over $3\frac{1}{4}$ percent..... 1.168

$1.168 \div \frac{1}{4}$ percent = 4.67 + ; 5 increments.

\$200 million + $5 \times \$15$ million = \$275 million net power income required.

2. 5-year net income (millions of dollars):

Fiscal year:	<i>Net power income</i>
1966.....	47.9
1967.....	40.7
1968.....	¹ 59.1
1969.....	50.7
1970.....	74.6
Total.....	273.0

¹ Adjusted to exclude Hales Bar Writeoff.

3. Margin: \$273.0 million - \$275 million = \$(2.0) million.

III. Application: FY 1971 (governs ability to sell bonds in FY 1972):

1. 5-year average U.S. interest:

	Percent
Cost.....	4.855
Less.....	3.250
Excess of average interest cost over $3\frac{1}{4}$ percent.....	1.605

1.605 percent + $\frac{1}{4}$ percent = 6.42; 6 increments.

\$200 million + $6 \times \$15$ million = \$290 million net power income required.

2. 5-year net income (millions of dollars):

Fiscal year:	Net power income
1967.....	40.7
1968.....	¹ 59.1
1969.....	50.7
1970.....	74.6
1971.....	² 16.3
Total.....	241.4

¹ Adjusted to exclude Hales Bar Writeoff.

² Estimated (without rate increase scheduled for Oct. 1, 1970).

3. Margin: \$241.4 million - \$290.0 million = \$(48.6) million.

Senator JORDAN. But you are supposed to break even on your power.

Mr. WAGNER. We have to.

Senator JORDAN. Yes. When you sell these bonds, do you have to compete with the private power companies in the interest rate that these bonds bring?

Mr. WAGNER. We sell them in the same market that they do, and generally, our interest rates will be just a shade below what they pay.

How much below, Mr. Watson?

Mr. WATSON. Well, the last \$50 million issue of 25-year bonds, we sold at a cost to us of about 9.3, and on the same day, the New Jersey Bell Telephone Company sold one at 9.35, so they are very comparable.

Senator JORDAN. You are comparable.

Mr. WAGNER. Yes.

Senator JORDAN. You sell them to the same people?

Mr. WAGNER. That is correct.

Senator JORDAN. Well, I presume your increase in rates which you are now putting in or proposing to put in is due largely to your coal cost?

Mr. WAGNER. It is due largely to our coal cost. About 60 percent of it is coal cost. About 18 percent of it is interest costs, money costs, our payments to Treasury, and our interest on our bonds. Fifteen percent of it is due to delay in getting one of our large nuclear plants into operation. We had trouble with deliveries of equipment there, and so we have to buy more power to replace what that plant would have produced. And about 9 or 10 percent of it is general cost increases in equipment and materials and labor, and so forth.

Senator JORDAN. The Federal Power Commission sets the price at which the oil companies can sell or the gas people can charge for their gas. Is that correct?

Mr. WAGNER. Wholesale prices.

Senator JORDAN. I am talking about wholesale prices, at the wells.

Mr. WAGNER. That is correct.

Senator JORDAN. If I am not mistaken, the Utilities Commission of North Carolina—I know they were up here, because they met with me and some others—is trying to get more gas. There is a shortage of gas in North Carolina as well as in some other places, too, and the reason that the oil companies or the gas companies say they can't supply more or won't supply more is that the Federal Power Commission won't grant an increase in rate to them. They are just not going to produce gas just for the fun of producing it, and I can understand that thoroughly. I am just wondering if the Federal Government is getting in the way of the consumer that they are claiming to protect.

Mr. WAGNER. I don't know whether I am qualified to give you a comment on that, Senator. I know that there are pressures to increase the price of gas. I have read just recently a statement, I believe it was in the August 1 issue of Business Week, that the people in the gas business were saying that they were not willing to sell gas unless they could get the prices up to where their profit margin was comparable with what they were making on other commodities. I don't really have the facts to know where truth and justice lie in this instance, but from our standpoint, we regret any increase in the cost of raw energy sources of any kind used in the production of electric power, which is essential to the growing economy and the security of this country.

The CHAIRMAN. I have a statement from Senator Ribicoff of Connecticut, and it will be included in the record at this point.

STATEMENT OF HON. ABRAHAM RIBICOFF, A U.S. SENATOR FROM THE STATE OF CONNECTICUT

I want to take this opportunity to commend the chairman and Senator Randolph for sponsoring Senate Resolution 45 which would authorize a study of national fuels and energy policy by the Interior Committee. Such a study can be one of the most important contributions the 92d Congress can make to the American economy.

The fuel crises of recent years have underscored the need for an intelligent, rational, and effective national fuels and energy policy. Large cities and millions of citizens have been hit by power failures and reductions last summer and again this winter. Homeowners, schools, and factories have had to contend with severe shortages of home heating oil, residual fuel oil, and even natural gas. The same people have to pay skyrocketing prices for their oil products as well as for the gasoline their autos consume.

In Connecticut the price of home heating fuel has risen almost \$0.03 over the past 24 months to \$0.209 per gallon. The cost of fuel used to generate electricity has jumped an unbelievable 70 percent in the last year. These ever-increasing petroleum prices have fueled the fires of inflation.

While the consumer of the Nation is squeezed tighter, the ownership of our energy companies is being concentrated into fewer and fewer hands. Any citizen who reads a newspaper or pays a heating bill or drives a car knows that something is seriously wrong. It is now up to the responsible leadership in government and business to develop an energy policy for the future which will insure a supply of low cost energy without unwisely depleting our valuable natural resources.

I hope that the study will give particular attention to the problems in high areas of high energy consumption such as the Northeast. New England, for example, has 8 percent of the Nation's population, but consumes more than 20 percent of the home heating oil. In fact, New Englanders consume more home heating oil than gasoline.

Our national energy policy and legislation have for too long favored the production areas and companies—particularly for gas and oil—at the expense of the American consumer. The new energy study must focus on means of redressing this illogical and unfair imbalance.

While this study is to be national in scope, there are issues of particular importance to my home State of Connecticut and the entire Northeast which must be examined carefully. Hard questions must be asked and complete answers given.

I urge the committee to consider the following:

The need for conservation of our own oil resources for times of emergency and increased use of imports in times of stability.

Decontrol of crude oil and refined products from Canada.

Decontrol of all imports from all Western Hemisphere sources.

Removal of all import restrictions on No. 2 (home heating) oil imports into the east coast.

Methods of insuring adequate supplies, at reasonable prices, of these two critical products.

Way of stimulating competition in the fuel oil market now controlled by a small number of giant companies.

The substitution of a tariff system for the present quota system for controlling oil imports as called for by President Nixon's own Cabinet Task Force.

The extent to which our present tax system causes disturbance and inefficiencies in the Nation's energy availability.

These are just some of the many issues which must be raised and considered, if the proposed study is to be meaningful.

We in Congress can no longer ignore the impending energy crisis this Nation faces. The primary burden of past errors and indecision has been borne by the homeowners and businessmen of the east coast, especially New England and New York. Unless the present system is restructured to serve the national interest, rather than a regional and commercial minority, every sector of the Nation will someday have to cope with the shortages and exorbitant prices we in the Northeast have experienced for years.

The CHAIRMAN. Thank you Senator Ribicoff.

Senator Tower has filed a statement for the record which will be included at this point.

STATEMENT OF HON. JOHN G. TOWER, A U.S. SENATOR FROM THE STATE OF TEXAS

Mr. Chairman: I appreciate this opportunity to comment upon S. Res. 45 which was introduced by my distinguished colleague, Senator Jennings Randolph. I am a cosponsor of this resolution calling for an in-depth investigation of the nation's energy resources and our future requirements for these resources. Indeed, I can think of few subjects for our deliberations here more urgent or more pervasive than the dangerous energy shortages which presently threaten our nation.

In comparison, other matters assume minor proportions. At its worst, a prolonged energy shortage could affect the amount of heat and light in virtually every home, factory, hospital and school throughout the land; at stake could be the possible cessation of all movement of automobiles, trucks, trains, busses, airplanes, and ships. Moreover, our national security could be seriously threatened. And, more importantly, our very existence could be jeopardized. Our vast energy uses are entwined in literally every facet and fibre of our lives. My imagination is able to conceive of few, if any, more pervasive or urgent concerns before this body than the preservation of adequate supplies of the four major energy resources—oil, natural gas, coal, and fissionable material—and the support of investigation into the potential of fusion power sources and solar power conversion.

In this Congress, I will reintroduce a resolution to authorize NASA to expand upon their research into small-scale solar power conversion on spacecraft to large-scale conversion through orbiting power stations. The potential of these future sources of power should be included in the Congressional consideration of our national energy policy.

While I hope that the energy shortage which I have described will never occur, I must admit that such an event is a possibility. I am convinced that immediate action is necessary to avoid an energy crisis.

The first step involved in taking such preventive action is the formulation of national energy policies. This is the thrust of Senator Randolph's resolution.

For many years, I have been concerned that the nation was losing its supplies of adequate and secure energy resources. My concern stems from the declining investment of risk capital in the energy resource exploration industries and the resulting decrease in exploration activity. For example, at the present time, domestic oil and gas exploration activity is at its lowest level since 1943. Oil and natural gas provide approximately 75 per cent of our energy requirements. Since these two resources provide the bulk of our energy requirements, my remarks in this statement will be directed primarily toward those resources.

The decline in exploration activity is, to a large degree, a direct result of policies emanating from Washington. Governmental policy has been negative during the past several years. An example of this negative attitude was the reaction of some members of the Executive Branch and the Congress to the recent 8 percent

increase in the price of domestically produced crude oil. This increase did not even offset the additional tax burdens placed upon the oil industry by the Tax Reform Act of 1969. Nor did this small increase nearly offset the increased exploration and producing costs which have risen as a result of inflation. These are the facts. Yet, the price increase was roundly criticized in Washington.

The end result of the discouraging economic and tax policies emanating from Washington has been a significant and alarming decrease in our exploration activity. This, in turn, has led to a decrease in our proven domestic reserves of oil and natural gas. In short, because of this decrease in exploration for new reserves of oil and gas, we have been consuming our proven reserves faster than we have been adding to them.

Recently we have realized the need to create comprehensive national energy policies, designed to insure adequate exploration, development, utilization and conservation of our limited, yet abundant, reserves of energy resources. Heretofore, we thought mostly in terms of individual resources.

For example, we set different regulating policies for all four resources. These resources have been regulated at different levels and by different departments of government. Ignored were the basic inter-relationships of these resources.

Let us examine one illustration of this important inter-relationship. At various levels of government, laws have been passed which greatly restrict emissions of sulphur particles into the air. Sulphur particles are emitted by the consumption of certain types of fossil fuels. Generally, these banned fuels were high-sulphur coal and fuel oil. The laws were passed to achieve a desirable and necessary result—clean air. They were passed, however, before adequate investigations were conducted to ascertain the availability of sources of fuel which could meet the strict anti-pollution requirements.

I would like to pursue further this example of the inter-relationship of energy resources to highlight the results of uncoordinated and sometimes conflicting government policies. After the laws were passed, the users of high-sulphur fuels naturally sought supplies of alternative fuels. A typical user, so affected, attempted to secure supplies of natural gas as a replacement for the banned fuel. Natural gas was chosen first because it pollutes the air least of all fuels. However, our producing reserves of natural gas have been dwindling over the past few years.

The primary cause of the diminishing supplies of natural gas has been, in my opinion, the short-sighted price setting policies of the Federal Power Commission. These policies sought to keep the price of natural gas low as an aid to consumers. However, because of the unrealistically low price of natural gas, the economic incentives to explore for new reserves were lacking. Thus, exploration for new reserves of natural gas has been declining steadily since the Federal Power Commission began to regulate the price of natural gas in 1954.

As a consequence of the demand created by new antipollution standards, the small amount of uncommitted producing reserves of natural gas were quickly contracted for. This left remaining a substantial amount of unsatisfied demand for other types of low-sulphur fuels.

Many users sought supplies of low-sulphur residual fuel oil. However, low cost imports had driven most domestic producers out of the market. Thus, there was virtually no excess domestic supply of this fuel to be found.

Logically, the affected user then sought supplies of low-sulphur residual fuel oil in the international markets. Here he found a convergence of peculiar, disconnected factors, which resulted in an extremely tight supply of fuel oil from foreign sources. Some of these factors included the closing of the Suez Canal in 1967, the shutting of the Trans-Arabian Pipeline for eight months in 1970, reduced production allowances imposed by Libya on producers in Libya, and a shortage of oil tankers to transport petroleum around the Cape of Good Hope.

Frustrated in their effort to locate other, more desirable fuels, the users sought domestic supplies of the least desirable alternative fuel—low-sulphur coal. In this case, the development of known deposits of low-sulphur coal had decreased over the past several years. This decreased mine development was due mainly to the expectations of the mine owners that increasing portions of future electric power generation would be fueled by fissionable materials. However, the nuclear power generating industry has encountered technical and environmental difficulties which have resulted in relatively few electric power generators being converted from coal to fissionable material. Nevertheless, long-term investment in the development of the coal mines had been forestalled or abandoned in anticipation of the coming nuclear electric power generation era.

Because some users have been unable to contract for adequate supplies of fuel, many of us have experienced the resulting effects of these shortages. By now,

we are all acquainted with brown-outs and even black-outs. These disturbing results will almost certainly increase in frequency, intensity and duration as our demand for energy increases and our supplies of energy resources continue to remain in short supply.

We have experienced mild power reductions this past winter. These energy shortages could have been much worse. We must not be lulled into a feeling of security just because we have managed to get through this past winter without severe power disruptions. We have been extremely fortunate. We have luckily experienced a mild winter; we had a small excess oil producing capacity which could be converted into fuel oil; and we called upon our good neighbor to the north, Canada, who had some excess oil and gas producing capacity and could sell to us increased amounts of oil and natural gas.

But we must not continue to trust to our luck and our neighbors. We must begin to formulate coordinated comprehensive policies which will result in our being able to supply the bulk of our own energy needs.

I have cited the many problems wrought by the single and laudable decision to clean up the air. This simple decision set off a chain of events still being felt. Involved have been various levels and departments of government—state and national. Yet these agencies of government have reacted without having a coherent and unified plan based upon carefully formulated policies. And this has been only one recent sample of the disjointed and conflicting consequences resulting from a lack of such policies. There are many other such examples of the havoc wrought through conflicting policies.

So, having recognized the lack of a comprehensive energy policy and the concomitant serious results which have followed, it should be evident that the formulation of such policies must be of the highest priority.

We have experienced energy shortages intermittently for several months. We have examined and recognized that the causes of the shortages of energy resources are mainly due to a lack of coherent national energy policies. Yet, we still have not even begun to formulate such policies.

I deplore the drift into a more and more serious energy situation. We must not simply slide into an era of catastrophic power shortages. To do so would be to jeopardize the security and safety of the American people.

Instead, we must act now to formulate comprehensive, coherent energy resource policies. Only by doing so will this country be assured of secure and adequate supplies of energy resources.

S. Res. 45 would authorize an in-depth investigation of our energy situation. Based upon this investigation the Senate Interior Committee would recommend national energy policies legislation. I urge the Committee to do so.

The CHAIRMAN. Before I call the next witness, the Chair would like to suggest that statements can be placed in the record and, if possible, attempts made to summarize them. We have a long list to be heard from today, and we want to complete the hearings on the pending resolution during the course of the day.

Our next witness is the Honorable Frank N. Ikard, former Member of the Congress, who is president of the American Petroleum Institute.

Mr. Ikard, we are delighted to have you here and to have the views of your institute.

STATEMENT OF FRANK N. IKARD, PRESIDENT, AMERICAN PETROLEUM INSTITUTE

Mr. IKARD. Thank you, Mr. Chairman.

For the record, my name is Frank Ikard. I am president of the American Petroleum Institute. I appear here in that capacity and also speak for the Mid-Continent Oil & Gas Association, the National Petroleum Refiners Association, the Rocky Mountain Oil & Gas Association and Western Oil & Gas Association.

In compliance with the request of the chairman, I will file my statement. I think it will suffice to say here that we enthusiastically endorse this resolution. We have felt for some time that there is a

great need for the kind of study that we think is envisioned by this resolution to where there is a meshing of all the governmental policies.

We pledge to you as you proceed in this that not only the American Petroleum Institute but the other organizations for whom I speak this morning will give you as complete and full cooperation as we possibly can.

With that, Mr. Chairman, I would like permission to file for the record my complete statement.

Senator BURDICK (presiding). Without objection, your complete statement will be filed.

Thank you very much.

(The prepared statement referred to follows:)

STATEMENT OF AMERICAN PETROLEUM INSTITUTE, MID-CONTINENT OIL & GAS ASSOCIATION, NATIONAL PETROLEUM REFINERS ASSOCIATION, ROCKY MOUNTAIN OIL & GAS ASSOCIATION, WESTERN OIL & GAS ASSOCIATION, PRESENTED BY FRANK N. IKARD

My name is Frank N. Ikard. I am president of the American Petroleum Institute but today I am appearing before you not only in that capacity but representing the viewpoint of the Mid-Continent Oil and Gas Association, National Petroleum Refiners Association, Rocky Mountain Oil and Gas Association and Western Oil and Gas Association.

Last year the American Petroleum Institute was asked to present its views as to S. 4092, a Commission type study of our national energy needs and problems. In response, I expressed those views in a letter to Senator Moss dated September 14, 1970. Although the format of Senate Resolution No. 45 differs from the earlier proposed Commission type study, it would appear that the objectives are essentially similar. We endorsed the idea of an energy study in 1970 and we reiterate our endorsement of such a study now.

We believe that an in depth study of the national energy requirements both long term and short term will help to bring about a greater public awareness of energy needs, and a more coordinated approach to governmental policies which impinge on the discovery and production of fuels. We believe a comprehensive overview is badly needed at this time. Such a study should help dispense with the current fragmented approach and result in a broader perspective for all participants.

We can no longer afford to have each separate issue treated as if it were unrelated to the overall picture. There must be recognition, at Federal, State and local levels, that all these issues converge and have a common impact.

With respect to the federal regulation of the field price of natural gas, last year we expressed the view that such regulation had failed to provide adequate incentives for exploration and development of natural gas supplies to meet current and future demands. The continuing declining trend in the reserves/production ratio underlines the gravity of this situation.

The 1969 major changes in the tax provisions have had, and will continue to have, a severe impact on oil, gas and mineral producers. In the petroleum industry the impact of these tax changes are on the order of \$700 million annually—funds which now are not available for reinvestment. In addition, the competitive position of the energy industry in its search for outside capital has been impaired.

Also affecting the domestic industry's ability to attract risk capital are the continuing attacks on the oil import control program by those who minimize the danger to national security of over-reliance on foreign oil supplies. The validity of this viewpoint is certainly questionable, in light of the recent and current OPEC negotiations.

One of the most difficult problems involved in any study of national energy needs and capabilities is to strike a proper balance between our energy requirements and our need to preserve and enhance the environment in which we all must live.

On the other hand, the importance of improving the quality of our air and water resources is self-evident. So is the need to preserve fish and wildlife.

In seeking these goals, however, sight should not be lost of the impact which government actions in this area can have on our energy supply picture. Unrealis-

tically rigid environmental requirements—which in some cases are unattainable under existing technology and not likely to be achieved within specified time limits—can jeopardize that energy supply which is the cornerstone of the public's comfort, health, enjoyment of life, economic progress and overall national security.

This problem is evidenced by the recurrent power shortages of the past year—shortages which the Federal Power Commission predicts will be with us for some time to come. Consideration of these problems cannot be deferred without heavy cost to the nation. We are confident that the study called for by S. Res. 45 will not delay the kind of attention that is so urgently needed.

These policy determinations concerning natural gas pricing, taxes, imports and ecology, are not separate and distinct; they are inextricably linked in the formulation of sound government energy policy. Fragmentation of government consideration of these various aspects bearing on energy has led to differing, sometimes conflicting and often confusing results.

Presently oil and gas supplies about 75 percent of our total energy needs. These needs are expected to triple between now and the year 2000. Even assuming some fluctuations in the percentage contributions of the various energy sources it is obvious that the oil and gas industry faces the need for huge capital investments in the near future. Petroleum is a high risk, capital intensive industry, and expansion in discovery, refining and transportation facilities requires vast amounts of capital—an estimated 300 billion dollars over the next ten years. Raising this kind of capital requires long range planning. Planning, in turn, requires stability and continuity in governmental policies.

The consumer, the industry and the government should all be made aware of the importance of a sound and stable national energy policy. No group can make intelligent long range decisions if rules reflecting policy are in a constant state of flux.

We urge that your proposed study be made in depth in the hope and expectation that such a study will be useful to the Congress and the Executive Branch in unifying and stabilizing the important government rules affecting energy. This will facilitate the energy industry's ability to meet the nation's vital energy requirements.

The American Petroleum Institute will be pleased to cooperate fully with such a study group.

Senator BURDICK. Do you have any questions?

(No response)

Senator BURDICK. Thank you very much.

Senator HANSEN. Mr. Chairman, while Mr. Ikard is still here, might I observe, I have not had a chance to read his statement. I certainly will be most interested.

Would you be willing, sir, if we did have some questions, that we submit them to you in writing and you answer them?

Mr. IKARD. Senator Hansen, we will be very happy to do that and to furnish any information that might be at our disposal.

Senator HANSEN. And furnish the answers for the record.

Senator BURDICK. That will be done.

(The information referred to has not been supplied in time to be included in the record.)

Senator BELLMON. Mr. Ikard, in your knowledge of the petroleum industry, do you doubt that we have in this country the natural resources that would make it possible for us to meet our energy requirements?

Mr. IKARD. It would be my judgment, Senator Bellmon, as an individual that we do have the resources if properly developed and if proper policies are espoused, that we can substantially meet our energy demands. I have indicated in my prepared statement two or three areas where I feel we have been or have policies that are contrary to that very desirable results that you mention of having some degree of self-sufficiency.

Senator BELLMON. I have not had a chance to read your statement. Do you tell us in the statement what these desired policies are?

Mr. IKARD. I do not attempt at this time to get into what we think policy would be. I assume that if the resolution is adopted, at that time, as you go along, we would have an opportunity, which we would welcome, to have an input with the committee in many areas.

Senator, I do mention that the price of natural gas, for instance, in our view has made an artificial demand for that very essential and desirable and clean fuel to the point that it has diminished the reserves and there has not been the economic incentive to replenish them.

I make the same point, too, sir, that you make, the point that at a time when we have diminishing reserves, the national policy is such, aside from some 750-odd million dollars off of the top of an industry that is already having difficulties, to where the exploratory average has been diminished in a marked way as you indicated in your questioning of Senator Randolph.

We also feel that foremost in our minds these days is the matter of preserving our environment and improving it. We share the view that Senator Jackson expressed when we feel that it is much more challenging and certainly possible to improve our environment and the quality of our life and still develop our energy resources to the point that the health and the comfort of the people that are dependent upon adequate energy supplies can be met. But we did not go in in any specific great detail at this point in time on just what these solutions to questions might be, other than to say that we very strongly favor this investigation.

Senator BELLMON. Thank you, Mr. Chairman.

Senator HANSEN. Mr. Chairman, if I may be permitted just one question.

On page 2 of your statement, I note that you say:

Also affecting the domestic industry's ability to attract risk capital are the continuing attacks on the oil import control program by those who minimize the danger to national security of over-reliance on foreign oil supplies. The validity of this viewpoint is certainly questionable, in light of the recent and current OPEC negotiations.

I could not agree with you more. I would like to ask, there has been a lot of criticism in recent years on two other facets of the overall management of the petroleum industry that I think are very important. I refer specifically to the Interstate Oil Compact Commission's activities insofar as regulatory authorities are concerned and would call your attention as well to the Texas Railroad Commission. In your judgment as a person who has had considerable interest in the production and in the discovery and production of oil and natural gas, have these activities, the regulatory authorities, served the public well in your judgment, or not well?

Mr. IKARD. I think with reference to the Texas Railroad Commission, Senator Hansen, if I may try to dredge up from my mind some statistics that I think best develop that point, the great east Texas oil field, which is the greatest one that has been discovered within the United States, the recovery from there would have been something like 1 billion barrels of oil but for the conservation practices of the Railroad Commission. With those practices in effect, the recovery is estimated to be something in the order of $6\frac{1}{2}$ or 7 million. So I think these figures answer your question in depth.

Or to say it another way, the public has had the value that comes to them from $4\frac{1}{2}$ to 5 billion barrels of desirable energy that they would not have had but for those conservation practices.

Senator HANSEN. Now, would you say that—let me ask you, what is your opinion as to the objective of the IOCC? Has it been the maximum recovery of resources and the prevention of physical waste, or has it been directed, as some people seem to believe, toward a price-fixing mechanism so as to return only the greatest amount of profit in the shortest amount of time to the oil industry?

Mr. IKARD. Senator, I have been in and around and observed the IOCC as a lawyer, as a Member of Congress, and as one who is in the oil business. I have never seen anything in my experience that would indicate that they ever concerned themselves or dealt with it or in any way became involved with price or anything of that sort. The discussions that they have, and I know many members of this committee are familiar with them, deal with the matters that you indicated of conservation and preservation and orderly development of our resources. And I think it makes a great contribution to that end.

Senator HANSEN. One final question. A year ago or more, there was criticism of the IOCC and the operations of the industry generally by pointing out that there are some 340,000-odd stripper wells in this country that, in the opinion of some of the "experts" at that time felt ought to be abandoned. They said it is not economical to try to recover the oil that is being brought in. I think these wells would represent some 8 billion barrels of reserves, roughly.

There were those who said we should forget about this oil, just leave it in the ground and buy oil from the Middle East, where we can buy it a lot cheaper.

Do you have any comments that you would care to make or would be willing to make on the wisdom of that?

Mr. IKARD. Yes, sir, this is an area that I would think would be developed in depth as a study such as this has gone along.

First of all, the stripper wells are an important part of the reserves of this country. I think it is important to have a study or an investigation such as the one that is envisioned here simply because, hopefully, the public would better understand the operations and the problems of the energy business, all the facets of it, and particularly my interest would be in the petroleum. The stripper operation, a typical one, is a family operation. I think it is analogous to some degree to the family farm, which we have all had great interest in. When you consider the economic impact, disregarding the effect it would have on literally letting go down the drain an important energy source—these stripper wells are normally operated, as Senator Bellmon well knows—in his State and in north Texas where I come from, are people who have maybe one or two leases and a father and two sons operate it. So when you say in effect that those would go, you are in effect confiscating literally thousands of small businesses in this country as you would if you confiscated small farms or small stores. I would think that the social and economic impact of that is something that should deserve considerable thought and consideration.

Now, another thing as to the pure energy side. As you indicated, we are talking of something in the order of 8 to 9 billion barrels of oil. The demand for oil and oil energy has increased so and the price has increased so that more recently, and just, as you indicated, in the paper this morning, there are indications that generally, I think the

the energy costs around the world are going up. So it is entirely possible that these stripper operations, in my view, and I speak now only as an individual, in a very short time might become economic.

I think it is analogous, again, to the shale situation where, if the price gets right and the technology increases a little bit, then it will come into the market. I think you have opened up an area, Senator, that we could spend a day on, really.

Senator HANSEN. I would like one more question if I may.

We had a fuel crisis in this country in 1967—not so much in this country but because of the impact that the 6-day war had on Europe and on Japan. We faced a very difficult situation. In a few words, could you describe what the domestic oil industry did to rise to the occasion in that period?

Mr. IKARD. Very briefly and certainly an oversimplification of a highly complicated problem was that the United States or the Western Hemisphere production reserves were called on to meet the requirements on a temporary basis of the United Kingdom and to some degree, Western Europe, to the point that there was averted there what otherwise could have been a very serious energy and economic crisis in that part of the world but for the reserves or the cushion or the inventory, whatever noun you want so use, that we had.

Senator HANSEN. The stripper wells played a part in it?

Mr. IKARD. And the stripper wells were a very important part of it, if that answers your question.

Senator HANSEN. Thank you.

Senator BURDICK. Any other questions?

(No response.)

Senator BURDICK. Thank you very much, sir.

Our next witness will be Mr. Carl E. Bagge, president of the National Coal Association.

STATEMENT OF CARL E. BAGGE, PRESIDENT, NATIONAL COAL ASSOCIATION

Mr. BAGGE. Mr. Chairman, members of the committee, I have a very brief statement I would like to read.

My name is Carl E. Bagge. I have been president of the National Coal Association since January 1, 1971. Prior to that time I served for 6 years as a member of the Federal Power Commission where problems of energy supply were of constant concern.

The record shows that the National Coal Association and the National Coal Policy Conference have urged the adoption of a national fuels and energy policy for more than 10 years. For most of those years the coal industry stood alone in advocating such a national policy. We welcome to our ranks others in the energy industry who have come around to the views expressed by spokesmen for the coal industry as early as 1959.

My predecessor as president of the National Coal Association, Mr. Stephen F. Dunn, appeared before this committee in 1961 in support of the adoption of a national fuels and energy policy. The distinguished senior Senator from West Virginia, Senator Randolph, in 1961 sponsored Senate Resolution 105 providing for the creation of a special committee on a national fuels study. The study subsequently was

undertaken by the National Fuels and Energy Study Group of which Samuel G. Lasky of the Department of the Interior was chairman. Various industries, including coal, were represented on the study committee.

Mr. Lasky's group submitted a 499-page report to this committee under date of September 21, 1962, but no action was taken toward establishing a fuels and energy policy at that time.

Today, Mr. Chairman, it is obviously far more urgent than it was a decade ago that the Congress establish a comprehensive national fuels and energy policy.

The fuel shortages, brownouts, and blackouts which have plagued this Nation in the past few years clearly demonstrate that the problem of energy supply demands immediate attention. All segments of our society—government, industry, and consumers—now recognize the need for a comprehensive energy policy.

To us it is significant that the authors of the resolution now before you—Senate Resolution 45—are the chairman and other members of this committee and, once again, the senior Senator from West Virginia. We are confident that from the study called for in this resolution will emerge a national policy that will guide the Nation through what is certain to be a difficult period of energy supply, particularly in view of our emerging environmental concerns.

The Senate Public Works Committee staff recently estimated that U.S. energy consumption will increase 41.5 percent from 1968 to 1980, and 171 percent to the year 2000. The staff repeated the now familiar statement that demand for natural gas and crude petroleum are outstripping current additions to provide reserves, "and the time will soon arrive when the production of these fuels will be at a maximum."

It is now apparent that our supplies of liquid and gaseous fuels will certainly have to be supplemented by other fuel resources, including coal. It is now well established that coal gasification and liquefaction are feasible, but they are not yet economically competitive with crude petroleum and natural gas. We believe an energy policy study will reemphasize the urgent need to pursue coal gasification and liquefaction as national goals in the highest priority in order to stretch out our supplies of gas and oil.

Similarly, the limited supplies of uranium may also present a problem in meeting our future requirements for atomic power. We in the coal industry have long recognized the importance of the atom in the Nation's energy future but have attempted to point out that the most beneficial use of this valuable resource will be in greater reactors and the emerging breeder reactors. A thorough energy study will determine whether we are justified in continuing the policy of depleting our uranium resources on an excessive number of nuclear powerplants of current design.

To date we have been dealing with our energy problems on a piecemeal basis. We have reacted to fuel shortages and power deficiencies with emergency measures. The time is now upon us when we must carefully draft a national policy that will take into account all of the Nation's energy resources, and plan for their most productive use.

In short, Mr. Chairman, the need has grown more urgent in the last decade for a study that leads promptly to the adoption of a national energy policy. Conflicting legislative and regulatory policies

must be supplanted by an overall energy policy—one that will assure the Nation of an adequate supply of energy for the years ahead.

I would like to say, Mr. Chairman and gentlemen of the committee, that both General Moody and Mr. Plathan, who led for over a decade, through the National Coal Policy Conference, the fight of the coal industry for the adoption of an energy policy, have not asked for time today but are present here in the room and concur fully with the statement.

Senator BURDICK. Thank you for a very excellent statement.

Senator Anderson.

Senator ANDERSON. You said there are 499 pages to this report?

Mr. BAGGE. Of the report, yes, sir, that emerged from the resolution back in 1961.

Senator ANDERSON. After several years of work?

Mr. BAGGE. Yes, sir.

Senator ANDERSON. That is a large report, 499 pages all at once? I hope the data was not outdated as many long-term studies I have seen have been.

Mr. BAGGE. Yes, sir, it is evidence of the study that was made at that time, Senator.

Senator BURDICK. Senator Fannin?

Senator FANNIN. Mr. Bagge, considering the economics, you state that "it is now well established that coal gasification and liquefaction are feasible, but they are not yet economically competitive with crude petroleum and natural gas." And you recommend that this study go into this matter.

Is it not true, though, that in some areas of the country there is coalbed project development, or the plant is right over a bed that is committed to other fuels?

Mr. BAGGE. Generally speaking, Senator, the efforts we are now trying to make in the coal gasification technology have not demonstrated that we could use nationally the existing level of technology to supplement our domestic—

Senator FANNIN. I understand that. Perhaps I did not make my question clear.

I am trying to determine the economics involved in utilizing coal in the production of electricity; for instance, over a coalbed, where you have a plant such as you have in the Four Corners area, to be specific.

Mr. BAGGE. Yes, sir.

Senator FANNIN. Is it not more economical to use that type of program than it would be to bring, say, natural gas into that area, or would you like natural gas?

Mr. BAGGE. That may be true in some areas, Senator, and not in some others. Are you referring to the mine mouth utilization—generation of electric power at the mine mouth?

Senator FANNIN. I am referring to the Four Corners area, where you have several developments. You have development coming through and I am quite familiar with some of the problems you have there and I know the studies that are being made to try to solve some of these problems. As far as some problems are concerned, this is being overcome, but as far as the sulfur content and some of the gases, the problem is not being overcome. I know that you are very hopeful that you will solve that problem. I think the economics enters

into all of these matters. I have seen some of the reports where they were projecting what might be done, of course, in the sale of sulfuric acid or some type of sulfur that could be utilized for many purposes, perhaps where it is not utilized today, in soil amendment, that type of activity. Are you making studies in this regard?

Mr. BAGGE. Yes, sir, Senator, I am pleased to say that for the first time in well over a decade, the current budget provides a substantial increase—we in the coal industry think it is not adequate, but for the first time there has been a recognition by the administration through a \$3.9 million increase in the appropriations for the Office of Coal Research specifically to fund to a higher level the liquefaction and the gasification technology. We endorse this, we support this wholly. We are very gratified by the fact that coal has now in the last year or two been accorded the increasing recognition by the policy planners within the Government and has led to this heightened research activity.

Senator FANNIN. But you feel that the liquefaction of the coal to bring it into our economic streams such as we now have with the natural gasolines and the fuel lines is a better utilization of it than to have it utilized at the powerplant—

Mr. BAGGE. Oh, no, sir, I am sorry. I misunderstood your statement.

Let me say not at all. We believe coal has to be consumed as coal in this country. What has happened in the last half decade through the imposition of various air pollution restrictions in the urban areas of the Nation has been virtually writing off of the tremendous Appalachian eastern coal, which happens to have a higher sulfur content than the coal, for example, in the State of Arizona. We cannot pursue this policy much longer. We have to redeem the coal and we have to use the coal as coal in the generation of electric power.

Senator FANNIN. That was my point. So you are going for the development of a procedure to recapture, say, the sulfur content—

Mr. BAGGE. Yes, indeed, Senator. One of the indispensable elements of any kind of a rational natural research policy necessarily has to include not only fuel coal, which provides 88 percent of this Nation's domestic fuel reserves, not only for its conversion into natural gas and its liquefaction into petroleum products, but in necessarily has to be the consumption and utilization of coal as coal to serve the energy markets and the generation of electric power. So that SO₂ removal technology, which we have not perfected yet, has to be an indispensable element. I would assume that when this is rationalized through this energy study, there has to emerge as a national goal also the redemption of the eastern coal and its utilization of coal with the kind of SO₂ removal technology which will redeem this vital resource for the Nation once again.

Senator FANNIN. Thank you.

Senator BURDICK. Senator Jordan?

Senator JORDAN. No questions.

Senator BURDICK. Senator Hansen?

Senator HANSEN. Thank you, Mr. Chairman. I do have a question.

I refer once more to the same sentence Senator Fannin called to your attention on page 3:

It is now well established that coal gasification and liquefaction are feasible, but they are not yet economically competitive with crude petroleum and natural gas.

Now, is it not a fact, Mr. Bagge, that for several years, for more than a decade, the price of natural gas has not been determined by the demand in the marketplace, but rather arbitrarily determined by executive action? Is that a factual statement?

Mr. BAGGE. Well, having been a part of the process, Senator, as a member of the Power Commission, I have to plead guilty that it has indeed been established by action of a regulatory body, the Federal Power Commission.

Senator HANSEN. Is it true that we have, because the price of gas has been lower than it might otherwise have been, we have not been using it for as high an environmental priority usage as it might otherwise have been used?

Mr. BAGGE. Senator, I have said publicly for a number of years that the artificial restraints on the field price of natural gas has led to two things: First, to the establishment of an artificial market because of its extensive employment as a boiler fuel in the generation of electric power, so that on the one hand it has increased the market artificially, and on the other hand, it has unfortunately, because of that, depressed the incentive to produce the quantities of gas. This has led me, 2 years ago, to advocate a complete reversal in our regulatory policy with respect to this important resource. I am delighted to see that you joined, Senator, in the introduction with Senator Tower and Senator Bellmon and Senator Pearson, the bill which I transmitted to Senator Tower in the last session of Congress.

I was gratified and am grateful to you for that.

Senator HANSEN. Would it be your feeling that if the price of natural gas were allowed to become established to where it would, with all the forces in a free interplay and economy being allowed to work, not only encourage the further exploration and development of natural gas, but at the same time, would it not give quicker impetus to the role that coal gasification and liquefaction could play in trying to meet all of our energy demands?

Mr. BAGGE. There is no question about that. I think that if the price of gas, the field price of gas were to be adjusted through normal market forces to the value which our society would, if it were free to do so, attribute to this fuel, inevitably, there would be a price rise. But at the same time, that would narrow the margin between the economic feasibility, which is the problem to which you addressed your original question, would narrow the margin between the problem which we in the coal industry have with respect to developing the technology to make feasible economically the conversion of this vast resource into energy forms that can be utilized, narrowing that margin, but in narrowing that margin, it would enhance the utilization of coal and make economically feasible the employment of coal in various conversion techniques, which it seems to me is in the public interest.

Senator HANSEN. In a word, then, would it be your opinion, that decontrol of the price of natural gas would in all facets of the effects that it would have upon the energy industry, serve the public purpose well?

Mr. BAGGE. I have said so for 2 years, Senator, and I would reiterate today that it is indeed in the public interest.

I think your concerns and my concerns and views in this area are well known and it is reflected in the bill which you and Senator Tower considered last session, which I support.

Senator HANSEN. I think you have been honest, you have been fair, and, unlike some people, you find it not impossible to admit that an old policy may have been in error.

I compliment you for that, sir.

Mr. BAGGE. Thank you very much, Senator.

Senator BURDICK. Our next witness will be Joseph Brennan.

STATEMENT OF JOSEPH BRENNAN, DIRECTOR OF MARKETING AND RESEARCH, UNITED MINE WORKERS OF AMERICA

Mr. BRENNAN. Thank you, Mr. Chairman. At the request of the chairman, I will attempt to summarize the statement I have here and file the entire statement for the record.

Senator BURDICK. The entire statement will be made a part of the record.

Mr. BRENNAN. Mr. Chairman, members of the committee: My name is Joseph P. Brennan. I am director of research and marketing for the United Mine Workers of America.

I appear here today for the active and retired coal miners in the anthracite, bituminous, and lignite mining industries of the United States, their families and in a sense, the communities in which they live and work.

For many years the United Mine Workers of America has supported the establishment of a national energy policy. Our support for such a policy was not difficult to understand.

Coal is America's basic energy resource. More than 80 percent of all fossil fuel reserves is in the form of coal. The fullest development of those resources would mean much to the coal miners of the United States in terms of wages, welfare fund payments, and other economic advantages.

Opponents of a national energy policy have read into our support a position of vested interest.

This is not the case. We never sought the security that can come only with the loss of the free market system. What we did seek, and what we still seek, is a rational framework within which coal can compete for its future, and within which the vast reserves of coal can be fully developed.

Nevertheless, the question of an energy policy now transcends any parochial interest, instead, the events of the recent past have raised it to an issue of urgent national necessity, an issue that must concern every American interested in the future of the Nation.

We in America have never known energy shortage. In fact, our history has been characterized by energy abundance, by the ability of American industry to produce energy in abundance, and by the willingness of the American people to use it in ever increasing amounts.

Our historic abundance, however, has given way to an unaccustomed scarcity. In the place of power without limit, millions of Americans have come face to face with the need to curtail power utilization, to forego the full enjoyment of their present power equipment, and even to look to a future where power will become an item of increasing luxury.

There is even a school of thought in this Nation which suggests that the further development of our energy industry should be curtailed in the interest of environmental protection. According to this group, the needs of the environment transcend those of power producers and consumers.

We of the United Mine Workers of America totally reject the "no growth" concept. To us it is a measure of defeatism entirely out of touch with the traditions of America. It would maintain a status quo, a status quo which would forestall Americans from increasing their standard of living and which would consign millions of our disadvantaged to lives of poverty and hopelessness. We believe that we can have environmental quality and an increasing standard of living. We believe that the genius of American technology and a firm national resolve to do what is necessary can permit us to grow both materially and in the quality of life. We reject any other course.

The question of an energy policy must also come to grips with the question of American foreign trade. At the present time America imports relatively little of its total energy requirements. Masked by this overall figure, however, is the startling fact that much of our east coast energy requirements for utility purposes are currently supplied by a foreign fuel.

Also hidden in the general figures is the steady growth of such dependence and the chilling fact that there are few, if any, readily available substitutes for foreign residual oil in the event it is cut off for any reason.

A large part of the problem of an energy policy is the present allocation of research and development funds. In our view, the key to the future of energy in the United States is held by our scientists and engineers. Through their efforts America can develop her indigenous resources and more importantly, can use them without insult to the environment. We can use high sulphur West Virginia coal. We can transmit Montana lignite over longer distances. We can improve the efficiency of our thermal stations. We can, in fact, have growth and environmental purity.

Along that line, I noted, Senator Burdick, that you made reference to MH power. For many years the UMW have supported this concept. I am on some of the committees of the office of coal research which this year will begin to look into that program. It is my earnest hope we can get going on that, because it does give us a way to improve our efficiency, to curtail the amount of water that is necessary to generate power, and to reduce the pollution from utility stations. It is an example of an opportunity that we have not taken full advantage of and I hope we can address it.

Unfortunately, in our judgment, there has been a misallocation of our resources in the R. & D. field. We have spent much for nuclear power and little for coal power. We have chosen to follow the route of the atom and have ignored the very real possibility of coal and other fossil fuels.

It is not my intention here today to dwell upon the problems inherent in nuclear power. But I would be remiss if I did not suggest that a part—and even a large part—of our current difficulty in energy has come about because of the premature acceptance of the atom as the savior of the energy force.

Overshadowing all other facets of the energy problem is the staggering demand for energy which seems to be inherent in our national life.

What is important is to realize that the consumption of energy is certain to grow to staggering proportions. Such growth will inevitably place extreme demands upon all of our energy resources.

Measured against this growth are the available resources to meet it. Even a cursory examination of this demand-supply equation indicates that our Nation must reevaluate those policies which have guided its energy industry to date. Any other course is predestined to lead up to a national disaster or to a stagnant standard of living, a circumstance which is intolerable for our Nation.

We suggest that the past policy framework within which energy operated is no longer adequate. We suggest that fragmentation of regulation, and laissez-faire in competitive relationships, no longer meet the realities of the seventies and beyond. What must be done is to totally reexamine the current energy framework and to change those parameters which must be changed, to redefine those goals which must be redefined, and to establish a new energy policy in keeping with our Nation's present and future needs.

Naturally, the United Mine Workers of America has a great many thoughts on what the new energy policy should be. We will not presume, however, to offer them to you here today. Rather, we will only suggest that the time is long past when talk of an energy policy is appropriate. It is now time to undertake whatever studies are needed and then to promptly move toward the adoption and implementation of an energy policy.

We will presume to suggest, however, what to our mind should be the goal of our Nation's energy policy. That goal should be:

The United States of America is committed to encouraging the greatest possible use of energy without undue insult to the environment; with proper regard for the social, economic, and cultural values of our Nation; and with the maximum development of indigenous energy resources.

Thank you very much.

(Mr. Brennan's prepared statement follows:)

STATEMENT OF JOSEPH P. BRENNAN, DIRECTOR, RESEARCH AND MARKETING,
UNITED MINE WORKERS OF AMERICA

Mr. Chairman and Members of the Committee: My name is Joseph P. Brennan. I am Director of Research and Marketing for the United Mine Workers of America.

I appear here today for the active and retired coal miners in the anthracite, bituminous and lignite mining industries of the United States, their families and in a sense, the communities in which they live and work.

For many years the United Mine Workers of America has supported the establishment of a national energy policy. Our support for such a policy was not difficult to understand. Coal is America's basic energy resource. More than 80% of all fossil fuel reserves is in the form of coal. The fullest development of those resources would mean much to the coal miners of the U.S. in terms of wages, Welfare Fund payments and other economic advantages.

The coal industry of the U.S. has gone through a period of severe decline. Major markets were lost. Foreign fuels threatened entire sections of our markets, and atomic energy loomed just over the horizon. The mechanization of the coal mines resulted in massive job losses, losses make none the less painful by their inevitability, given the economic facts of the time. Given this background, it is easy to see why. Opponents of a national energy policy have read into our support a position of vested interest. This is not the case. We never sought the security

that can come only with the loss of the free market system. What we did seek, and what we still seek, is a rational framework within which coal can compete for its future, and within which the vast reserves of coal can be fully developed.

Time after time the attitude of many of these people, and even members of the Congress, was that the coal industry was looking for a way to stay alive, that their cry for a national energy policy was merely a device to secure a safe and secure market for coal.

Nevertheless, the question of an energy policy now transcends any parochial interest. Instead, the events of the recent past have raised it to an issue of urgent national necessity, an issue that must concern every American interested in the future of the nation.

Energy is the basis of our civilization. With it we can continue to make social, economic and political progress. Without it we are destined to sink to the level of a second class power, unable to fulfill our historic mission either to our own people or to those nations who look to us for protection and example.

We in America have never known energy shortage. In fact, our history has been characterized by energy abundance, by the ability of American industry to produce energy in abundance, and by the willingness of the American people to use it in ever increasing amounts. We have used energy to heat and cool our homes, to power our cars and even to brush our teeth. We look to energy to make our deserts bloom, and somehow to continue to reduce the drudgery that is still too prevalent in our industrial and business life.

Our historic abundance, however, has given way to an unaccustomed scarcity. In the place of power without limit, millions of Americans have come face to face with the need to curtail power utilization, to forego the full enjoyment of their present power equipment and even to look to a future where power will become an item of increasing luxury.

There is even a school of thought in this nation which suggests that the further development of our energy industry should be curtailed in the interest of environmental protection. According to this group, the needs of the environment transcend those of power producers and consumers.

Environmental considerations affect energy at all levels, from regulations dealing with strip mining to the limits that are placed upon the emission of sulphur oxides and other pollutants at the utility stack. However, it should be pointed out that steps to control pollution caused by the consumption of energy are not limited to the industrial sector. Rather, the efforts to control noxious emissions from motor vehicles are now affecting, and will affect, every motorist in the U.S.

We of the United Mine Workers of America totally reject the "no growth" concept. To us it is a measure of defeatism entirely out of touch with the traditions of America. It would maintain a status quo, a status quo which would forestall Americans from increasing their standards of living and which would consign millions of our disadvantaged to lives of poverty and hopelessness. We believe that we can have environmental quality and an increasing standard of living. We believe that the genius of American technology and a firm national resolve to do what is necessary can permit us to grow both materially and in the quality of life. We reject any other course.

The question of an energy policy must also come to grips with the question of American foreign trade. At the present time America imports relatively little of its total energy requirements. Masked by this overall figure, however, is the startling fact that much of our east coast energy requirements for utility purposes are currently supplied by a foreign fuel. Also hidden in the general figures is the steady growth of such dependence and the chilling fact that there are few, if any, readily available substitutes for foreign residual oil in the event it is cut off for any reason.

A large part of the problem of an energy policy is the present allocation of research and development funds. In our view, the key to the future of energy in the United States is held by our scientists and engineers. Through their efforts America can develop her indigenous resources and more importantly, can use them without insult to the environment. We can use high sulphur West Virginia Coal. We can transmit Montana lignite over longer distances. We can improve the efficiency of our thermal stations. We can, in fact, have growth and environmental purity.

Unfortunately, in our judgment, there has been a misallocation of our resources in the R&D field. We have spent much for nuclear power and little for coal power. We have chosen to follow the route of the atom and have ignored the very real possibility of coal and other fossil fuels. We have been mesmerized like the Forty-niners of the California gold rush with the quick solution while we have ignored

the much greater riches inherent in the development of our more mundane, but also more lucrative, conventional energy resources.

It is not my intention here today to dwell upon the problems inherent in nuclear power. But, I would be remiss if I did not suggest that a part—and even a large part—of our current difficulty in energy has come about because of the premature acceptance of the atom as the savior of the energy force.

Overshadowing all other facets of the energy problem is the staggering demand for energy which seems to be inherent in our national life. I will not refer to the many projections for such demands that have been made. Nor is it necessary to underscore the fact that electric utilities badly underestimated the growth in demand. What is important is to realize that the consumption of energy is certain to grow to staggering proportions. Such growth will inevitably place extreme demands upon all of our energy resources.

Measured against this growth are the available resources to meet it. Even a cursory examination of this demand-supply equation indicates that our nation must reevaluate those policies which have guided its energy industry to date. Any other course is predestined to lead up to a national disaster or to a stagnant standard of living, a circumstance which is intolerable for our nation.

It is a happy occurrence for us that coal, alone, among the fossil fuels is in abundant supply. Coal, alone, seems able to meet the needs of a growing energy complex, not only in the field of electric generation, but also as a supplement to our rapidly decreasing supply of petroleum and natural gas.

The only feasible alternative to coal seems to be an increasing reliance upon nuclear power in the field of electric generation, or imported fuels for our gas and oil needs. Both courses are fraught with problems, problems of health and safety on the one hand, problems of national security on the other.

In any event, we suggest that the past policy framework within which energy operated is no longer adequate. We suggest that fragmentation of regulation, and 'laissez-faire' in competitive relationships, no longer meet the national need. What we must have is a reorientation of our policy to meet the realities of the 70's and beyond. What must be done is to totally reexamine the current energy framework and to change those parameters which must be changed, to redefine those goals which must be redefined and to establish a new energy policy in keeping with our nation's present and future needs.

Naturally, the United Mine Workers of America has a great many thoughts on what the new energy policy should be. We will not presume, however, to offer them to you here today. Rather, we will only suggest that the time is long passed when talk of an energy policy is appropriate. It is now time to undertake whatever studies are needed and then to promptly move toward the adoption and implementation of an energy policy.

We will presume to suggest, however, what to our mind should be the goal of our nation's energy policy. That goal should be:

The United States of America is committed to encouraging the greatest possible use of energy without undue insult to the environment, with proper regard for the social, economic and cultural values of our nation and with the maximum development of indigenous energy resources.

Senator BURDICK. I want to thank you for your contribution this morning. I want to commend you on your fine statement, particularly that closing paragraph. It wraps it all together.

Senator JORDAN?

Senator JORDAN. Thank you.

Mr. Brennan, you say that "It is a happy occurrence for us that coal alone among the fossil fuels is in abundant supply." The known reserves of coal would supply the energy needs of this Nation for how long?

Mr. BRENNAN. At the present rates of consumption, Senator, approximately a thousand years. Obviously, the present rates of consumption are going to increase dramatically, but I think we are talking in terms of centuries for—coal can meet at least the present share and an increasing share of our energy demands.

Senator JORDAN. If energy demands of the Nation doubled every 10 years, that would be considerably shortened?

Mr. BRENNAN. That is what I said. That is true. I said a thousand years at the present rate.

Senator JORDAN. You are speaking of the known reserves. There must be countless unknown reserves yet to be discovered.

Mr. BRENNAN. Of coal, Senator?

Senator JORDAN. Yes.

Mr. BRENNAN. Yes; there are.

We know in general what they are, but specific locations, specific amounts, we really have not done enough work on. We do know, however, that they are vaster by far than any other possible reserve.

The next largest one, Senator, of course, is oil shale, which also occurs in large amounts.

Senator BURDICK. Did you take into account that excellent lignite coal that we have out in the West?

Mr. BRENNAN. Yes, sir; I sure did.

Senator BURDICK. Senator Fannin.

Senator FANNIN. Thank you, Senator.

I am very interested in your statement, Mr. Brennan. I certainly appreciate your great concern over the developments that must go forward as far as our dependency upon fuel from foreign resources. I realize what is happening and the trend that many would like to establish in that regard. But we do have the problem, though, of economics. I keep bringing that up because I feel that this is going to be a decision as to what will be done.

You say that we can use high sulfur West Virginia coal and I do feel that we have a problem there as far as the atmosphere is concerned. But if we could go forward together in research so that we can perfect a method of recovering the sulfuric acid, whatever might be involved, and be able to market these products—I have been in that field of endeavor, the chemical field, so I knew there is a continuing increase in the need for these products at a price, as I mentioned earlier, in the soil amendment, and what can be done.

Are you at all involved in research work in that regard?

Mr. BRENNAN. Senator, the United Mine Workers does not sponsor research as such, but as Director of Research and Marketing, I am very heavily involved in the entire research field. One of the very strong feelings that I have is that if we have a proper energy R. & D. policy and if we devote a proper amount of resources, we can in fact use our coal resources to their maximum potential.

For example, about a year ago, the Commonwealth Edison Co. of Chicago petitioned the Federal Government to import low sulfur fuel oil into the Chicago metro area. The Commonwealth Edison Co. at that time proposed to pay about 20 cents per million B.t.u.'s more than they were currently paying for their relatively high-sulfur Illinois coal. At the same time, in the Office of Coal Research, I and others have been urging the development of something called low sulfur coal research. It is a project in OCR conducted by a Pittsburgh Coal Co. and they have for years been attempting to get money for a pilot plant. We are talking about \$5 or \$10 million. The economics indicated and still indicate that if that powerplant had been built and if the data that we had were substantiated, the Commonwealth Edison Co. could have used a fuel made from Illinois coal at a price which was competitive or cheaper than the oil that they were going to import

from Venezuela and the Middle East. Now, to me, and my basic training is in economics, to me the development and the promotion of this type of program is absolutely essential and there is nothing that is insurmountable in carrying it to its success.

Senator FANNIN. I wholeheartedly agree with you and I think that many times, we have made mistakes in not going forward with these programs just because they appeared very costly; but then, as we developed these problems, and now with the problems with the atmosphere and the great emphasis that has been placed on cleaning up our smokestacks, we find in most every industry a source of supply of these sulfur products. Although we were in short supply and were importing sulfur not too many months ago, we now reserve the picture so that we need a marketing program on sulfur as well as on coal.

I think this is all within the concept of your responsibility and I do hope that you give serious consideration to the assistance that you can get in this regard.

Mr. BRENNAN. We certainly have and we will continue to, Senator. Senator FANNIN. Thank you.

Senator BURDICK. Senator Bellmon.

Senator BELLMON. I have no questions.

Senator BURDICK. Thank you very much.

Senator BELLMON. Mr. Chairman, if it is not out of order I would like to ask Mr. Bagge one question. I realize he has left the stand.

Senator BURDICK. Mr. Bagge, would you return to the witness table?

Senator BELLMON. I apologize for having been out of the room when you finished your statement. But I would like to ask some questions.

STATEMENT OF CARL E. BAGGE, PRESIDENT, NATIONAL COAL ASSOCIATION—Resumed

Senator BELLMON. You are a former member of the FPC?

Mr. BAGGE. Yes.

Senator BELLMON. Do you feel that the FPC decisions have had anything to do with the present energy crisis we are facing in this country?

I ask the question because I am curious to know what kind of guidance the FPC has been using over these past years and whether or not the energy policy such as we are going to undertake to establish here might need some help from future efforts of the FPC.

Mr. BAGGE. Senator, I cannot attribute what my role was for 6 years or my colleague's role and, by some approximate cause, charge the agency with which I was involved with having contributed to the energy crisis. I can only say that is the policy of producer price regulation with which the Commission was charged under law and under the *Phillips* case. As you know, the Commission, quite against its own desires, its own vote, was forced to undertake. What the Commission has done has been to attempt within the consonant due process of law and the Supreme Court precedent to apply a conventional utility regulation to an area which simply did not lend itself to

conventional utility regulation. There was an effort to break away from conventional individual costing in 1960 through the adoption of area pricing as an alternative to individual producer costing.

Now, here a decade later, we still have not achieved throughout the Nation the establishment of area prices and in the intervening decade, we have come to discover more and more that a cost-based costing analogy, no matter how sophisticated the costing technique may be, is not satisfactory in achieving a realistic price for gas.

The market inevitably has to establish that price and it is on that basis that—I had an exchange with Senator Hansen when you were absent, Senator Bellmon. It was on that basis that I concluded 2 years ago and in public forums available to me as a member of the Commission, sought to establish a dialog concerning the whole question of continuing this policy of producer price regulation.

So I would say it is not the Commission per se, it is not my former colleagues per se, but it is the policy with which the Commission was charged through the interpretation of the Natural Gas Act by the Supreme Court in the *Phillips* case which led, it seems to me, to the problem.

Gas cannot respond to the energy crunch of this past year, Senator. The coal industry, and I think this is significant, the coal industry was able, in 1970, to produce 590 million tons of coal, more than it had produced since its all-time peak in 1948, more than it has produced in 22 years, because the market, it was operating within the context of a free market, where price could determine supply. It was precisely the absence of that kind of the dynamics of the free market that precluded the increased gas production which was so vitally needed this last year, because of the cumbersome pricing machinery.

Even if we on the Commission sought to increase the price of gas, we could only do so within the context of a highly cumbersome adversary hearing record, which took 5 years to produce a decision in the *Permian* case, which was the first area pricing case.

So in answer to your question, I would say that we cannot charge the Commission per se, but we can say that these policies need to be reevaluated, I would assume that one of the areas of concern under this proposal is a review of all of our policies, including that of producer price regulation.

Senator BELLMON. It would also seem to me to be in the national interest if the Congress could establish an energy policy which all executive agencies could use for guidance—FPC, the Oil Import Administration, perhaps even the courts, because it is obvious to me that in spite of the tremendous natural resources we have here, we are rapidly getting ourselves in a condition of being dependent upon insecure offshore sources for our petroleum.

Mr. BAGGE. We in the coal industry, Senator, believe that an increased reliance upon domestic fuels has to be the cornerstone of any kind of rational energy policy.

Senator BELLMON. That is all, Mr. Chairman.

Thank you very much.

Senator BURDICK. The next witness will be Alex Radin, general manager of the American Public Power Association.

STATEMENT OF ALEX RADIN, GENERAL MANAGER, AMERICAN PUBLIC POWER ASSOCIATION

Mr. RADIN. Thank you, Mr. Chairman.

In the interest of time, I would like to have my statement inserted in full in the record and I will read only portions of it, which I can do in about 10 minutes or so.

Senator BURDICK. We appreciate that very much, and the statement in full will be made a part of the record without objection.

Mr. RADIN. Thank you.

We appreciate this opportunity to comment on Senate Resolution 45 because it deals with an issue which profoundly affects the operations of our member utilities.

Senate Resolution 45 also is of great importance to the general public, because the United States has a highly energy-dependent socioeconomic system.

Yet, our Nation has no articulated, comprehensive fuels and energy policy. To date, such energy policy as has been followed in the United States has been developed largely on an ad hoc basis, and has been rooted primarily in the economic interests to be served by the utilization of various fuels.

Little attention has been given to such questions as the relative long-term availability of various fuels, and the best utilization of each fuel to serve specific purposes.

To place our subject in perspective, it should be noted that the fossil fuels—coal, oil, and natural gas—today account for some 81.9 percent of the production of electrical energy. Nuclear energy accounts for only about 1 percent of total production, and even by the year 2000 is expected to provide only about one-half of the Nation's constantly growing requirements for electric energy. Hydroelectric power provides some 17 percent of total electric production, and is expected to become a progressively smaller proportion of total output in the future. The fossil fuels, therefore, are the very lifeblood of the Nation's electric industry, and are likely to remain so for many years in the future.

During the past summer, many of the member utilities of our association were deeply troubled about their difficulties in obtaining an adequate supply of fuels. Some municipal utilities in the Northeast were facing the imminent expiration of fuel oil contracts without new contracts being proffered. Other utilities found their stockpiles of coal rapidly diminishing. The Nation's largest electric utility system—that of the Tennessee Valley Authority—at one time was down to a 10-12 days' supply of coal, compared with a normal systemwide supply of 60-75 days.

Because of a variety of circumstances, the availability of fuels has improved considerably in recent weeks. However, Hollis Dole, Assistant Secretary of the Interior for Mineral Resources, recently said: "My concern, however, is that having warned the public of an energy crisis that has not yet materialized, those who did so may now be accused of crying wolf. * * * The wolf was indeed at the door earlier this winter; he has merely gone away for a time. * * * But he surely will be back, and he may well bring the whole pack with him."

Although there has been an easing of the fuels supply problem, at

least for the present, there has been no relief in the price of fuels. In fact, the substantially higher fuels prices which were established at the time of the severe shortages last summer appear to have formed a new watermark which thus far has shown few signs of receding.

Electric rates are especially sensitive to the price of fuel, because the cost of fuel represents about 35 percent of total utility operation and maintenance expenses. An indication of the importance of fuel in determining the price of electric energy is that some utilities have fuel clauses which permit them to adjust their rates automatically, depending upon the rise or fall of the cost of fuel.

Reversing a long-term downward trend in rates, electric utilities across the country are besieging State and Federal regulatory agencies with requests for rate increases; and it appears that the Nation is in for the biggest round of electric rate increases in its history. There are presently pending before the Federal Power Commission \$45 million in wholesale electric rate increase requests.

In addition, State regulatory agencies granted more than \$401 million in retail rate increases during the first 10 months of 1970, and an additional \$385 million in rate increases were pending. Although certain other expenses have also risen sharply in recent years, I believe that hearings before regulatory agencies will show that the rapid increases in fuel costs represent the major cause of the impending electric rate increases.

Because the use of electric energy plays such a vital role in the American economy, it is obvious that the cost of fuel will make itself felt in a pervasive manner; and to a greater or lesser degree, increased fuel costs will become embodied in the prices of virtually all goods and services produced in this country; and I might add, also feed the fires of inflation.

Reports from member utilities of our association have indicated that fuel price increases of 100 to 200 percent and more have been inflicted on some utilities within the past 12 to 18 months, and the most recent reports show no signs of price relief.

One of the most alarming current trends in the fuels industry—and it is a trend which I believe deserves special study by your committee if Senate Resolution 45 is adopted—is that of the oil companies' acquisition of competing fuels, particularly coal and uranium, I might add that eight of the 10 largest coal companies are now no longer independently owned, but owned by oil companies or large conglomerates; and they control about half of the fuels, and their share is increasing each year.

This policy may be profitable to the oil companies and make economic sense to the managements of those companies, but to permit the unchecked development of such private concentrations of power represents extremely dangerous national economic and social policy.

The potential for mischief which such oligopolistic control holds in making price and marketing decisions affecting vital fuels is appalling, and should not be tolerated. Your committee can perform an important public service by defining a positive national policy which deals with this vital problem.

In addition to the problems to which I have already referred, it seems to me that your committee might also encompass within its

study some vital questions affecting the present organization of the electric utility industry.

Those of us living on the east coast, particularly are painfully aware of the increasing number of brownouts or voltage reductions which have been imposed by electric utilities, and the situation for next summer may well be worse than that experienced last summer; and that, incidentally, was documented in a report issued by the Federal Power Commission early this week, which indicated that many utilities in various sections of the country might have very tight power supplies next year.

The Federal Power Commission indicated that they regarded 20 percent as a desirable level of reserves; and of all of the regions of the country, they now anticipate that only one will have 20 percent or more reserve capacity during the forthcoming summer.

I might say even if there is in excess of 20 percent, there might be brownouts in some areas.

There are a variety of reasons why the electric industry seems to be having increasing difficulty in meeting its demands, but it seems to me that one of the factors that should bear particular study by your committee is the present method of planning within the industry—particularly interregional planning.

At the present time, there exists no adequate method for such planning; and in the absence of initiative taken by the executive branch, no one seems to be planning the type of interregional planning.

At the present time, there exists no adequate method for such planning, and in the absence of initiative taken by the executive branch, no one seems to be planning the type of interregional interconnections such as the great Pacific Northwest-Pacific Southwest intertie.

Yet, there are many obvious benefits that can be achieved by such interties.

I therefore hope that the study authorized by your committee will include consideration of the present institutional arrangements in the electric industry, the mechanisms for interregional planning, and whether or not these institutions and mechanisms are adequate for the future.

A study of energy requirements of this Nation also would not be complete without taking a new look at the potentialities for hydroelectric power. I realize that there are environmental objections to some hydro projects, but we must face the fact that hydroelectric power continues to be the Nation's only renewable, nonpolluting source of energy.

In view of recent technological improvements in low-head turbines, including work which can be done in that field, perhaps the time has arrived when the Congress should direct an appropriate agency of the Federal Government to make a new survey of the potential hydroelectric sites, particularly low-head sites which would require the least inundation of land.

Over the long run, it is obvious that our Nation must develop a comprehensive, positive, energy policy which, among other things, would deal with such questions as: (1) The Nation's future energy requirements; (2) the availability of energy resources to meet those requirements with minimal adverse effects on the environment; (3)

whether certain fuels should be reserved for identified superior uses for which they are best suited; (4) the scope and emphasis of research needed to provide the best utilization of the nation's energy resources; and (5) the implications of monopoly trends in the fuels industry.

The provisions of S. Res. 45 would authorize the Senate Committee on Interior and Insular Affairs to equip itself to carry out a complete study of these questions and to formulate the kind of policy recommendations which are so urgently needed.

We would have preferred the adoption of S. 4092, which was sponsored by Senator Randolph and 62 other Senators in the 91st Congress. This bill, which would have authorized the establishment of a separate fuels and energy commission to make a thorough study of the Nation's energy problems, would have been preferable because it would have provided for the direct participation in such a commission by representatives of the executive branch and independent citizens, as well as by the Congress. The continuing inputs of the executive branch and private citizens would undoubtedly have been of great value in the work of the commission.

However, if in your committee's judgment there now appears to be no likelihood that a bill such as S. 4092 will be adopted by the Congress, then we support S. Res. 45, and we applaud Senators Randolph and Jackson for their initiative in submitting this resolution.

We most certainly support the stated aims and intentions of the resolution.

We are, however, disturbed by some of the attendant remarks made upon introduction of S. Res. 45. We are particularly distressed by those comments which we would interpret as suggesting that passage of S. Res. 45 would be used as an occasion for an attempt to provide new underpinning for such programs as the oil import quota system.

I realize this is an area of controversy, but it appears to us that the oil import quota system represents an outstanding example of catering to narrow private economic interests at the expense of the public interest.

Certainly it should be the prerogative of the Senate Interior Committee to study objectively and intensively the oil import quota system, but I hope that the comments made about the need for self-sufficiency in fuels resources are not interpreted by the committee as a mandate to support the present oil import quota program.

In short, the committee's study will prove most valuable if it is undertaken with no preconceived ideas about existing policies, and if it results in the formulation of an energy policy which is based on the principle of securing for all of the American people an ample supply of energy for this and future generations, with the least detriment to the environment and without the potential for manipulation of price and supply by a handful of all-powerful energy companies.

Thank you very much.

(Mr. Radin's prepared statement follows:)

STATEMENT OF ALEX RADIN, GENERAL MANAGER, AMERICAN PUBLIC POWER ASSOCIATION, WASHINGTON, D.C.

My name is Alex Radin, and I am General Manager of the American Public Power Association, a national trade organization which represents more than 1,400 municipal and other local publicly-owned electric utilities in 47 States, Puerto Rico, the Virgin Islands and Guam. Our offices are located at 2600 Virginia Avenue, N.W., Washington, D.C.

We appreciate this opportunity to comment on S. Res. 45 because it deals with an issue which profoundly affects the operations of our member utilities.

S. Res. 45 also is of great importance to the general public, because the United States has a highly energy-dependent socio-economic system. Yet, our nation has no articulated, comprehensive fuels and energy policy. To date, such energy policy as has been followed in the United States has been developed largely on an ad hoc basis, and has been rooted primarily in the economic interests to be served by the utilization of various fuels. Little attention has been given to such questions as the relative long-term availability of various fuels, and the best utilization of each fuel to serve specific purposes.

The direct concern of the member utilities of the American Public Power Association is with fuels for use in firing electric generating stations. While recognizing that the policy questions confronting this Committee transcend the question of fuels for electric utility use, I should like to limit my remarks to that portion of the problem.

To place our subject in perspective, it should be noted that the fossil fuels—coal, oil and natural gas—today account for some 81.9% of the production of electric energy. Nuclear energy accounts for only about 1.0% of total production, and even by the year 2000 is expected to provide only about one-half of the Nation's constantly growing requirements for electric energy. Hydroelectric power provides some 17% of total electric production, and is expected to become a progressively smaller proportion of total output in the future. The fossil fuels, therefore, are the very lifeblood of the Nation's electric industry, and are likely to remain so for many years in the future.

During the past summer, many of the member utilities of our Association were deeply troubled about their difficulties in obtaining an adequate supply of fuels. Some municipal utilities in the Northeast were facing the imminent expiration of fuel oil contracts without new contracts being proffered. Other utilities found their stockpiles of coal rapidly diminishing. The Nation's largest electric utility system—that of the Tennessee Valley Authority—at one time was down to a 10–12 days' supply of coal, compared with a normal system-wide supply of 60–75 days. Some individual TVA steam electric generating plants were down to just a few days' supply.

Because of a variety of circumstances, the availability of fuels has improved considerably in recent weeks. However, Hollis Dole, Assistant Secretary of the Interior for Minerals Resources, recently said: "My concern, however, is that having warned the public of an energy crisis that has not yet materialized, those who did so may now be accused of crying wolf * * *. The wolf was indeed at the door earlier this winter; he has merely gone away for a time * * *. But he surely will be back and he may well bring the whole pack with him."

Although there has been an easing of the fuels supply problem, at least for the present, there has been no relief in the price of fuels. In fact, the substantially higher fuels prices which were established at the time of the severe shortages last summer appear to have formed a new water mark which thus far has shown few signs of receding.

Electric rates are especially sensitive to the price of fuel, because the cost of fuel represents about 35% of total utility operation and maintenance expenses. An indication of the importance of fuel in determining the price of electric energy is that some utilities have fuel clauses which permit them to adjust their rates automatically, depending upon the rise or fall of the cost of fuel.

Reversing a long-term downward trend in rates, electric utilities across the country are besieging State and Federal regulatory agencies with requests for rate increases, and it appears that the Nation is in for the biggest round of electric rate increases in its history. There are presently pending before the Federal Power Commission \$45 million in wholesale electric rate increase requests. In addition, state regulatory agencies granted more than \$401 million in retail rate increases during the first 10 months of 1970, and an additional \$385 in rate increases were pending. Although certain other expenses have also risen sharply in recent years, I believe that hearings before regulatory agencies will show that the rapid increases in fuel costs represent the major cause of the impending electric rate increases.

Because the use of electric energy plays such a vital role in the American economy, it is obvious that the cost of fuel will make itself felt in a pervasive manner, and to a greater or lesser degree, increased fuel costs will become embodied in the prices of virtually all goods and services produced in this country, and I might add, also feed the fires of inflation.

Reports from member utilities of our Association have indicated that fuel price increases of 100%-200% and more have been inflicted on some utilities within the past twelve to eighteen months, and the most recent reports show no signs of price relief.

In regard to the pricing of fuels, it seems to me that there is a point of fundamental importance which should be emphasized. It is perhaps belaboring the obvious to point out that America's natural resources belong to her people, and that private owners or lease-holders develop those resources under trust from all citizens of the United States. Our fuels are so vital to our society that no one should be permitted to withhold these essential commodities from the market and demand tribute or extraordinary gains for their release.

Although the fuels industry is entitled to a fair profit, there is no inherent right on the part of the private holders of vital natural resources to obtain a price which bears little or no relationship to the cost of production, or to withhold those resources until guaranteed virtually any price which a tight market might permit them to extract.

One of the most alarming current trends in the fuels industry—and it is a trend which I believe deserves special study by your Committee if S. Res. 45 is adopted—is that of the oil companies' acquisition of competing fuels, particularly coal and uranium. This policy may be profitable to the oil companies and make economic sense to the managements of those companies, but to permit the unchecked development of such private concentrations of power represents extremely dangerous national economic and social policy. The potential for mischief which such oligopolistic control holds in making price and marketing decisions affecting vital fuels is appalling, and should not be tolerated. Your Committee can perform an important public service by defining a positive national policy which deals with this vital problem.

Another aspect of the competitive problem which is of concern to APPA is the possibility that fuel shortages and run-away fuel prices will lead to further concentration of control in the electric utility industry itself.

Publicly-owned electric utilities seem to have been hit earlier and harder by the fuels crisis than privately-owned utilities. There are two reasons why this is so:

1. Many publicly-owned utilities operate under statutory restrictions which prohibit them from entering into long-term fuel contracts; therefore, price increases can be passed on to them sooner.

2. Publicly-owned electric utility systems tend to be small and are, therefore, less apt to be preferred customers of fuel suppliers than are their larger rivals. They are also less able to make large capital expenditures on their own in order to directly acquire fuel reserves, transportation facilities, storage facilities, etc., and thereby protect themselves from shortages and artificially inflated prices.

For these reasons, the present chaotic situation in fuels may have the effect of making publicly-owned utilities more vulnerable to acquisition by larger privately-owned competitors. If this should be the result of the present disruptions and high prices in the fuels market, the public would suffer doubly by losing the important competitive, or "yardstick" effect of public power—a device which has been significant in holding down the rates of the privately-owned electric utilities.

In addition to the problems to which I have already referred, it seems to me that your Committee might also encompass within its study some vital questions affecting the present organization of the electric utility industry.

Those of us living on the East Coast, particularly, are painfully aware of the increasing number of brownouts or voltage reductions which have been imposed by electric utilities, and the situation for next summer may well be worse than that experienced last summer. There are a variety of reasons why the electric industry seems to be having increasing difficulty in meeting its demands, but it seems to me that one of the factors that should bear particular study by your Committee is the present method of planning within the industry—particularly inter-regional planning. At the present time, there exists no adequate method for such planning, and in the absence of initiative taken by the Executive Branch, no one seems to be planning the type of inter-regional interconnections such as the great Pacific Northwest-Pacific Southwest intertie. Yet, there are many obvious benefits that can be achieved by such interties.

I therefore hope that the study authorized by your Committee will include consideration of the present institutional arrangements in the electric industry, the mechanisms for inter-regional planning, and whether or not these institutions and mechanisms are adequate for the future.

A study of energy requirements of this Nation also would not be complete without taking a new look at the potentialities for hydroelectric power. I realize that there are environmental objections to some hydro projects, but we must face the fact that hydroelectric power continues to be the Nation's only renewable, non-polluting source of energy. In view of recent technological improvements in low-head turbines, including work which can be done in that field, perhaps the time has arrived when the Congress should direct an appropriate agency of the Federal government to make a new survey of the potential hydroelectric sites, particularly low-head sites which would require the least inundation of land.

Over the long run, it is obvious that our Nation must develop a comprehensive, positive, energy policy which, among other things, would deal with such questions as: (1) the Nation's future energy requirements; (2) the availability of energy resources to meet those requirements with minimal adverse effects on the environment; (3) whether certain fuels should be reserved for identified superior uses for which they are best suited; (4) the scope and emphasis of research needed to provide the best utilization of the Nation's energy resources; and (5) the implications of monopoly trends in the fuels industry.

The provisions of S. Res. 45 would authorize the Senate Committee on Interior and Insular Affairs to equip itself to carry out a complete study of these questions and to formulate the kind of policy recommendations which are so urgently needed.

We would have preferred the adoption of S. 4092, which was sponsored by Senator Randolph and 62 other Senators in the 91st Congress. This bill, which would have authorized the establishment of a separate Fuels and Energy Commission to make a thorough study of the Nation's energy problems, would have been preferable because it would have provided for the direct participation in such a commission by representatives of the Executive Branch and independent citizens, as well as by the Congress. The continuing inputs of the Executive Branch and private citizens would undoubtedly have been of great value in the work of the Commission.

However, if in your Committee's judgment there now appears to be no likelihood that a bill such as S. 4092 will be adopted by the Congress, then we support S. Res. 45, and we applaud Senators Randolph and Jackson for their initiative in submitting this resolution. We most certainly support the stated aims and intentions of the resolution.

We are, however, disturbed by some of the attendant remarks made upon introduction of S. Res. 45. We are particularly distressed by those comments which we would interpret as suggesting that passage of S. Res. 45 would be used as an occasion for an attempt to provide new underpinning for such programs as the oil import quota system. It appears to us that the oil import quota system represents an outstanding example of catering to narrow private economic interests at the expense of the public interest.

Certainly it should be the prerogative of the Senate Interior Committee to study objectively and intensively the oil import quota system, but I hope that the comments made about the need for self-sufficiency in fuels resources are not interpreted by the Committee as a mandate to support the present oil import quota program.

In short, the Committee's study will prove most valuable if it is undertaken with no preconceived ideas about existing policies, and if it results in the formulation of an energy policy which is based on the principle of securing for all of the American people an ample supply of energy for this and future generations, with the least detriment to the environment and without the potential for manipulation of price and supply by a handful of all-powerful "energy companies."

Senator BURDICK. Thank you very much, Mr. Radin, for your contribution.

Thank you for summarizing your statement. I think you got to the meat of it, too.

Mr. RADIN. Thank you.

Senator BURDICK. Senator Bellmon?

Senator BELLMON. I compliment you for your statement. I have a couple of questions.

In your last paragraph, you recommend that the study be based on the principle of securing for all American people an ample supply of energy.

Are you concerned with the source of this energy—from domestic or from foreign countries? Does this interest your organization at all?

Mr. RADIN. Oh, yes; we are certainly interested in this question, particularly as to the effect which the source of energy might have on the price of energy.

I might add, Senator, that as an American citizen, we also are certainly concerned about the security of supply of oil for this country, but I am not convinced that the oil import quota system is imperative for the national security of this country. I think there are other means of securing a supply of oil for our needs without the oil import quota system.

Senator BELLMON. Do you feel that the cost of residual fuel oil is high at the present time?

Mr. RADIN. Oh, yes.

Senator BELLMON. Do you realize that the oil import quota system does not control the residual fuel?

Mr. RADIN. Yes, I think that is related to the fact that there is an import control system for crude oil. If there were an absence of the restrictions on imports of crude oil, I think the price of crude oil would be lower and there would be a greater supply of domestically produced residual oil.

Furthermore, we would develop in this country the refining capacity and the manpower to produce a greater supply of residual fuel oil.

So I would think the fact that there is no control at the present time on imports of residual oil necessarily indicates that the lack of such a control is a reason for the present shortage alone. It has to be looked at in the context of the fact that there is an overall control on the imports of crude oil.

Senator BELLMON. Does it occur to you that since it was for a time cheaper to import residual fuel than it was to produce it here, our home industry did not develop this capability, and the same thing might happen with crude if it became cheaper to import crude than to produce it?

We might very soon see our crude-producing capability diminish. If this happened, what do you suppose would happen to the price of crude?

Mr. RADIN. Well, first of all, even if the supply of crude might diminish, I think there are other ways for national security requirements that we could provide a supply of crude. I think that in the long run, we have to consider our long-term requirements for oil.

It seems to me that considering the fact that there are increasing requirements for oil, we ought to take advantage of foreign supplies to the extent we can husband our own domestic supplies so that they can be stretched out for use over a longer period of time.

Senator BELLMON. How do you propose husbanding these supplies? You mean not producing them?

Mr. RADIN. Well, if they are in the ground, obviously they are available for future use. I would be in favor, for example, if it turned out that this were economically feasible, or to the advantage of our country economically, you can provide an incentive or subsidy to the petroleum industry for the exploration of new reserves so that we have reserves available that can be used in the event that they are needed. But if, in the short run, it is cheaper to get supplies from

foreign sources, then I would certainly be in favor of using those supplies to the extent that they are lower in price.

If they go higher, obviously, then, the market forces will be brought to bear and the domestic oil will then be salable.

Senator BELLMON. You realize that most of the foreign crude that is produced and shipped into this country comes from countries that are quite, in most cases, underdeveloped economically and countries that in most cases have only one resource and have no way of getting capital to improve their housing and their health conditions, their transportation, the general buildup of strength of the country, and improve the conditions of the people. Does it occur to you that we are practicing something akin to neocolonialism in the oil-producing countries and nonindustrial countries of the world, to take those resources at the very lowest price and use them to build our own industries rather than pay what could be looked upon as a fair price in other countries? Does this bother you at all?

Mr. RADIN. I am certainly bothered by any trend to neocolonialism. I do not support any such policy as that. However, if this is the principal resource that these countries have and it helps develop them economically and exploit that resource, I cannot see that that is to the detriment of the exporting countries.

I am not convinced that they are getting an unreasonably low price for oil, Senator Bellmon.

Senator BELLMON. What price would you consider to be a fair price for oil from, say, in the OPEC countries?

Mr. RADIN. Senator, I could not predict what a fair price should be.

Senator BELLMON. You said they are not getting an unreasonably low price. I am curious what you feel is a reasonable price for this oil.

You are interested in getting the cheapest price for your oil?

Mr. RADIN. Yes.

Senator BELLMON. But there are other considerations.

Mr. RADIN. Oh, yes.

Senator BELLMON. I have one final question.

In your statement, you say that we should get an ample supply of energy without the potential for manipulation of price and supply by a handful of all-powerful energy companies. Would you like us to be in a position of having the manipulation of price and supply to be in the hands of a handful of all-powerful energy countries?

Mr. RADIN. No, I certainly would not.

Senator BELLMON. How do we avoid what I consider to be a likelihood of this possibility?

Mr. RADIN. I think if that eventuality developed, then we would bring into production our own oil.

Senator BELLMON. Do you think it is that simple that we first wipe out an industry and then build it back up again?

Mr. RADIN. I am not convinced we would wipe it out, Senator Bellmon.

Senator BELLMON. What has happened to our residual fuel oil industry of this country?

Has it been wiped out?

Mr. RADIN. There is very little residual fuel oil, but I attribute that, as I pointed out earlier, to the oil import quota program.

Senator BELLMON. We have no oil import quota residual oil.

Mr. RADIN. That is true, but the fact that we have kept our crude prices higher than the world price has discouraged the production of residual oil in this country.

Senator BELLMON. How do you reach that conclusion?

Mr. RADIN. If there is a greater availability of oil from foreign countries, that oil could be imported here and we could refine it in this country. Then the price would be competitive with the domestic production of residual.

Senator BELLMON. We are importing about 23 percent of our crude requirements and none goes into residual. Why is this?

Mr. RADIN. I beg your pardon?

Senator BELLMON. We are presently importing about 23 percent of our crude requirements, but none of this goes into residual fuel. I wonder why this is the case?

Mr. RADIN. We can get more for other types of petroleum products.

Senator BELLMON. Right. And as long as we can do this, we are not going to develop any residual manufacturing capacity in this country.

Mr. RADIN. Well, I would question that.

Senator BELLMON. The point I am trying to make is that as long as fuel users can buy their fuel cheaper from offshore sources, they are probably going to do it.

Would you agree?

Mr. RADIN. Yes.

Senator BELLMON. This means, then, that there will be no incentive to develop the fuel industry in our own country?

Mr. RADIN. I am not certain, first of all, that we can provide all of our requirements from abroad. But it could be that if the world price has a greater impact on domestic production, the price of domestic oil might be reduced somewhat so that it is more competitive with world oil prices and make available oil at a lower cost in this country.

Senator BELLMON. Do you feel, then, that the energy used at the present time is unfairly profitable?

Is this what you are saying?

Mr. RADIN. I would not make any blanket statement such as that, Senator, but I do not think that, I do not see that they are in financial stress.

Senator BELLMON. Do you see that they are not building—

Mr. RADIN. In fact, I think some of the statements I have seen—unfortunately I do not have them with me at the moment—so that their stocks have a very high rating.

Senator BELLMON. Do you see that the reserves of the petroleum industry are going down rapidly?

Mr. RADIN. The proven reserves?

Senator BELLMON. Yes.

Mr. RADIN. I would not be able to answer that off hand, Senator.

Senator BELLMON. If this is the case, would you have an explanation as to why this is happening?

Mr. RADIN. Well, I would not know.

Senator BELLMON. Might it occur to you that the industry is not strong enough to provide the financial resources to continue exploration and development of reserves? Is this a possibility?

Mr. RADIN. I do not know.

Senator BELLMON. If it is a possibility, do you feel that this is in the long range interest of the country to see our reserves diminish until we are totally dependent upon other resources for industry?

Mr. RADIN. Senator, as I indicated earlier, there is a differential right now between the world price of oil and the domestic price.

Senator BELLMON. And the domestic is very rapidly narrowing.

Are you aware of that?

Mr. RADIN. Well, I saw a statement just in the past week or so that it might level out to about a dollar a barrel difference.

Senator BELLMON. I do not know who made such a statement, but I suggest it is not keeping up with current trends, because the OPEC settlement, as you know, has very sharply increased the price of imported crude.

You made a sharp attack on the import program and I wonder if you fully understand what this program has been and what it has meant to our own industry in the way of providing low cost energy and to national security, which certainly is a matter of great importance, particularly to the industrialized sectors of the country.

Mr. Chairman, I have no further questions.

Senator BURDICK. Thank you.

We have another witness before we adjourn this noon. Former Congressman Walter Rogers, president, Independent Natural Gas Association.

Good to see you again, Walt.

STATEMENT OF WALTER E. ROGERS, PRESIDENT, INDEPENDENT NATURAL GAS ASSOCIATION OF AMERICA

Mr. ROGERS. I will be as fast as possible and with your permission, ask that my statement be included in the record.

Senator BURDICK. Without objection.

Mr. ROGERS. I will summarize it.

I have made the point, Mr. Chairman, primarily with relation to the natural gas business. To be very succinct and brief, let me say that the major points have to do with the growing crisis in supply. In the overall energy picture in this country, our population increased from 1920 to 1970 by about 100 percent. Our demands for energy increased by 250 percent.

Between 1960 and 1968, the population increased by 11 percent, our demands for energy increased by 41 percent. In 1946, we added to our reserves of natural gas 17 trillion cubic feet. At that time, we used a little less than 5 trillion cubic feet.

Now, that has completely reversed itself and we are now in a deficit situation of approximately 9 trillion cubic feet a year. Now, if this continues, between now and the year 2000, we will be completely out of gas because our proven reserves today are around 275 trillion. That is an approximate figure. If we have to draw 10 trillion cubic feet out of that each year, we will be completely out of reserves by the year 2000 because we will be using up all that we are producing.

We can expect this demand for natural gas to increase measurably. As a matter of fact, if it increases by as much as 1 trillion cubic feet a year, by the year 2000 we will require around 47 trillion cubic feet. And there has never at any time in the history of this country been discovered more than, I believe, around 24 trillion cubic feet in any one year. So we are faced, actually, with a very difficult crisis insofar as domestic production is concerned.

I would call to your attention that efforts are being made as previous witnesses have stated with reference to a substitute, the gasification of coal, the importation of LNG. That will add some to our requirements.

But I think it is a very serious matter and I want to commend the committee on what you are doing in looking into it.

Now, I call attention in the last part of my statement to the existence of two studies. Both of those studies have been supported by the industry, began in about 1960, because they did anticipate this crisis that was arising. One is the future requirements studies; the other is the potential gas study which goes to the reserves. Now, copies of the last reports of those two committees, which are separate committees that are sponsored by two different groups so that they will be objective studies, have been furnished to the committee, I believe several months ago. But I do have and can obtain additional copies of that and I think they will be very helpful to the committee and we will furnish them to the committee staff.

That concludes my statement.

(Mr. Roger's prepared statement follows:)

STATEMENT OF WALTER E. ROGERS, PRESIDENT, INDEPENDENT NATURAL GAS
ASSOCIATION OF AMERICA

My name is Walter E. Rogers. I am President of the Independent Natural Gas Association of America, which is frequently referred to as INGAA. INGAA is a non-profit national trade association representing virtually all of the major interstate natural gas transmission companies subject to the jurisdiction of the Federal Power Commission under the Natural Gas Act of 1938. The member companies of this organization account for ninety percent of the natural gas transported and sold for resale in interstate commerce. Natural gas transmitted through these facilities reaches every State of the Union, with the exception of Alaska and Hawaii. The organization also has within its membership a group of producers and a group of distributors of natural gas.

May I express to you my thanks for your invitation to appear before the Committee and present testimony. The subject matter to which the Committee is addressing itself concerns the vital interests of this nation, and I commend you on your efforts to find solutions to the very serious problems associated therewith. Although our Association is primarily concerned with natural gas, its production, its transportation, and its distribution, we fully realize that it is only an integral part of the overall energy problem. Until only a few years ago, it seemed to be the consensus of the general public that the supplies and the availability of energy sources in this country were of such vast proportions that the danger of shortages was a myth. However, due in large part to the constant warnings of those in the several energy industries—production, transportation and distribution—the American public has in my opinion awakened to the realization that the plentiful supplies of the past could, in the not too distant future, turn into scarcities. That this has been recognized and is being objectively appreciated, as evidenced by the provisions of Senate Resolution 45, is a most healthy sign for the future of this nation.

A review of recent history should lead even the most skeptical to the conclusion that an objective study of the fuels and energy of this nation as to supplies, availability, and future requirements is advisable. Such a study could constitute the basis for the formulation of an overall national fuels and energy policy within the confines of the three competitive enterprise systems that has served our country so well.

I think it can be truthfully said that the progress of man has been directly dependent upon his access to energy supplies and the use to which he has put them. Certainly the 20th Century should be indisputable evidence of that conclusion. Man during this period has undoubtedly made the greatest strides of advancement since the beginning of civilization. A substantial, if not an overwhelming part of which must be attributable to the availability and use of energy supplies in Western civilization and especially in the Western Hemisphere. It has been said

that over one-half of all the minerals and metals used by man has been extracted from the earth in the last fifty years, and that over one-half of all the energy consumed by man in the last two thousand years has been consumed in the last one hundred. This points up the fact that as man progresses, his energy requirements increase both individually and collectively.

For instance, the population of this nation since 1920 has increased by approximately one hundred percent. The total energy requirements have increased almost two hundred and fifty percent. During that period, the consumption of natural gas increased by approximately twenty-two hundred percent. This tremendous increase in the use of natural gas was undoubtedly due to the fact that until 1930, natural gas was not in general use. However, the increasing demands are evidenced by the fact that between 1960 and 1968, the requirements for natural gas increased by forty-one percent, while the population was increasing by approximately eleven percent. In short, it could be said that the advancement of man in all fields is compounding the demand for energy.

Treating the matter on an individual basis, we find that the annual energy requirement per capita in 1930 was 181 million Btu. There was no increase in this requirement—in fact, there was a decrease—during the depression years. However, in 1940 the energy requirement per capita had returned to 181 million Btu and then began an upward spiral to 226 million Btu in 1950, 249 million Btu in 1960, and more than 300 million in 1970. Using these increases as an experience table, we must anticipate a level of approximately 425 million by 1980, and 500 million by the year 2000. In other words, the energy requirements per capita will have more than doubled from 1930 to 1980 and nearly tripled by the year 2000.

What one must realize is that fossil fuels, to wit, oil, gas and coal, the basis of our energy, are all depleting products. They cannot be reproduced in kind on an annual basis as can agricultural products. Hence, unless they are properly husbanded and new and extra efforts are expended in exploration for the discovery of new reserves and the full development of proven reserves, we must anticipate serious problems in the near future.

As I pointed out heretofore, the primary concern of our organization is natural gas, and I would like to make a few remarks confined to that part of the energy picture. At the present time, natural gas is providing about one-third of the energy requirements of this nation. This percentage would undoubtedly be measurably increased if additional natural gas was available. However, during the years that natural gas began to emerge and to take its proper place in the energy supply of this nation, it was subjected to the strictest regulatory controls. Many have felt that unrealistic application of such controls produced a price below competitive fuels and below the actual value of the product being used. Many feel that this basic philosophy and practice created a demand out of proportion to the availability of supplies over the long term. Hence, the resulting spectre of a shortage crisis before the year 2000.

In addition to the low price, natural gas was recognized as the cleanest non-pollutant fuel available; a fuel that could be transported without visible damage to the landscape and with no discernible noise. If it could be used to answer all of our energy needs, it would also solve our environmental problems. However, there is just not enough of it to approach the fulfillment of these increasing demands. Only a few years ago, natural gas was considered in great surplus. In 1946, only approximately 5 trillion cubic feet were marketed, while more than 17 trillion cubic feet were being added to the reserves. This situation is now in reverse. In the two years 1968 and 1969, we marketed 18 trillion cubic feet more than were added to the reserves, and it presently appears that this trend will continue unless early action is taken to reverse it. Our present proven reserves are less than 14 years, based upon the 1969 consumption figures. With the increasing demand and the decreasing of the discovery of additional reserves, it is inevitable that we will soon run out of natural gas. In other words, if the requirements for natural gas between now and 2000 exceed the addition to reserves by as much as 10 trillion cubic feet per year, this country will be completely without domestic supplies of gas before the year 2000.

The gas industry has long been aware of the developing deficit in supply. The alerts sounded by this industry were based upon studies and projections which gathered together fragmented information and undertook to consolidate the same in a meaningful estimate. In 1960 the Future Requirements and Supply Committees were formed, with the responsibility to develop estimated future requirements and supply. The supply group was organized into twelve area subcommittees that were composed of many qualified geologists and engineers, each expert in the

occurrence of natural gas in a particular area. Participation by producers, distributors, pipeliners, state organizations, academicians, and consultants, assured the objectivity of the study. In 1966, the Gas Industry Committee, composed of a representative of the American Gas Association, the American Petroleum Institute, and the Independent Natural Gas Association of America, recommended support of a study of the future natural gas supply, and in that same year an organizational structure was set up which provided diversified representation from other organizations interested. Active sponsorship by the Mineral Resources Institute of the Colorado School of Mines Foundation, Inc., also was provided by the new structure. The initial report of the Potential Gas Committee was published in 1967. A copy of the 1969 report has been filed with your Committee heretofore. Additional copies of that report can be made available upon your request.

As to the projected future requirements, may I say that the Future Requirements Committee, known as the Future Gas Requirements Committee, in 1964 published its initial report as an independent gas industry committee. Soon after the issuance of that report, the Colorado School of Mines agreed to assist the committee, which became a division of the Future Gas Requirements and Supply Committee of North America. The Colorado School of Mines served as the cooperating institute of the committee at the time work commenced in 1966. Early in 1967, the requirements effort was reorganized by the Gas Industry Committee and assigned to the Future Requirements Committee. After an extensive selection procedure, the Denver Research Institute of the University of Denver was designated by the Gas Industry Committee as the Future Requirements Agency to assist the Future Requirements Committee. The most recent report of "Future Natural Gas Requirements of the United States" was issued in September 1969. Copies of this report have been filed with your Committee heretofore and others can be made available on short notice.

The make up of the two committees or groups under separate sponsorship, with no connection as between each other, was intended to provide the means for a completely objective study of the problems involved. Insofar as natural gas is concerned as a part of the energy picture, I think this Committee will find that the gas industry, through these agencies acting independently, has provided an excellent documentation of the situation that faces this nation as to the supplies and future requirements of natural gas.

In conclusion, may I say that this presentation has not been intended as an in-depth presentation of the problems with which we are confronted. It is intended to call to the attention of the Committee a few of the important facts concerning the problems of the gas industry in the overall energy picture.

Senator BURDICK. In short, you are telling us that based upon known proven reserves, we are going to be out of gas by the year 2000.

Mr. ROGERS. Yes, sir; that is right.

Now, we will be out of gas, Senator, insofar as our proven reserves are concerned, unless we move out very quickly and make new discoveries and get into new exploratory areas, because if we are using at the present time 20 trillion, approximately 21 trillion cubic feet of gas a year, if we only add ten trillion cubic feet a year to the proven reserves, that means that we have to go to the pantry and take out 10 trillion in order to meet the requirements of the American people.

If this increases, as I said a moment ago, as it has been increasing in the past few years—and actually, there is reason to believe that the increase will be greater because gas is the cheapest and cleanest, the most non-pollutant fuel available. We hope something can be done to get it back into an area where it is a competitive fuel, because we feel that the unrealistic pricing policies that have been visited upon the industry in the past several years, as was pointed out by Carl Bagge, have contributed immeasurably to the supply situation with which we are now faced.

Senator BURDICK. I want to ask just a simple question. What will we do about it?

Mr. ROGERS. I think that if we could create a situation where the incentive was greater for the search for gas as such, Senator, rather than letting it be a by-product of the search for oil, that we could go a great way in helping solve this problem.

Senator BURDICK. Are you referring to tax incentives?

Mr. ROGERS. No; not tax incentives, price.

To sum it up very quickly, the average price of gas, mpf to the city gate in the eastern area will be around 40 cents because of the prices fixed by the FPC in the past. If you import LNG, your basic price is going to be up at 60 cents, and I am very conservative at that.

At the present time, your price of gasified coal, if we can perfect this, and we do not anticipate this for another 7 to 10 years, would be in the general area of around 80 cents.

Now, say we import gas from Alaska, and I would hope that this can be done. But when we translate this into cost, we find that you are going to have to pay about one and a half cents per hundred miles per thousand cubic feet of gas, which means that your cost laid down in Chicago is going to be about 45 cents a thousand cubic feet; in other words, 5 cents above the cost of domestic gas.

Senator BELLMON. Those are transportation costs?

Mr. ROGERS. Transportation costs.

Senator BELLMON. How much do you figure that will—

Mr. ROGERS. Well, I do not know. In Alaska, if we got it free, it would cost us more in Chicago than the gas costs in the present situation.

The major point is this, gentlemen, that I think every effort should be made to go out and develop, to discover the reserves within the lower 48 States and the offshore areas and develop those reserves, because I think it makes sense economically for the American consumer, because no matter what is done in this regard, it is going to be cheaper than foreign gas or gas brought in from Alaska or coal gasified.

Senator BURDICK. Well, thank you for your very informative but startling statement.

Mr. ROGERS. Thank you, sir, for allowing me to come.

Senator BURDICK. Senator Bellmon?

Senator BELLMON. Mr. Chairman, I have one or two or three questions.

You have testified that we are running rapidly out of gas or if we go to gasification of coal or import gas from the Northern Slope, it is going to cost more. Do you feel we could, if we had the incentives you mention, develop the reserves we need in the lower 48 States or the potential here?

Mr. ROGERS. Senator, I think a great part of the problem here could be answered. The Future Requirements Committee has come up with figures, and with your permission, I am going to send you a copy of that report. It has come up with figures, I think, estimating around 1,227 trillion cubic feet of gas, which means that adding to that the proven reserves, you have close to 1,500 trillion cubic feet of gas. But this is divided into this sort of situation—that would be divided into proven reserves, which we know are here.

The next, I believe, is probable, which is additions to the proven reserve areas; the next is possible, which of course, is saying that we hope we can discover it. The last is speculative. So we just do not know.

The only way we are going to find out is to get the people moving out into the general area to make these exploratory trips and find out what we have.

Senator BELLMON. Do you feel that the lack of a national energy policy is in any way a disincentive to the energy industry to go ahead and make the investments they need? In other words, is there at the present time a feeling of hesitation in the industry because of the uncertainty as to such things as the oil import quota and the future tax policies and these other kinds of things?

Mr. ROGERS. Well, Senator, of course, our national policy covers an awful lot of things. I think that if something could be worked out to give some continuity to the industry in operating and producing the energy that is needed within the free competitive enterprise system of this country, I think it would be welcome.

I think if you start talking about national fuels policy of going into end use controls and things like this—in other words, over the governmental situations—I think we are going to be faced with the same thing that the gas industry, under government regulations, is faced with today. In other words, an artificial price has created an artificial market and both of them have created a real shortage.

Senator BELLMON. The point I was trying to make is at the present time and until the industry knows what our policy is to become and remain reasonably self-sufficient so far as energy sources are concerned, I am not sure we could convince investors that the oil and gas business is here to stay.

Mr. ROGERS. I think you have hit on a very sensitive nerve, and I think this: As far as the oil import program is concerned, I think this country would be very, very foolish to undertake to depend at all on foreign sources. I think we have to be self-sufficient for defense purposes, to say nothing of the other areas that would be helped by it. I think this country has to be self-sufficient in energy.

I think, Senator, that the greatest advancement of man that has ever been made in civilization has been made by the finding and the utilization of the energy reserves by Western civilization, and especially the people in the U.S. area in the last 50 years. Information has been furnished to me, and I do not know how authentic it is, but of all of the energy ever used by mankind, over 50 percent of it has been used in the last 100 years.

Senator BELLMON. Mr. Radin, representing the American Public Power Association, just testified that the power industry wanted cheaper fuel. The impact of his testimony is that we should get this from foreign sources. How long do you feel that the price of fuel from foreign sources would remain cheap if we were largely dependent upon the fuel from these other areas?

Mr. ROGERS. Just so long as they thought the time had come that we were dependent upon them for fuel.

Now, I have great respect for foreign countries; I have great respect for Canada. But our history proves that Canada is not a simple trader. I think the gentleman from Oklahoma will realize this on this committee insofar as going back to study the water picture.

I think you will find out very quickly that foreign countries do not have too many philanthropic tendencies and the minute that they find that we are dependent upon them, you can bank on one thing for sure, that price is going to go up and go up fast.

Senator BELLMON. Mr. Radin quoted a statement which estimated that there will always be a differentiation of \$1 between domestic produced crude and imported crude. Do you have reason to agree with this?

Mr. ROGERS. I would not think that would be true at all. I think the differentiation in price is simply there because of present conditions. I think that when the situation changes the price will change.

Now, for instance, we have in the world a great number of what they call emerging countries that we have spent a tremendous amount of money helping to emerge. Well, the difficulty about that is, once some of them begin to emerge, if their energy requirements are going to following the pattern that has been followed in this country and they are going to increase measurably to the population, there is going to be a demand for foreign oil and foreign gas that will be more attractive, perhaps, than ours.

Senator BELLMON. I agree with you, we have spent a lot of money helping these foreign countries emerge. We have done it through foreign aid or perhaps handouts. I was wondering if we might not help these countries get a higher price for their energy than they might get themselves.

I have been sort of baffled by this sort of two-faced attitude we have with these countries. On the one hand, we pretend to be helpful to them and, on the other hand, we try to take their energy away from them at the lowest price we can get. I contend this is a two-faced attitude on the part of our Government and on the part of our industry.

Do you have anything you want to add?

Mr. ROGERS. No, thank you.

Senator BELLMON. The chairman has asked that we be in recess until 2 p.m.

(Whereupon, at 12:40 p.m., the committee recessed, to reconvene at 2 p.m., the same day.)

AFTERNOON SESSION

Senator BELLMON (presiding). Mr. Netschert, why do you not begin and we will proceed while we wait for other Senators to get here.

STATEMENT OF DR. BRUCE C. NETSCHERT, DIRECTOR, WASHINGTON OFFICE, NATIONAL ECONOMIC RESEARCH ASSOCIATES

Mr. NETSCHERT. I am pleased, Mr. Chairman, to appear before this committee at your behest to testify on Senate Resolution 45 proposing a study of national fuels and energy policy. It is a field in which I am greatly interested, having worked in it for the past 15 years or so, first with Resources for the Future and continuing with National Economic Research Associates.

I have been associated with, or have myself made many studies covering topics included in the resolution, some of which were Government projects. Since NERA does consulting work in the general field of energy industries, we are now engaged in such studies and expect to continue to be in the future. I therefore welcome what could be a fundamental contribution to the field.

I would like to begin by observing that it is necessary to give meaning to the phrase "national energy policy." In and of itself it is almost devoid of meaning, since it means different things to different people. Because of the very wide ramifications of energy production and use we cannot make any simple, clean-cut statement of an energy policy such as we can in other policy areas. Let me illustrate: We can have a foreign policy which says we will not give economic aid to Communist countries. We can have a trade policy which says we favor low tariffs to the extent other nations will reciprocate. We can have an economic policy which says we adopt continuing full employment as a national goal. All these policies are relatively meaningful and unambiguous.

But consider what meaning a "national energy policy" can have. One could say that the goal is cheap and abundant energy supply. Yet this is not unambiguous, because it is not self-evident just what the government should do or not do toward that end if it is possible. One could say that the policy is for free and open competition among all the energy commodities, including electricity—that is, no government interference in the form of either regulation or special favors. But this is unreal in that it is counter to a host of existing policies of long standing. It would mean no Federal control of wellhead gas prices as well as no oil import controls, no depletion allowance, no regulation of pipelines and gas and electric utilities, no Government subsidization of nuclear power at any stage, and no pollution abatement regulations.

There is, nevertheless, a meaningful way in which to use the phrase "national energy policy"; this is to view it as standing for the coordination of all the many policies of the Federal Government pertaining to the several energy industries and their activities, taking into account State and local governmental policies.

As recently as 5 years ago this would have been sufficient, but today even this is not enough. In the past 5 years or so there has arisen, almost out of nowhere, the phenomenon of concern with environmental preservation as a major public policy issue. Unfortunately, it is probably that energy production, conversion, and use is the largest source of problems in environmental preservation. These problems range from acid mine drainage and marine pollution due to oil-drilling blowouts and fires, to stack gas and automobile exhaust emissions.

The fact is, we cannot produce, transport, convert, or use energy without either creating in some degree a direct and continuous adverse effect on the environment or posing the risk of accidents that may produce catastrophic environmental effects.

Given this central and crucial position of energy versus environmental preservation, it follows that a national energy policy is meaningful today only if it stands for the coordination of energy policies and policies for the preservation of the environment.

I turn now to the specific subject of this hearing—Senate Resolution 45.

A study is proposed to aid in the establishment of a national energy policy in the sense in which I have been describing it. It must be recognized at the outset that the several individual energy industries, from their points of view and their own interests, have sharply divergent opinions as to what is appropriate and desirable in energy policy.

The petroleum industry sees national security as the overriding issue—we must not allow ourselves to get in the position of too great a dependence on oversea sources of supply for our oil needs, and, to insure that this does not happen, price and other incentives are needed in order that the domestic industry can supply those needs.

The coal industry sees itself as the manager of an energy resource known to exist with certainty (and thus not subject to the vagaries of discovery), in sufficient quantities to satisfy all our energy needs indefinitely. In its view, therefore, the cornerstone of energy policy should be reliance on coal.

The electric industry sees itself as the end-use supplier of energy in its most convenient form, a circumstance which has made demand for electricity the fastest growing element in aggregate energy demand. The concern of this industry is that the increasing severity of environmental restrictions now being placed on its operations will impede its ability to provide for that demand growth.

The marketing segment of the oil industry considers itself at a disadvantage in the heating market, where it competes with the electric and gas utilities, and calls for a policy of tighter regulation of the utilities while it retains its freedom from regulation. The nuclear industry holds itself out as the answer to the air pollution problems associated with power generation, from which it follows that the logical energy policy is to encourage nuclear power.

To all of these conflicting interests within the energy industries must be added those of the environmentalists, by which I mean both the government officials, at all levels, who have the responsibility of carrying out our antipollution laws, and the private groups which have organized on behalf of environmental preservation. Given the central role of energy in environmental quality that I have described, the interest of the environmentalist will frequently conflict with that of an energy industry.

Now it is obvious and inevitable that if a broad investigation is to be undertaken by a congressional body, that effort will be subject to a host of conflicting pressures from the many interests involved. I do not mean to be pejorative in stating this, I merely wish to point out that because these interests are conflicting, any attempt to formulate a coordinated policy means that some interest or interests must inevitably “lose” in the sense that the policies they espouse will not be adopted.

I would hope that the study, as such, would be wholly objective and would be able to state the facts as they are and draw the logical conclusions therefrom, regardless of their favorable or unfavorable implications for any one interest group or groups.

This committee is, of course, the instrument of a political body, and politics, as is often said, is the art of compromise. But the compromise should be in the formulation of the policy, after the basic facts have been objectively assembled and put together in usable form, not in the investigation itself. For the proposed study this should apply to all of the topics listed for consideration in the resolution.

I remind you, in this regard, that the intrusion of compromise into the investigative phase of at least two previous governmental energy policy studies resulted in largely wasted effort. I am referring to the report of the National Fuels and Energy Study Group, produced

for this committee in 1963, and the report of the Interdepartmental Energy Study Group, a White House effort, produced a few years later.

In both instances the reports reflected compromise among the conflicting interests that was, in effect, a standoff, resulting in little, if any, influence on policy. In sum, it is essential that the findings of fact be kept separate from policy recommendations and be made publicly available for the debate that will follow.

Having said this, I must emphasize again that I recognize the study will be part of the activity of a representative political body and that it would be both unrealistic and inappropriate to suggest that the study be undertaken with no attempt whatsoever to consider the views and opinions of the conflicting interests involved.

One way of obtaining these views would be to solicit position papers from the various interest, in which they could set forth their arguments at whatever length they wished on the topics listed in the resolution. The papers could be circulated for comment.

Once the papers had been received, however, the working staff for the study should proceed with complete insulation from further argument and debate with members of the energy industries. I suggest that the motto of the staff in its work be (if you will pardon my Latin): *Bos sacra non est*—which, freely translated, means “there are no sacred cows.”

With respect to the work required for a meaningful study, I suggest first that a relatively small effort be devoted to the projection of future energy demand levels, listed in the first subject item in the resolution. There are a number of recent existing energy projections from both governmental and nongovernmental sources that can be modified as seen fit. More important, in a policy-oriented study such as this one will be, the specific levels of energy demand, both in the aggregate and for the individual energy commodities, are really not too important.

We know the aggregate level will be high—awesomely so. We also know that this aggregate demand will have to be satisfied in one way or other, in a pattern of consumption that will be determined by both relative prices and Government policies.

It might seem at this point that I have met myself coming back, but no—it is not the burden of Government to say “we see a demand of x billion barrels of oil in 1985 or y million tons of coal in 2000, and we must see that these demands can be met.” This burden is something an energy industry might want to take on itself, since it is in the business of meeting demand. Rather, the proper Government approach is, given the environmental problems, balance-of-payment problems, national security problems or what-have-you-associated with the increased use of x energy commodity, should Government encourage or discourage such a trend, and in what way should it act?

This is nothing more than the conventional distinction between the business policymaker and the Government policymaker. The former is concerned only with his costs and profits, the latter with the social costs and profits (i.e., benefits).

I therefore suggest that the study throughout should emphasize policy tradeoffs by presenting the alternatives in each instance. One

area of such tradeoffs is the complex interrelationships between the various aspects of energy production and use on the one hand and environmental policy on the other.

An outstanding example of this is nuclear power and the environment. In terms of "conventional" air pollution—that is sulfur oxides, nitrogen oxides and particulates—nuclear power is the ideal solution, since it results in no pollution whatever. It does, however, involve greater "thermal pollution" of the cooling water and, according to some, increases the risks of radiation damage to the population.

Do the evident gains outweigh the potential risks?

If the answer is yes, energy policy should clearly favor a more vigorous pursuit of the nuclear route than is now occurring, and the Government would be justified in taking strong measures to reduce the regulatory lag that is now impeding the growth of nuclear power.

Another important tradeoff area is research and development and the proper balance within the total R. & D. effort in the energy field, most of which has to do with energy conversion. Electricity generation is such conversion and, indeed, the only conversion now engaged in on a large scale.

In addition, however, there are potentially very important other conversions that are technically feasible and perhaps now marginally economic. These include the production of synthetic gas from coal and petroleum and of synthetic liquid fuels from coal. Each of these offers tradeoffs in such areas as national security, regional cost differences and environmental effects.

A third tradeoff area is in the efficiency of energy use. It is an unfortunate fact that most of the energy input to our economy is wasted in the sense that it is lost through inefficiency in use. The best fossil-fueled generating stations have an efficiency of only some 40 percent. Nuclear stations are currently at the 32-percent level.

The automobile, even in economy runs in which energy losses are minimized as much as possible, cannot reach 20 percent. Improved efficiency of use is therefore an important potential means of curtailing the growth in our energy resource needs and at the same time of greatly lessening environmental effect; for to a considerable degree it is the wasted energy that creates the adverse effect on the environment. The thermal pollution from a powerplant is the waste heat that goes into the cooling water; part of the wasted energy in the automobile engine is in the unburned gasoline that goes out of the exhaust and of course is one of the air pollutants.

Here the tradeoff is between the cost of reducing pollution by adopting means of energy use that are more efficient and the cost of other means of pollution abatement. Possibilities for such improved efficiencies exist. The technique of magnetohydrodynamics, or MHD, for example, offers the opportunity to reach 60 percent efficiency in power generation.

In vehicular propulsion the fuel cell, for example, offers the opportunity of approaching such levels. All of the means of improving efficiency in energy use require further R&D work, however, so that here there must be a coordination not only of policy but of the tradeoffs on which the policy decisions are to be made, as well.

All of the preceding examples presuppose that our growing energy needs will be met in some fashion or other. The tradeoff is between the

different means of meeting those needs and at the same time minimizing adverse environmental effects. But there is in addition a more fundamental tradeoff to which our attention is now being called.

The advocates of "zero energy growth" are contending that we must stop the growth in our energy use in order to preserve the environment. This argument cannot be dismissed out-of-hand, and the study should, therefore, evaluate carefully the implications of such a policy for the health of our economy and the standard of living.

I wish to make clear that in this listing of policy tradeoff examples I am not arguing in favor of those I have chosen. That is, I am not trying to convince you that nuclear power is the answer to pollution in power generation, that MHD is the best means of improving efficiency, or that synthetic gas is the solution to the gas supply problem. If your study is to be comprehensive, as I am sure it will be, it would in any event be looking at these subjects. The point I would like to leave with you is that the most meaningful and productive way of considering them is in terms of policy alternatives, because it is policy, after all, that is your business.

Finally, I suggest that an important subject for consideration in the proposed study is the recent emergency of the "energy company," a petroleum company which is involved in one way or another in one or more of the other fuel resources, coal, uranium, oil shale and tar sands.

(For a description of this major transformation of the structure of the fuels industries and its potential effects, I refer you to testimony I and some of my colleagues at NERA presented last year to the Subcommittee on Antitrust and Monopoly of the Senate Committee on the Judiciary.)

The energy company tends by its very nature to be potentially anticompetitive in that it brings under single corporate control energy commodities that are competitive with each other. This, of course, is highly relevant to almost every other aspect of your proposed study.

Thank you.

Senator BELLMON. Thank you.

I want to lead you along a little further on this concept you raised on page 8 about the efficacy of our energy use. There is one additional area that interests me from both the side of conserving energy and improving environment.

Do you see any relationship between energy consumption and land-use planning?

To get down to the point, here in Washington you will find every morning our highways are jammed with thousands of automobiles bringing generally highly paid Government workers from where they sleep to where they work. It seems to me a great deal of our energy is used in moving people unnecessarily; that we would be wiser in planning where we build our work spaces as related to where we build our living spaces.

Mr. NETSCHERT. Well, Senator, it happens that I have written a paper on that very subject, which is the relationship between energy consumption and urbanization. I found in that study that there is a very direct positive correlation between the degree of urbanization and the level of energy consumption.

You are absolutely right that there is a connection between land-use planning and the level of energy consumption, and the two go together.

Senator BELLMON. Does your study show that increased urbanization means increased energy consumption?

Mr. NETSCHERT. Yes, sir.

Senator BELLMON. I would like to congratulate you on a very excellent statement and one that brings in some additional concepts that have not been presented before. I assure you the committee will give your comments full and careful consideration.

Thank you very much.

Mr. NETSCHERT. Thank you.

Senator BELLMON. Is the president of the Conservation Foundation, Mr. Sidney Howe, present? (No response.)

It is my information that Mr. Howe may wish to file a statement and if he does it will be received and placed in the record of the hearing.

Next, we will call on the general counsel of the Independent Petroleum Association of America, Mr. Daniel Jones.

STATEMENT OF L. DAN JONES, GENERAL COUNSEL, INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA

Mr. JONES. Mr. Chairman, my name is Dan Jones. I am general counsel of the Independent Petroleum Association of America.

In the interest of time, I would like to request that my statement be placed in the record in full and then I would like to make one reference to a point that we raised in our statement.

Senator BELLMON. Without objection, your full statement will be placed in the record.

Mr. JONES. Because of some of the existing policies now in effect, Mr. Chairman, we are moving rather rapidly into what seems to be generally agreed upon to be a serious energy and fuel situation.

For that reason, of course, it is important that this committee is undertaking or considering to undertake overview of this problem. At the same time, we wish to point out that there are certain specific policies that are now operating to the disadvantage, as we see it, of full development of our resources. These matters have been studied repeatedly and continuously and for a long time.

It would be our hope that in these instances, rather than to undertake further studies in these matters, the committee could consider how it might review and reach early conclusions as to what would be some of the solutions that would be proper in these specific areas, and not defer action on them until the broad general study can be concluded, which will take some time.

One example has been referred to already, and that is natural gas, which I think illustrates the point I wish to make.

Last summer, for example, the Federal Power Commission, in recognition of the fact that the policies in effect for 17 years have worked to the end of leading us into this natural gas shortage position, initiated on their own motion a proceeding to review the rates for natural gas producers and the indication was that they intended to do that in an expeditious manner. It has been months and there is no action that has been taken. It is a matter that the Commission itself has studied now continuously for 17 years. It is a case where it seems to us that there is no further need for study, but there is great need for action.

In some way, I would be hopeful that the committee can use its great influence and its prestige in bringing about action on these matters that the record would indicate are fully studied, and that we are now in a position where we need policy decisions on them.

I could cite other examples, but I have done that in my statement and I would urge that the committee consider those in the light of how they might arrive at some method of expediting decisions.

I appreciate very much having the privilege of appearing before the committee. Thank you very much.

Senator BELLMON. Thank you, Mr. Jones.

Let me ask you just one more question.

In testimony that has been entered into the record already, it appears that we have had studies from time to time over the years and we will apparently have a study and then there will be a lapse of time and we will apparently get into another critical situation and so we have another study and our policies change.

It is critical that we develop some kind of vehicle to continue to bring the information relating to the energy situation in the country before the Congress and before the public and before the executive departments so we can adjust our policies, not every 10 years or 20 years, but continually as the situation changes?

Mr. JONES. I see nothing wrong in having a vehicle of that sort.

Senator BELLMON. Do you see that we have a vehicle at the present time in the Government?

Mr. JONES. It would be piecemeal if we do have. It would seem to me there is nothing wrong with having the vehicle, but a greater problem is not a vehicle for further study, but a vehicle for decision-making on these policy matters.

Senator BELLMON. The problem with the Congress is, we have a hard time making decisions until we know all the facts. I think in the past some mistakes have been made because decisions have been made without knowing all the facts in the situation. I refer to the so-called tax reform bill which seems now to have virtually slowed down oil and gas exploration.

How are we going to avoid these kinds of mistakes, if they are mistakes, in the future?

Mr. JONES. Well, sir, I see nothing wrong with having a mechanism for continuous study of these matters. Looking back over the past several years, it seems to me that a greater problem is a mechanism for forcing decisions on these matters, because we can look back and see repeatedly instances where a vast amount of information is available and yet we can never get a decision on them. I think the FPC natural gas matter is a good example.

Senator BELLMON. Perhaps one reason the decisions are slow to come is that a lot of the information seems to come from prejudiced sources. I am frankly appalled at the difference in viewpoint between Members of Congress who represent the consumer States as opposed to those who represent the producer States. Yet the interests are not that different.

It is not going to help the consumer States if we finally run out of energy in this country and we are certainly heading in that direction. I am curious to know if there is not some way to help all Members of

Congress as well as others in a decisionmaking position in the Government to have a more complete knowledge as to what the true facts in the situation are.

I hope that this will help us get to that point.

Mr. Jones, thank you for your testimony.

Mr. JONES. Thank you.

(Mr. Jones prepared statement follows:)

STATEMENT OF L. DAN JONES, GENERAL COUNSEL, INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA

My name is L. Dan Jones. I am General Counsel of the Independent Petroleum Association of America which is a national trade association representing independent producers of crude oil and natural gas, including land and royalty owners in all producing areas of the United States.

I appear in support of S. Res. 45.

We believe that there are a number of areas in which government policies need new and firm direction if the nation is to avoid a fuel and energy crisis.

It appears to us that this situation calls for Congress to inject itself into the fuel and energy crisis on a more direct and active basis; and that it should first and especially focus on bringing about policy decisions that have been avoided too long already. Further delay, in our opinion, will seriously jeopardize national security and be very costly, in terms of unreasonable prices, to the consumers of petroleum (oil and natural gas) and the economy in general.

The anticipated growth in the demand for fuel and energy imposes a responsibility on both the petroleum industry and the Federal Government. The government is involved because it exercises such a dominating influence over the climate that will prevail. By 1980, requirements for petroleum are expected to be 50 percent greater than today and within 15 years or so more than double. If these future requirements are to be met, our exploration and development effort for oil and gas must be expanded accordingly. The declining trends of the past years will have been reversed.

At present, the petroleum industry is investing in the order of \$5 billion annually in exploration and development activity aimed at finding new reserves of oil and natural gas and we are not keeping pace with the increase in consumption. If we are to increase our capacity sufficiently to keep pace with our growing needs, this expenditure must be increased very soon to some \$8 to \$10 billion or more per year.

There is strong evidence that under the present climate, especially in the area that is dominated by the Federal Government, these increased funds will not be forthcoming. If a crisis is to be avoided there is need to improve this climate. To do so will require the modification of governmental policies which for the past few years have discouraged investment in exploration and development activities and have caused the petroleum industry to lose confidence.

For these reasons we welcome the study authorized by S. Res. 45 and endorse its adoption.

PRIORITY CONSIDERATIONS

We do wish to emphasize the importance of the time element and to point out that in our opinion there are certain matters which deserve immediate attention by Congress and should not be deferred pending the study. These matters are:

1. Increased prices for new sales of natural gas

On June 17, 1970, the Federal Power Commission on its own initiative, in recognition of the inadequacy of prices it had previously established, proposed to adjust the prices for new sales of natural gas. Shortly thereafter the FPC Staff recommended that such prices be substantially increased above present prices.

2. Exemption of small producers

On July 30, 1970, the FPC, again on its own motion, proposed to exempt small producers from regulation.

Both of these proposals by FPC were for the stated purpose of encouraging exploration and development of natural gas reserves.

Now—some eight months later the gas supply situation has worsened—yet FPC has not acted.

For 17 years—since 1954—the FPC has regulated producers and no subject has been so continuously, thoroughly and endlessly studied.

There is no need or justification for further study. There is need for action.

3. Limitation on Eastern Hemisphere imports

Imports from the Eastern Hemisphere in 1969, the latest year for which data is available, averaged more than 750,000 barrels daily—equal to more than 5% of U.S. consumption. New refinery facilities now coming on stream have been built to utilize Eastern Hemisphere crude with the output to be imported into the United States. This use of Eastern Hemisphere oil will therefore substantially increase unless prohibited.

Under present policies we are slipping gradually into more and more dependency on Eastern Hemisphere sources; and there is no need or reason to do so.

A Department of Interior report in 1968 shows that there are vast provinces within the United States favorable to future discovery and development of petroleum products to meet our needs for decades to come. Vast resources of oil shale provided further assurance that we need not become dependent on insecure foreign sources. A further assurance is found in the large reserves of coal which are available for synthetic oil or gaseous products when economic conditions are favorable. The physical energy resource base is more than adequate to meet our needs.

In addition, the U.S. consumer would be better served because the average combined price of crude oil and natural gas produced in the U.S. is about \$2.00 per barrel, converting gas to barrels on the basis of Btu content. This is lower than the lowest cost foreign oil imported from any source and greatly lower than imported liquefied natural gas.

In regard to this matter, it is pertinent to point out that the very thorough report of the Cabinet Task Force on Oil Import Control, issued a year ago, recognized the danger of increasing dependency on Eastern Hemisphere and recommended that such imports be limited.

The subject of oil imports and the dangers of dependence on Eastern Hemisphere sources has been under continuous study and surveillance by the Government since 1956. Many special reports are on file. Also many comprehensive studies have been conducted by various congressional committees.

Even more timely—the experiences of the past year with the disruptions and threats of disruptions of Eastern Hemisphere oil, and the accompanying increases in tanker rates—gives us a lesson which needs no further analysis or review.

Again there is no need for further study. There is a need for action to firmly limit U.S. dependence on Eastern Hemisphere oil.

4. Increased incentives for exploration and development

The crux of the problem of declining reserves of both oil and natural gas versus growing consumption is an increase in exploratory drilling. Last year such drilling declined 12 percent following a steady decline for many years. To reverse this trend will require increased incentives. Such incentives could be provided through improvement in the tax treatment of the producing industry and more particularly the treatment of expenditures for exploration and development.

In conclusion, it is urged that the Committee give priority consideration to these matters which require judgment decisions but do not appear to require any further in-depth study.

Senator BELLMON. It is my understanding that Mr. Tupling, who was to represent the Sierra Club, has already filed his statement for the record.

(Mr. Tupling's statement was not supplied in time to be included in the record.)

Senator BELLMON. Call the director of the Government Relations and Services, American Gas Association, Mr. G. H. Lawrence.

Is Mr. Lawrence present?

(No response.)

Senator BELLMON. If Mr. Lawrence appears or submits a statement for the record, it will be accepted.

(Subsequent to the hearing Mr. Lawrence submitted the following statement.)

AMERICAN GAS ASSOCIATION, INC.,
February 25, 1971.

Senator HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your letter of February 22 inviting my views regarding S. Res. 45 which authorizes a study of national fuels and energy policy.

The American Gas Association, Inc. (A.G.A.) is comprised of 345 member companies, including 254 gas distribution companies, 60 gas and electric distribution companies, 31 gas transmission companies and several thousand individual members. Some 42 million homes, businesses and industrial facilities in all 50 states are served with gas. The distribution companies in A.G.A. serve 92% of these customers which include some 145,000,000 of our population. Therefore, A.G.A. has a vital interest in the study authorized by S. Res. 45.

A.G.A.'s concern with the growing problem of natural gas supply was first expressed in a letter from our Association President to the Federal Power Commission on December 16, 1968. Since that time, A.G.A. has submitted testimony before several committees of the Senate and House of Representatives documenting the reasons for this concern and recommending various solutions. A statement was also submitted to the Cabinet level Oil Import Task Force. Last July, in hearings by the Department of the Interior on possible gas and oil leases on the Outer Continental Shelf, Offshore Western Louisiana, the President of A.G.A. submitted testimony which outlined the growing gas supply problem and the need for solutions which would benefit the overall national interest.

As to the issues which presumably would be considered by the study authorized by S. Res. 45, A.G.A. is especially interested in supplementing domestic natural gas supplies by overland pipeline from Canada and the Arctic areas of Alaska, by importing LNG from both Alaskan and foreign sources, and by a greatly accelerated research program to confirm the commercial feasibility of coal gasification to enable the nation's vast coal reserves to be made available to energy consumers in a manner most compatible with environmental and aesthetic considerations. A.G.A. and its members are also interested in the stimulation of natural gas productivity by nuclear fracturing of extremely tight formations.

A.G.A. has repeatedly stated, however, that the most timely and expeditious solution to our gas supply problems lies with the development, to the maximum extent feasible, of our potential domestic natural gas reserves which are indeed considered to be substantial. To accomplish this there are three steps that are believed essential:

- (1) More public land lease sales on a regular basis;
- (2) Incentive field price levels set by the Federal Power Commission; and
- (3) Legislation which will assure producers that they can in fact receive these prices once FPC approval of their contract is obtained.

Thus our abiding interest in the subject matter of the study to be authorized by S. Res. 45 is a matter of public record and we would certainly cooperate in every way possible in the conduct of the proposed study. To this end, A.G.A. has through the years collected extensive data on the production, transmission, distribution and marketing of natural gas and various other aspects of the operation of natural gas utilities. Each year the data is published in a book entitled GAS FACTS, a copy of which is enclosed for your information. We would be happy to provide for use in the study all such data and information we have available. In this regard, we feel that for a study such as that authorized by S. Res. 45 to be effective, every consideration must be given to the vast amounts of experience and information private industry has accumulated in the area of energy resources. Also, while we could fully expect the study to probe all aspects of government and private activities related to energy supply, we hope that because of the urgency of the energy supply situation—and particularly that of gas supply—the conduct of the study will not inhibit present government and industry efforts to implement certain immediate solutions to the supply problems.

Again, Mr. Chairman, we appreciate very much the invitation to comment regarding S. Res. 45. Please be assured of our full cooperation in the conduct of the proposed study. It would be appreciated if these comments could be made part of the record of the hearings on the resolution.

Very truly yours,

GEORGE H. LAWRENCE.

(The book *Gas Facts* referred to by Mr. Lawrence is in the committee files.)

Senator BELLMON. Next we call the president of the Power Systems, Westinghouse Electric Corp., Mr. John Simpson.

STATEMENT OF JOHN W. SIMPSON, PRESIDENT, POWER SYSTEMS CO., WESTINGHOUSE ELECTRIC CORP.

Mr. SIMPSON. Mr. Chairman, I am John W. Simpson, president, Power Systems Co., Westinghouse Electric Corp. I appreciate the opportunity the committee has afforded me to be here today at a hearing on Senate Resolution 45. I strongly support this resolution. The proposed study of fuels and energy covers matters which I believe are of paramount concern to our Nation, now and for decades to come.

As you can see from my biography, I am an engineer by training. My career has been dedicated to the development and delivery of electrical energy. My work in nuclear energy dates from the early efforts on its use in marine propulsion and power generation. I was in charge for Westinghouse of the design and construction of the nuclear propulsion plant for the U.S.S. *Nautilus*, the world's first nuclear submarine. I headed the team that designed and built the pressurized water reactor for the world's first full-scale nuclear powerplant, still in operation at Shippingport, Pa.

We have come a long way in nuclear power since those early days. In the United States at the start of this year, 20 nuclear powerplants were in operation with capacity of 7,500 megawatts of electricity; 53 more nuclear powerplants under construction, with 44,000 megawatts—equivalent to 22 Grand Coulees; 36 nuclear plants planned—with reactors ordered—to provide 35,500 megawatts of electricity.

A Federal Power Commission staff analysis of the anticipated relative use of various fuels to be converted to electric energy by electric utilities during the 1970-90 period predicted the nuclear share would rise from 5 percent in 1970 to 32 percent in 1980 and to more than 55 percent by 1990.

Permit me to sketch briefly the outlook, as I see it, for electric power needs of the country in the decades ahead.

First, there is a natural growth of our population. The additional people will need more homes, schools, hospitals, and jobs, all requiring more electric power. Meanwhile, our standard of living generally will continue to improve, with even greater reliance on electricity to enhance the quality of our lives through labor and timesaving devices. An abundant and economical supply of energy could have a particularly significant effect on improving the lifestyle of the disadvantaged.

By 1985, it has been projected that average annual residential consumption of electricity will be $4\frac{1}{2}$ times that of 1960.

In this decade, industrial use of electricity will double, on top of a 70-percent increase in the past 10 years. New processes such as electron beam welding, ultrasonic cleaning, induction heating, computerized process controls, and electric arc furnaces are contributing factors.

New technology to control pollution and to treat wastes will also increase industrial demand for electric power. It is estimated that about \$30 billion will have to be spent in the next 5 years on new sewage treatment facilities to clean up water pollution. Enormous

amounts of electric power will be needed for that and for recycling of waste materials. And, of course, the availability and cost of electricity have a direct effect on the production of all products from consumer items to heavy industrial equipment.

Increased amounts of electricity will be needed for farm production—for such things as poultry production, sprinkler irrigation, and crop drying.

Use of electric power will be able to revolutionize our modes of transportation and simultaneously cut back on air pollution.

The task ahead is this: Between now and 1990, utilities will need some \$350 billion to finance new plants and equipment. During the next two decades, the industry will need to build and install about 1 million megawatts of new capacity. This breaks down to about 40 new hydroelectric installations of 100 megawatts or more, approximately 50 new pumped storage hydroelectric installations of 300 megawatts or more, and about 90 fossil and 165 nuclear powerplants.

And what about fuel for the expansion between now and 1990?

Last year the energy crisis emerged. Blackout and brownout were caused primarily by lack of sufficient generating equipment; but at the same time, we awoke to the fact that we can no longer count on fossil fuels to provide limitless, low-cost energy for our power-generating plants.

Natural gas is not available for much additional electric power generation.

Because of complex problems, better known to this committee than to me, coal—even though abundant as a resource—is and will be in short supply. Its cost has soared and continues to rise, and there are no quick solutions to air pollution from high sulfur coal.

Because of pollution control, we have become more dependent on foreign residual oil; and this committee is well aware of the problems demonstrated by the negotiations over Middle Eastern sources.

In both the short and long run, nuclear power provides most of the answers to our energy problems. In the short run, the introduction of nuclear power is beset by problems of a social and political nature rather than technical ones. For the long-range objective of limitless economic power, the development of breeder reactors, producing more fuel than they consume, still requires the solution of substantial technical problems.

Even if there were to be little or no additional demand for electricity, the proper management of fuel resources should have a high national priority and the role of Government is crucial.

The problem has many facets which are being studied and handled by numerous dedicated and highly competent Government agencies, but with frequently overlapping or even conflicting objectives. Clearly then, your proposed review of the fuel and energy situation is in order.

Much, if not all, of the future electrical energy requirements could be supplied by nuclear plants with a minimum of danger to man and his environment and at minimum cost. But nuclear energy cannot be the whole answer. Certainly in many situations fossil fuels will be chosen and prodigious quantities of gas, oil, and coal will have to be supplied, not only for new plants, but for many already in operation.

In addition, there will be an increased demand for fossil fuels by

chemical industries as well as demand for these fuels to meet other energy needs.

There are some important questions waiting to be answered regarding our energy resources and how we use them. How can we improve methods of burning fuels to improve efficiency and reduce the adverse effects on our environment?

How do we go about selecting the sites for new powerplants?

How can we improve the reliability of electric power systems?

The list of questions goes on. But this much is clear, we must have the best answers to these inquiries.

I am personally familiar with the profound effect which the Government has had in the development of nuclear energy. I cannot speak too highly of the dedication and foresight of the members of the Joint Committee on Atomic Energy and the Atomic Energy Commission. Their superlative record of foreseeing and seizing opportunities for promoting the welfare of the Nation in both war and peace is now a matter of history. With the same dedication, foresight, and initiative, the Government can and must act on an even broader scale. It is not an overstatement that our future depends upon it.

I am pleased to see that Senate Resolution 45 provides for participation in the proposed fuels and energy study by ranking Senate members of the Joint Committee on Atomic Energy and the ranking members of the Senate Commerce and Senate Public Works Committees. The membership is indicative of the broad interests involved. The matter is not one involving a single industry or a single fuel or form of energy. As the resolution itself states:

Adequate supplies of fuel and energy resources in all forms are essential to the continued welfare of the Nation, which includes national security, balanced growth, and safeguarding and enhancing the quality of environment.

I commend the committee and Senator Randolph as sponsors of the resolution for your foresight in seeking to undertake this broad inquiry on matters which affect virtually every facet of our national existence. A public discussion under your auspices by Government, industrial, and scientific experts on the problems, their solutions, and the Nation's expectations could prove to be a landmark in Government service, with beneficial results for decades to come.

I am confident the committee, and the Senate, will approve Senate Resolution 45. I hope to have the opportunity to return during your study to contribute to better congressional and public understanding of fuels and energy problems and to the formulation of a carefully considered, consistent national policy. The Nation will be grateful for the leadership which you here in the Senate are taking to meet one of the major challenges of our century.

Thank you, Mr. Chairman.

Senator BELLMON, Thank you, Mr. Simpson, I would like to congratulate you on a very fine statement, and also on the splendid career you have made in the energy field.

I have a couple of questions I would like to raise.

On page 2, you say it has been projected that by 1985 the average annual residential consumption of electricity will be two and a half times that of 1960. Do you mean that much per residence?

I am curious to know where we get such a big jump in residential consumption.

Mr. SIMPSON. That is a total, including the growth in population and the increased use per person as well as the growth in population.

Senator BELLMON. It seems to me that some of our energy projections may be simply extrapolating resident rises in energy demand.

A lot of this has come because of air conditioning and because of development of new appliances and increased affluence of our citizenry. I wonder if we can expect these kinds of increases indefinitely in the future?

Mr. SIMPSON. While I am not prepared with the exact figures, I can tell you how we in our company go about estimating the probable need for electrical power equipment.

We break down the uses of electricity to residential, commercial, and industrial. We then look at the growth in population; we look at the saturation of the market for air conditioners, for electric heating, for the various appliances. We project the new appliances and uses that might come along in the future and the time scale in which they would come along.

We project the use of electricity for transportation, for industrial uses, projecting by the number of kilowatts, for example used per dollar of production goods; the use of electricity in services. Then we add all of these up and come up with an overall projection. Then we balance that against what we see as projections by the Federal Power Commission and the Edison Electric Institute.

Then we go to each of the utilities in the various areas of the country and ask them what they believe that their growth will be in their load area and then we try to put all this together and come out with what we believe will be the total requirement. I think this is somewhat better than just a simple extrapolation.

Senator BELLMON. And this figure you have given here is the result of the kind of research that you have just described?

Mr. SIMPSON. Yes.

Senator BELLMON. I want also to compliment you for taking note of the importance of electricity and the need for additional electricity in agriculture. I think all of us tend to take our food abundance for granted; we do not realize the tremendous role that electricity plays in production of food and fiber and the fact that now one agricultural worker produces enough food and fiber for 50 people would not be possible if we did not have electrical energy to serve the agricultural industry.

Mr. SIMPSON. Yes, sir. And I feel particularly strongly that the disadvantaged people of this country must have their chance to have the good things that we enjoy. And if we who are in the higher economic brackets want to cut back on the total amount of energy, it sort of seems to me that it smacks a little bit, of, we have ourselves and we do not really care whether they get theirs or not.

I do not believe that is the mood of this country today.

Senator BELLMON. These figures you gave relating to the increase in residential energy consumption, do they anticipate elevating the energy level of some of our lower income citizens?

Mr. SIMPSON. Yes, sir.

Senator BELLMON. One other question.

You mention that the nuclear power provides most of the answers to our energy problems. Does this anticipate new sources of nuclear fuel, or how do you come to this conclusion?

Mr. SIMPSON. I believe that the total amount of uranium discovered, that which is in known reserves, that that will be discovered at the current rate of exploration, together with the fast breeder reactor which I believe will be developed on approximately the scale that the Atomic Energy Commission envisages, that there will be sufficient supplies of uranium available. The fast breeder will make almost limitless supplies of fuel material.

My remark goes to the fact that the industry is capable of producing the plant in the quantity that will be needed even if a larger percentage than is now envisaged were to be nuclear energy. I do not believe that everybody will turn to it, even though it were the cheapest and the best, for many and varied reasons, such as duplicating a plant at a given place, a utility has a plant sitting on top of a coal mine, and many other reasons. But I do believe that it would be possible and it certainly will be an important source of energy.

Senator BELLMON. You are not concerned that we will run out of nuclear fuel or atomic fuel the way we appear to be running out of oil and gas?

Mr. SIMPSON. Particularly not if we develop the fast breeder reactor. Then I believe, because we would multiply our ability to utilize uranium manifold, we would have enough uranium resources for many centuries.

Senator BELLMON. Realistically, when can we expect breeder reactors to become a commercial reality?

Mr. SIMPSON. I believe that there will be a few that will be commercially a reality in the mid-1980's. Those will probably be slightly more expensive in the cost of the overall power than the other reactors. By the late 1980's, they will begin coming in in very significant quantities, and in the 1990's, they will be a very major source of energy.

I believe that the light water reactors and the fossil fuels will also be used; the gas turbines will be used for the very peak of the low demand curve, where it is only used for a few hours or a few days a year, going on down to where the fast breeders will be the base load plant, the light water reactors the next step up the line, and the coal and oil plants the next up the line.

Senator BELLMON. Mr. Simpson, again I congratulate you on your statement and on the knowledge you have on the subject.

I see you volunteered to return when the study gets underway, and I am sure you will be called upon.

Thank you very much.

Mr. SIMPSON. Yes, sir; because I believe it is a very important study.

The CHAIRMAN. Is Mr. Edward Berlin, the representative of the Consumer Federation of America, present?

Mr. Berlin, you may read your statement or summarize it, whichever you prefer.

STATEMENT OF EDWARD BERLIN, CONSUMER FEDERATION OF AMERICA

Mr. BERLIN. Thank you, Mr. Chairman. It is quite short. I believe it would be better if I read it.

I am pleased to be able to appear this afternoon to present the views of the Consumer Federation of America on a resolution which is

addressed to the one problem area, perhaps more than any other, that is so in need of intensive study—the so-called fuels and energy crisis.

CFA is proud that it now includes within its membership 190 local, State, and National organizations whose members, in turn, number some 30 million Americans. We are, as our president, Oregon State Senator Don Willner, recently stated, “a coalition of many diverse groups united by the common principle of providing better representation for the consumer viewpoint at every level of our national life.” We welcome that diversity and regard it as a source of strength.

On occasions, there will be sharp differences among the views of our constituent organizations. When that is the case, CFA itself must temper its position. There is one issue, however, on which there has never been the slightest disagreement within the federation—the need for a sweeping, intensive review of the fuels and energy resource area, from the production to the consumption end. Indeed, no subject received greater attention in CFA’s statement of policy resolutions than did that of energy and natural resources.

Let there be no misunderstanding; Senate Resolution 45 deals with a consumer problem of the highest priority. Out of every consumer dollar, 7 cents is directly spent on the consumption of energy.

In addition, the consumer must bear the indirect cost of the fuel utilized in industrial, commercial, and governmental operations. Last year we witnessed an unprecedented rise in fuel prices with the cost of coal and residual fuel oil doubling and in some cases tripling. By the beginning of last year alone, the electric utility industry was pressing the State commissions for retail rate increases exceeding \$2 billion, and the natural gas producers were blackjacking the Federal Power Commission into more than a \$3.5 billion increase in the price of that fuel.

We are concerned that notwithstanding unprecedented price increases there is a fuel crisis in many parts of the country. We are concerned by the alarming concentration of control that has all but destroyed interfuel competition.

We are concerned by the Administration’s suggestion that the ownership of the Government’s uranium enrichment facilities be relinquished to the developing energy concentrations, thereby further exacerbating the control problem.

We are concerned by the failure of all segments of the electric power industry to join together in working out the best approach toward the resolution of regional and national power needs. We are concerned by the absence of meaningful research and development efforts by private industry.

For all these reasons, and for many others, we view the initiation of the study contemplated by Senate Resolution 45 essential and overdue. It is shameful that crucial executive and regulatory decisions are made in the absence of an intelligent, complete record. The stakes are too high to permit continuation of this cavalier approach.

No doubt we will hear it said that the study contemplated already has been initiated by the President. No doubt much work has indeed been undertaken by several executive departments and considerable information has been collected. But we can only recall the fact that information already collected has not been shared with the public, has not been made the subject of an open dialog—particularly where it is

inconsistent with the administration's view as to how our energy problems should be solved. The American public is entitled to full disclosure. It is entitled to know that the vital underlying economic and social issues were considered by a bipartisan forum, one that inspires full confidence.

It is for this reason that we endorse the suggestion that the study be sponsored by the Congress. We are concerned, however, about the enormity of the task that Senate Resolution 45 would impose upon the chairman and ranking minority members of four already overworked committees.

In our judgment, it would be preferable for Congress to establish a short-term independent legislative study commission bringing together experts representative of each essential area of input—the businessman, the consumer, the environmentalist. Freed of competing demands on their time and enjoying the prestige of the Congress, such a full-time, paid commission could quickly gather the crucial data and recommend a range of legislative and executive responses.

Needless to say, it is imperative to the success of this task that the study commission approach its responsibilities without any preconceived notions such as a disposition in favor of or against expanded oil imports.

With the study commission's findings as a foundation, it would then be highly appropriate to turn to a joint legislative committee, such as envisioned in Senate Resolution 45, to consider, by holding public hearings throughout the United States, the findings and recommendations of the study commission. In view of the obvious economic implications, we would recommend expansion of the legislative committee to include the leadership of the Joint Economic Committee, an expansion of the advisory panel to include consumer representatives.

If I could just digress for one moment to suggest that one area of study that we would hope would be looked into either by the study commission or by the Joint Committee should that approach be pursued would be the question of growth estimates. I noted that Senate Resolution 45 proceeds on the assumption that we will be witnessing a 200 percent increase in the growth of energy consumption by the year 2000. I think it would be highly appropriate for the Congress to consider in some depth the question of the direction we are going in in areas of energy consumption.

I was reminded of this by your comment, Senator Bellmon, in regard to Mr. Netschert's testimony about how the problems of urbanization themselves exacerbate the fuels crisis. I wonder if that is perhaps only one small piece of a great big pie representing a major problem. Perhaps it is highly appropriate and perhaps even overdue for us to give some consideration to the whole question of, are we building in the wrong kind of incentives and perhaps giving unwarranted stimulus to the wrong kinds of energy usages?

I can think offhand of one area that I would like to see studied and that is the question of whether or not retail and industrial and commercial electric rate schedules in fact are not themselves guilty of prejudicing the energy problem by stimulating what we might conclude to be less attractive areas of increased consumption.

We suggest that this two-step approach, the approach of the study commission—to be followed by the joint legislative committee—has.

the advantage of permitting the early completion of an intensive, broad-based study, while retaining to the Congress all of its legislative options.

Should the committee agree with this recommendation, we urge that it consider arming the study commission with subpoena authority. In the energy field, both the Congress and the public have been information starved. Perhaps in no other area is the credibility gap as great. If it is to be overcome, the study commission must have the authority to demand access to private and public records.

Thank you.

Senator BELLMON. Thank you, Mr. Berlin. I congratulate you on the fine statement and certainly agree with your feeling that both the Congress and the public have been starved for a review of accurate information regarding these critical energy questions and sometimes we have had to make decisions that probably would have been somewhat different had all the facts been known.

I want to raise a couple of questions.

You mentioned on page 2, the second paragraph, that there is a fuels crisis in many parts of the country. Has your work on this subject enabled you to have an opinion as to why we have these fuels crises?

Mr. BERLIN. Unfortunately, I perhaps suffer from the greatest information gap of all people appearing on both sides of this witness table. Therefore, I can only offer speculation and not hard facts.

It seemed to me from my exploration of the limited information that was available in the natural gas area, which is an area of concern to the Consumer Federation of America, that part of the problem was caused by a reluctance by the production industry to take full advantage of the reserves that they now have available to them. I think part of this stems from the fact that we have a rather unfortunate concentration of control of the fuels industry, where we see, of course, oil and gas under one ownership, and added to that coal and shale and uranium reserves.

I cannot help perhaps being a little suspicious of the fact that this concentration, coupled with the fact that there are an enormous number of levels in our Outer Continental Shelf that could be gas-producing, that makes me believe that perhaps the crisis is something that can be alleviated should the industry be desirous of applying itself with the vigor that I know it is capable of.

Senator BELLMON. Did you, in checking into the natural gas situation, compare the cost of the B.t.u., energy from natural gas to the cost of the B.t.u. from coal or crude oil or any other source?

Mr. BERLIN. I did not, no.

Senator Bellmon, it would have been difficult to make the comparison with the information that is now available. There obviously will have to be considerable additional costs ground into the production of coal. I for one would believe that part of the answer to the problem lies in the development of our immense coal reserves, perhaps our wealthiest in that area of any other natural resource areas, but of course, in order to take full advantage of that, we are going to have to grind in the costs of additional safety features having to do with production of coal as a result of congressional action that was taken by the last Congress.

And of course, we would have to be very concerned about the environmental implications of burning coal. So we are going to have to explore the costs of utilizing the technology that is available to certainly reduce the coal to low sulfur and even take steps beyond that to make it compatible with the environmental protection.

So I think again it is difficult at this stage to make that kind of comparison in view of the fact that I am not sure we have all of the underlying data available now.

Senator BELLMON. Let me say to you, and I am not trying to be critical, but I think you should know that, that the cost of B.t.u. of energy from natural gas is roughly 30 percent of the cost of the same amount of energy from any other source. If you do the things you are mentioning so far as providing better safety for coal miners and cleaning up the spoils of our strip mines and taking care of the emissions from smoke stacks and utilities that burn coal, certainly the cost of energy from coal is going to go up; in view of that, I wonder if you would have made the statement about how the natural gas producers would be blackjacking the Federal Power Commission in the rate increase.

It seems to me that natural gas, which is probably a source of less pollution than any other form of energy, with the possible exception of nuclear energy, with the tremendous sources in natural gas which still exist in the country, closing this cost gap might encourage the development of natural gas and get some of these shut-in wells you mentioned into production.

I am curious why a consumer group would oppose the upward adjustment of natural gas prices so that we would get more development of this energy source.

Mr. BERLIN. Senator Bellmon, we never took the position, and I can certainly supply for the committee's files the statement that CFA filed with the Federal Power Commission in the recent series of hearings on the question of natural gas price rises—we never took the position that the natural gas industry should be denied a fair rate of return.

Our position was simply that before the FPC determines what the appropriate price should be as to oil and natural gas production, it should have the benefit and the public should have the benefit and be able to contest and refute if necessary all of the costs for production that should be accredited to the price at the well head. Unfortunately, the course of procedure established by the FPC, in fact it went into rulemaking proceeding and did not depart from the former procedure of testing out the price setting.

It was our concern that we could not have full confidence that the prices being sought by the production industry necessarily reflected cost plus a fair rate of return.

We certainly have no desire to curtail the production of natural gas. I share with you 100 percent—I in fact believe that if we are to reap the full benefits of natural gas production, we have to do so in the next 20 years, because I suspect that beyond 1990, natural gas will lose its position of prominence in our fuel situation now and that we will develop methods of utilizing other sources of energy, whether it be coal or solar energy, and I think it imperative that we do everything necessary to stimulate natural gas production and consumption now.

The position of CFA is that not at all it should be retarded, but rather that price increase should be done only after production costs should be spread out on the open record. That is the only case in which we would do that, sir.

Senator BELLMON. I believe that you will find that the FPC procedures are rather exhaustive in trying to find out what the cases are. We cannot settle that today.

Senator Randolph is here and is the principal author of the legislation and may have some questions he would like to ask.

Senator Randolph?

Senator RANDOLPH. Mr. Chairman, I have no questions to ask of the witness. I have attempted during the day to read the statements which have been either given or filed by witnesses appearing before the committee. It was necessary that I be in other committees or I would have wanted to share with you and others of this committee the privilege of hearing the testimony that was presented. I kept in close contact, Mr. Chairman, with what you are doing today.

I am gratified at the breadth of outlook, the understanding of the witnesses as they come to help us in the resolution of their thinking in connection with this problem.

Thank you.

Senator BELLMON. Thank you.

Senator Randolph, you will be pleased to know that our witnesses are almost unanimous in support of your resolution and feel that you have rendered a great service by making this study not only possible but likely.

Senator RANDOLPH. Thank you.

Senator BELLMON. Thank you, Mr. Berlin, for your statement.

I understand there is a letter to be filed by the American Mining Congress.

(The letter referred to follows:)

AMERICAN MINING CONGRESS,
February 24, 1971.

HON. HENRY M. JACKSON,
*Chairman, Committee on Interior and Insular Affairs, U.S. Senate, New Senate
Office Building, Washington, D.C.*

DEAR MR. CHAIRMAN: The American Mining Congress endorses the objectives of S. Res. 45, a resolution that would authorize the Senate Interior Committee to undertake a study of national fuels and energy policy.

The American Mining Congress on September 27, 1970, adopted the following declaration of policy in regard to national fuels and energy policy:

In order to permit the various fuels industries to develop sound and viable plans to meet the nation's future energy requirements, the President should appoint a National Commission on Fuels and Energy to study and report on the energy resources and requirements of the nation with particular attention to (a) the projected energy needs for the next decade, with particular reference to electric power plants; (b) the fuels resources available or which must be developed to meet those needs; and (c) the existing policies and programs of the federal government or state and local governments which may have any significant impact on the availability or economic utilization of such fuels or resources and on the ability to meet the nation's energy needs and environmental requirements.

We feel that the study of national fuels and energy policy proposed to be undertaken by the Senate Interior Committee would accomplish the same objectives as contemplated under the bill to establish a National Commission on Fuels and Energy as introduced in the 91st Congress. The American Mining Congress enthusiastically supports the development of a congressional statement of national energy policy.

An energy crisis of enormous magnitude is facing the United States. Projections of future requirements indicate continued growth in energy demand as well as increased reliance on all types of fuels. For the nation to maintain its economic growth, it is essential that adequate and dependable energy sources be available.

The Committee's study would be the initial step in a long-overdue formulation of a realistic energy policy. The welfare of the U.S. depends on adequate supplies of fuel and energy resources, and the projected increase in consumption of these resources necessitates that these demands be met in an orderly manner.

Laws and regulations affecting fuels and energy policy are vital to development of these resources. The study authorized by S. Res. 45 could well result in more efficient formulation of government policy.

The problem of providing dependable and adequate energy sources for the nation's continued development is one of the most serious that we face today. A coordinated national policy is essential if these problems are to be dealt with effectively. There are many additional problems associated with energy policy and fuel supply, and all need detailed study.

We appreciate the opportunity to express our support for S. Res. 45 and urge its favorable consideration. The American Mining Congress pledges its complete cooperation with the Committee as it seeks to develop a congressional statement of national energy policy.

Sincerely,

J. ALLEN OVERTON, Jr.,
Executive Vice President.

Senator BELLMON. For others who may have statements they would like to file, the record will be left open for a period of 5 days so that if there are other statements or comments or submissions, we will be glad to receive them and have them printed and make certain that they get careful consideration by the committee in our study of this proposal.

If there are no further statements at this time, the hearing will be adjourned.

(Whereupon, at 3:15 p.m., the committee adjourned.)

The first part of the paper is devoted to a general discussion of the problem of the origin of life. It is shown that the problem is one of the most important and most difficult in the history of science. The author discusses the various theories of the origin of life, and shows that the most plausible is the theory of spontaneous generation. This theory is based on the fact that life is a complex of many different parts, and that these parts are all derived from a common ancestor. The author also discusses the possibility of life being introduced from elsewhere, and shows that this is also a possibility.

The second part of the paper is devoted to a discussion of the evolution of life. It is shown that life has evolved from simple to complex, and that this evolution has been the result of natural selection. The author discusses the various stages of evolution, and shows that the most important is the transition from simple to complex. This transition is the result of the fact that life is a complex of many different parts, and that these parts are all derived from a common ancestor.

The third part of the paper is devoted to a discussion of the future of life. It is shown that life is a complex of many different parts, and that these parts are all derived from a common ancestor. The author discusses the possibility of life being introduced from elsewhere, and shows that this is also a possibility.

APPENDIX

(Under authority previously granted, the following communications were ordered printed in the hearing record.)

WYMAN, BAUTZER, FINELL, ROTHMAN & KUCHEL,
Washington, D.C., March 2, 1971.

HON. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate,
Washington, D.C.

DEAR SENATOR JACKSON: I understand that the Interior Committee held a hearing on S. Res. 45 on February 25.

As you may know, my law firm represents the Pacific Lighting Companies which serve Los Angeles and the surrounding southern California area with natural gas. The Pacific Lighting Companies constitute the largest natural gas distribution system in the United States on the basis of the number of meters served. Pacific Lighting serves a population of more than 10 million persons directly and, in addition, provides wholesale service for part of the requirements of the Municipal Gas Department of the City of Long Beach and all the gas supplies to the San Diego Gas and Electric Company serving San Diego. Like other gas utilities, Pacific Lighting faces a shortage of natural gas as the needs of the communities which it serves expand beyond presently available sources of supply.

Alaska, with large natural gas supplies available in its southern Cook Inlet area, is, geographically, a logical source of supply of liquefied natural gas (LNG) to the west coast and Hawaii. However, the national maritime policy embodied in the Jones Act (46 U.S.C. § 883) that water-borne commerce between United States ports be carried solely by U.S. built ships, has, by reason of the substantially added cost factor occasioned thereby, thus far placed Alaskan LNG beyond the reach of gas consumers on the west coast, in the Lower 48 states generally and in the State of Hawaii. By reason of the present operation of the national maritime policy, a substantial obstacle exists discouraging the availability of Alaskan LNG to areas in the United States that should, all other factors considered, be its most logical outlet. It is anomalous that Alaskan LNG has had to be developed as an item of foreign, rather than domestic, commerce at a time of increasing shortages at home. To heighten the anomaly, at the same time that east coast natural gas suppliers are importing liquefied natural gas from north Africa, Alaskan natural gas is not only moving to Japan; it has even been sold for use in Spain.

I have read with great interest the Review of Energy Issues in the 91st Congress, prepared at your request by Harry Perry of the Library of Congress, and your memorandum of transmittal which highlights the institutional conflicts and inconsistent policy directives which characterize the Nation's "de facto" approach to energy policy-making. To those inconsistencies of policy which you list might well be added the situation where a number of federal agencies encourage the search and development of natural gas from domestic sources under a variety of federal laws, while other federal laws discourage other states from access to what could be a major new domestic supply from one of our states.

Under the able chairmanship of Senator Frank Moss of Utah the Subcommittee on Minerals, Materials and Fuels, held hearings in mid-November 1969 on the gas supply situation. At that time, I presented the enclosed statement on the problem of making Alaskan natural gas available to consumers in the Lower 48.

As pointed out in my statement of November 12, 1969, the cure for this problem does not necessarily require repeal or suspension of the Jones Act, although that is certainly an alternative solution. If it is wise national policy to retain the requirement that cargo between U.S. ports be carried in U.S. bottoms in order to help assure an effective available merchant marine in times of national emergency, then it seems to me that consideration might well be given to making the cost of that policy a national cost rather than leaving it as a burden to be borne almost

entirely by the economy of Alaska and, because they must make up the deficit in gas supply at much higher costs than would otherwise be the case, by the gas consumer of southern California and Hawaii. You will recall, I am sure, that in the analogous case of the deficiency in Colorado River water supply occasioned by the Mexican Water Treaty of 1944, the Senate Interior Committee, under your leadership, recommended and Congress declared the cost of making up that deficiency to be a national responsibility, to be met by the federal government, rather than the responsibility of the seven Colorado River basin states. I refer to section 202 of P.L. 90-537, the "Colorado River Basin Project Act of 1968".

May I, therefore, most respectfully recommend, in the event S. Res. 45 is adopted, that as one of the first items of inquiry there be explored the relationship between the Jones Act and the availability of Alaskan natural gas to users in southern California, the west coast generally and in Hawaii.

Sincerely yours,

THOMAS H. KUCHEL.

STATEMENT OF SHELL OIL COMPANY

Shell Oil Company Agrees with the Purpose of the Resolution

Senate Resolution 45 authorizes a study of national fuels and energy policy by the Senate Interior Committee, with the cooperation and assistance of the Senate Committees on Commerce and Public Works, and of the Joint Committee on Atomic Energy. Shell Oil Company agrees that such a study is desirable at this time.

We recognize that the study authorized by the Resolution will be an extensive one. Topics to be examined range from present and future United States energy reserves; the size of present and future United States energy demand; the effect of energy use on the environment; the structure of United States energy industries; the proper development of facilities for the distribution, transportation, or transmission of fuel and energy; the adequacy of manpower and other plant construction abilities; and present and future United States energy policies. Shell Oil Company believes that the kind of understanding that would flow from such a study is essential, if the United States is to enjoy the type of growth and continued well being its people have become accustomed to. Thus, we expect that such a study will serve to correct many of the misapprehensions shared about the part energy now plays in our society and will play in the future and that it will assist the suppliers of energy to plan well for the satisfaction of growing future needs.

For these reasons, Shell Oil Company supports the purpose of Senate Resolution 45 and looks forward to participating in the projected investigation.

The Present Policy Crisis

In particular, Shell Oil Company believes that a study is timely because of the prominence energy and environmental needs have attained in the last year. The world tanker shortage, the ecological debate, delays in construction of an Alaskan crude oil pipeline, the OPEC discussions, and last winter's anticipated fuel shortage have made the nation far more aware of domestic energy problems than in the past. By the end of 1970, the term "energy crisis" was being used widely in connection with such events as expected New England furnace oil shortages, brown-outs and black-outs on the East Coast, last Fall's national rail strike, and the diminishing United States supply of natural gas.

On the supply side, there are many sources of energy available to the United States. In the case of oil, even with production coming on from Alaska's North Slope, the rate of crude oil production in the United States is not expected significantly to exceed current rates, unless price increases occur which are substantial enough to permit a satisfactory rate of return to be obtained on a higher level of exploration and production investment.

Furthermore, in the case of natural gas, it is significant that in 1968, for the first time, proved reserves showed a decline in the United States, reflecting the fact that consumption that year exceeded the amount of new reserves discovered. Here, once again, improved returns are essential to the development of new reserves. But even with added inducement a considerable part of the large increased demand in future years will very likely have to be met from Canada (to the extent that Canada has an exportable surplus) and from other foreign sources.

With regard to coal, however, vast reserves exist in the United States, but a combination of factors has held back the industry's growth.

Similarly, atomic energy, which may well hold the key to longer-term future basic supply, has not developed as rapidly as expected. A variety of problems has thwarted the predictions of the Atomic Energy Commission, and other sources, that many plants would be in use by now.

By comparison with other sources of energy, the problems facing hydroelectric power are relatively less complex. Even though hydroelectric power is a stable and low-cost source of energy, it will be able to contribute little to the surging demands of the future largely because further growth in the United States is limited by the fact that few sites remain for the big dams that produce hydropower cheaply.

There are other potential sources of energy for the future that, to date, have been largely untapped. They include oil shale, coal and tar sands. We call these sources "unconventional" or "synthetic" raw materials because they are resources other than crude oil from which "oil" products could be made. Tremendous deposits of these resources exist in North America—enough to supply all our oil requirements. It is unlikely that they will play a major energy role in the 1970s, however, for reasons economic and technological. The United States Government and several private companies have operated shale oil pilot plants off and on for many years, but they cannot yet produce fuels from unconventional sources that can compete with fuels from lower-cost domestic crude at present prices. And even if the problems in economics and technology should be solved in the near future, it would still take several years for processes to be perfected and efficient plants to be built.

On the demand side, government and industry forecasts show us a future of sharply rising demands for energy, both in the United States and abroad, in the face of dwindling supplies of oil and natural gas. The apparently inexhaustible reserves of foreign crude oil are rapidly becoming both finite and expensive. At the same time, laws and regulations requiring clean air in our cities are denying those cities' power plants the sulfur-containing coal and oil they have traditionally burned. The nuclear power plants on which we so confidently relied to meet the demands of the last third of the twentieth century have been slow to materialize.

We, therefore, find the nation confronted with the paradox of having both ample raw materials and the technology to use them, but an inability to transform those raw materials into light, heat, and transportation. We, therefore, submit that instead of an "energy crisis", it might better be said that the United States is facing important and serious energy supply problems—both short-term and long-range. These problems arise from a variety of fundamental causes and, thus, cannot be solved quickly and simply. This country is in the process of recognizing that the energy policies that evolved during the past for regulating coal mining, natural gas transmission, crude oil production, and atomic energy development are no longer adequate for United States needs in the future. The policies that exist today are the products of times of vast cheap oil and gas reserves, coal-burning utilities, rudimentary atomic energy, and environmental unconcern. But those times have passed, and we are all finding that the world has changed faster than we expected. Some of the policies of the past, which gave us the security, prosperity, and high living standard we enjoy today, may well be beginning to fail us; it is becoming clear that not all of these policies will be adequate for tomorrow. Thus, we believe, it might be said that it is not an energy crisis, but rather a policy crisis which is upon us. If the policy problems are not properly resolved, the real "energy crisis" will surely follow.

The Nation Must Formulate a New Energy Policy

Shell Oil Company recognizes the need for such a study as Senate Resolution 45 authorizes. The energy policy problem is far from a simple one; it extends into all sectors of our society and, directly or indirectly, affects *every* citizen. But the understanding of the issues involved in the energy policy crisis, and the achievement of the means to resolve those issues, are not easily come by. Present public policies regarding energy are fragmented, inconsistent, and dispersed among many federal and state regulatory agencies. Other agencies set policy for the regulation of environmental conservation. A vast complex of domestic industries finds and produces fuels; another transports fuels and converts them to energy or energy products; and still another consumes energy. We believe that in the projected study, opportunities must exist for all of these important segments of our society to be heard fully and objectively.

Moreover, it is not yet evident what our national objectives regarding energy utilization will be, nor how national priorities for energy development will be set. The apparently conflicting requirements of national security, national prosperity, national environmental conservation, manpower utilization and land

use must be reconciled. The nation must consider what degree of national energy sufficiency we wish to maintain, and what fuels we elect to buy from or sell to the rest of the world. We must decide how best to use our domestic energy resources while preserving our air, water, and landscape. We must determine how much of our national product we commit to development of fuels and energy, and how to allocate that capital and labor among competing items.

Now Is the Time To Formulate National Energy Policy

For these reasons, Shell Oil Company believes that a study of the type authorized by Senate Resolution 45 is necessary, and that this year is none too soon to initiate it. The study, and the hearings undertaken in its course, will help inform the Congress on the critical role played by fuels and energy in American society. Moreover, the hearings will help inform the American public about where its energy comes from, how much it costs to provide it, what happens when that energy is used, and how we must plan now for future use.

We believe that it is vital at this time that such information be provided to Congress and to the public. Only with the aid of that information can the nation proceed with the necessary business of forming the national fuels and energy policy which it so urgently requires.

STATEMENT OF NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. Chairman and members of the committee:

My name is Charles A. Robinson, Jr. I am Staff Counsel to the General Manager of the National Rural Electric Cooperative Association (NRECA). NRECA is the national service organization of REA-financed, consumer-owned electric systems which deliver retail electricity to some 24 million people in the rural areas of 46 states. More than 94% of all such systems are members of NRECA.

NRECA wholeheartedly supports early adoption of S. Res. 45 which would authorize the Senate Committee on Interior and Insular Affairs to conduct a study of national policy on fuels and energy. Our membership is strongly committed to the premise that the United States, as a nation, must continue to develop whatever energy resources are necessary to power an expanding economy, and that we must achieve this objective without destroying the life sustaining qualities of our environment. U.S. population is expanding, and all of our people, old and young alike, continue to demand an ever improving standard of living. Under such circumstances, any major loss of momentum in the nation's economic growth, such as would result from substantial cutbacks in energy availability is wholly unacceptable. A pristine environment coupled with ruinous inflation is no more acceptable than abundant energy coupled with a poisoned environment.

The NRECA membership is most especially concerned and apprehensive over the present high cost and scarcity of fossil fuels used in the generation of electric power. In some cases, the wholesale cost of coal purchased by REA-financed generating stations has risen 100% during the past year. We recognize the desirability for fuel producers and processors to earn a fair profit. We also understand that new safety legislation and environment protection requirements impose added costs on these industries. It is apparent, moreover, that to an increasing degree the business of gathering and processing raw energy materials—coal, oil and gas—is a venture in which very large investments of capital are required over extended periods of time. It logically follows that to attract such investment, there must be reasonable assurance of adequate profit return and amortization of principal.

It follows, also with good logic, however, that these large capital investment requirements restrict the entrance of new entrepreneurs into the fuel industries and thereby create at least the opportunity for the manipulation of the prices and levels of availability at which coal, oil and gas are sold. The energy extraction and processing industries, therefore, are not ones which can be validly analyzed in the framework of "free competition".

Moreover, we respectfully direct the Committee's attention to the fact that petroleum production controls (pro-rationing) and restrictions on petroleum imports are devices susceptible of abuse designed to raise prices. The coal industry, of course, does not operate within any such set of controls. However, many of the very large coal companies which account for a substantial portion of total national coal production have been acquired by or merged with major integrated petroleum corporations or other energy oriented industries.

According to a recent study by National Economic Research Associates all of the 25 largest oil companies are in natural gas; 18 of them have positions in oil shale, 11 have positions in coal, 18 are in uranium and 7 are in tar sands. Four of the largest 15 coal companies are oil company subsidiaries. In addition, Humble and Kerr McGee are in the coal business via reserve acquisitions. Nine of the largest oil companies each also have holdings in all other major fuel materials; coal, gas, oil shale and uranium. We understand that with petroleum supplies scheduled to run out in a few hundred years, these corporations desire to acquire coal reserves in order to protect their future course of bituminous raw material. We also suggest, however, that this massive concentration of corporate control over our energy base, when coupled with already existing petroleum import and production restrictions and with the financial hurdles which protect the industry against additional competitors, establishes a situation which, if not carefully regulated, will almost certainly lead to abuses.

Very few people object to paying a price for any goods or service which includes a fair profit. At present, however, the general public doesn't really know whether fuel prices reflect a fair profit or represent some higher order of income to producers. In short, there is a growing lack of public confidence in the integrity of fuel industry pricing.

We respectfully suggest, therefore, that any and all studies performed pursuant to S. Res. 45, include at every step of their conduct professional representation of the consumer point of view and the views of consuming states. Such consumer representation would lend validity to the work of the study groups, and help to achieve public acceptance of the policy recommendations which S. Res. 45 seeks to formulate.

There also exists a critical need to reexamine the magnitude and direction of our national goals as to fuels and energy and Federal participation in research designed to meet these goals; i.e. which way should we go and at what speed? Most experts agree that the breeder-reactor must be brought to commercial feasibility by the mid-1980s, but there is little agreement on how many prototypes should be undertaken, what portion of total cost should be defrayed by the Government or precisely what time schedule should be established as the objective.

Except for nuclear power, coal, with known reserves of about 1,000 years, is our only presently feasible long term energy resource. However, much of our coal is too high in sulfur to meet new power plant emission standards. We must, therefore, find the answers to large scale desulfurization of the raw material, and removal of sulfur oxides from stack gas. We must also develop practical application of magnetohydrodynamic techniques to improve the coal fired steam station cycle, and processes by which to economically extract gas, liquid fuels and lubricants from coal.

Our people also believe that the role of hydroelectric power should be reappraised in view of its capability to produce electricity without the rejection to the environment of either heat, particulate matter, or carbon or sulfur oxides. Only about 25% of U.S. hydro capacity is presently developed. Hydroelectric power is especially valuable for meeting peak loads on large interconnected systems, and, so used, will not adversely affect the economics of the fossil or nuclear fuel industries to any significant degree.

Most particularly we strongly urge that any implementation of S. Res. 45 include a thoroughgoing, complete and comprehensive review of the extraordinarily restrictive criteria currently used by the Corps of Engineers, Department of the Interior, and Water Resources Council, in evaluating Federal hydro projects and marketing the power from such projects. There seems to exist an almost purposeful administrative reluctance against modernizing these criteria and the procedures utilized in their application.

We suggest, moreover, that as the additional cost of building and operating coal, oil, gas and nuclear powered generating stations increases to comply with new environmental protection laws, many hydro projects previously deemed not feasible will become much more attractive and should be reevaluated.

There is also much work to be accomplished in formulating and coordinating national policies that will assure timely development and commercial availability of geothermal energy, fuels extracted from oil shale, controlled fusion, underground transmission and other advanced concepts. All of these concepts, we strongly suggest, must be brought to fruition with some substantial consciousness for balancing economic benefits between consumer and producer.

Mr. Chairman, we very much appreciate this opportunity to present the views of the NRECA membership in support of this important legislation.

STATEMENT OF EDISON ELECTRIC INSTITUTE

MARCH 4, 1971.

The Edison Electric Institute is the national trade association of the investor-owned segment of the electric utility industry. The Institute includes 182 electric power companies serving 98 percent of all customers of the investor-owned segment of the electric power industry in the United States. These customers comprise 77 percent of our nation's customers for electricity.

We appreciate this opportunity to present this statement because Senate Resolution 45 is concerned with the cost and availability of fuel, the basic raw material of our business.

In 1969 the electric power industry in the United States used slightly more than 310 million tons of coal, 250 million barrels of oil, $3\frac{1}{2}$ trillion cubic feet of gas and 380 short tons of uranium ore to produce 82.7 percent of the 1.5 trillion kwhr of electric energy consumed by our nation. Hydraulic energy produced the other 17.3 percent of our electric needs.

In the next two decades we expect that the electric power requirements of this country will almost quadruple. The nation's economic well being will depend directly upon the ability of the electric power industry to meet these energy demands. It has been evident since the days of Thomas Edison that the conversion of raw fuels into clean, versatile electric energy has not only made production processes more efficient, but has made possible the development of entirely new industries, countless job opportunities and economic growth.

Not only will the continued use of electricity mean jobs but it also will mean a better environment. Increasing use of electricity is fundamental to solving some of the most serious environmental problems now facing the nation, such as sewage treatment, solid waste recycling, and transportation.

The expected quadrupling of electric energy during the next two decades for these economic, social and environmental benefits will require enormous quantities of fuel. We estimate that in the year 1990, the investor-owned electric power industry will require the equivalent of 37,000 trillion Btu's of primary energy. Increased quantities of all the basic fuels—fossil fuels and uranium—will be required. The proportions of each, and in fact the availability and acceptability of each, will depend upon such factors as environmental requirements, technological developments, costs, the extent or lack of competition between the basic fuels, the extent or lack of competition within the submarket for each basic fuel, and the policies and regulatory approaches of government at both the Federal and State levels.

Information on the effects of these factors that can be developed in the study proposed by your committee would be helpful.

In considering the scope of and organization for the proposed study, the Institute recommends that consideration be given to the following six points:

1. The direction of the study should be broad, not limited to a predetermined consideration of maximum utilization of domestic resources. Currently many electric power companies depend upon foreign sources of fuel because of environmental restraints and economic considerations. A competitive fuel industry is in the public interest and the availability of foreign sources of fuel can help to maintain competition. Admittedly, there are other important considerations, such as national security, that must be taken into account. But we do not believe the Congress will obtain a clear picture of the energy and fuel resource situation if there is a requirement that the study be biased against a possible energy resource, particularly when that energy resource currently is important to the electric power industry. Consideration should be given to the increasing world-wide demand for energy and the implications of such demands on national and foreign resources. The effects of governmental restrictions on imports and the consequences of an absence of restrictions on exports must be weighed.

2. The study should be performed by an independent research body. Many Federal agencies have regulatory and, in at least one instance, supplier responsibilities in various fuel and energy fields. In certain instances, several agencies have regulatory responsibilities in the same energy field. Thus, while it would be proper to utilize the services, information, facilities, and personnel of any of the departments or agencies of the Government, we believe the most effective study can be provided by an independent body.

3. The study must be carried out in the context of seeking a balance between the need for energy and the desire not to adversely effect the environment. The problem that many electric power companies face today is their inability to obtain fuel that will meet stringent, and sometimes changing environmental standards. In some cases these standards appear to have been promulgated without regard to resulting consequences or to the feasibility of compliance. It is essential that we use the large quantities of our domestic fuel resources which currently do not meet the air quality standards that are being promulgated. The study should take this into consideration, particularly that it will take time to develop the technology to make this possible.

4. The study should consider the broad spectrum of energy use and not concentrate on the need for, and use of, electric energy. It is our understanding that S. Res. 45 envisions a broad study.

5. The study should also consider the ultimate implications of any governmental policies recommended or currently existing on the rates of electric and gas utilities and on interfuels competition for sales to the consuming public. This would include consideration of whether or not such policies have created, or are likely to create, monopolistic conditions in the marketing of any basic fuel.

6. Representatives of the investor-owned electric utilities should be included on the advisory panel or panels because of the very large consumption of fossil and nuclear fuels by this industry.

The proposed study of fuel and energy is of vital interest to the nation's electric utility industry. The institute would be happy to assist in furthering the study in any possible way.

UNION CARBIDE CORP.,
Washington, D.C., March 5, 1971.

HON. HENRY JACKSON,
Chairman, Senate Interior Committee,
Washington, D.C.

DEAR SENATOR JACKSON: While we believe that a comprehensive study of national fuels and energy policy, as proposed in S. Res. 45 would be desirable, one aspect of the energy problem is of particular concern to Union Carbide. We believe that an investigation of fuels and energy policy should also include consideration of the non-energy uses of petroleum, coal and natural gas.

Our interest arises from our experiences with the Oil Import Program. The developments from 1954 to 1959 that led to the Oil Import Program clearly indicate that it developed from the impact of imports on domestic oil production and exploration. Non-energy uses of petroleum and the raw material needs of the petrochemical industry were never mentioned and apparently were never considered at the time.

But, as you know, one of the unintended effects of the Oil Import Program has been to put the domestic petrochemical industry at a competitive disadvantage, in terms of raw material costs, with overseas chemical manufacturers. U.S. petrochemical producers have, for several years, been seeking changes in the program to eliminate this disadvantage.

The domestic petrochemical industry consumes about 700,000 barrels of oil and natural gas liquids a day as feedstocks in the production of chemicals and plastics. While this use of oil as a raw material for chemical production is small in relation to the total U.S. petroleum demand of 14 million barrels per day, it is of critical importance to the \$20 billion petrochemical industry. Chemicals are also produced from both coal and natural gas.

The language of S. Res. 45, particularly the words "and other purposes", in lines 6 and 7 of page 4, appears to recognize the importance of the non-energy uses of petroleum, coal and natural gas. However, we believe it would be desirable and useful for the Committee's report on the bill to call attention to these non-energy uses of fuel and energy resources and to make it clear that they are to be considered in the course of the Committee's study.

Very truly yours,

MORSE G. DIAL, Jr.,
Regional vice president.

